



# **STATE COMMISSION ON MARITIME ACCIDENT INVESTIGATION**

## **FINAL REPORT 41/13**

**marine casualty**

**M/V ANNEMIEKE**

**and**

**M/V TAO HUA HAI**

**Collision of Annemieke and Tao Hua Hai  
during exit manoeuvres from the port of Świnoujście  
on 19 December 2013**

**February 2015**

The examination of a marine casualty of Annemieke and Tao Hua Hai was conducted under the State Commission on Maritime Accident Investigation Act of 31 August 2012 (The Journal of Law item 1068) as well as norms, standards and recommended procedures agreed within the International Maritime Organisation (IMO) and binding the Republic of Poland.

The objective of the investigation of a marine accident or incident under the above mentioned Act is to ascertain its causes and circumstances to prevent future accidents and incidents and improve the state of marine safety.

The State Commission on Maritime Accident Investigation does not determine liability nor apportion blame to persons involved in the marine accident or incident.

This report shall be inadmissible in any judicial or other proceedings whose purpose is to attribute blame or liability for the accident referred to in the report (Art. 40.2 of the State Commission on Maritime Accident Investigation Act).

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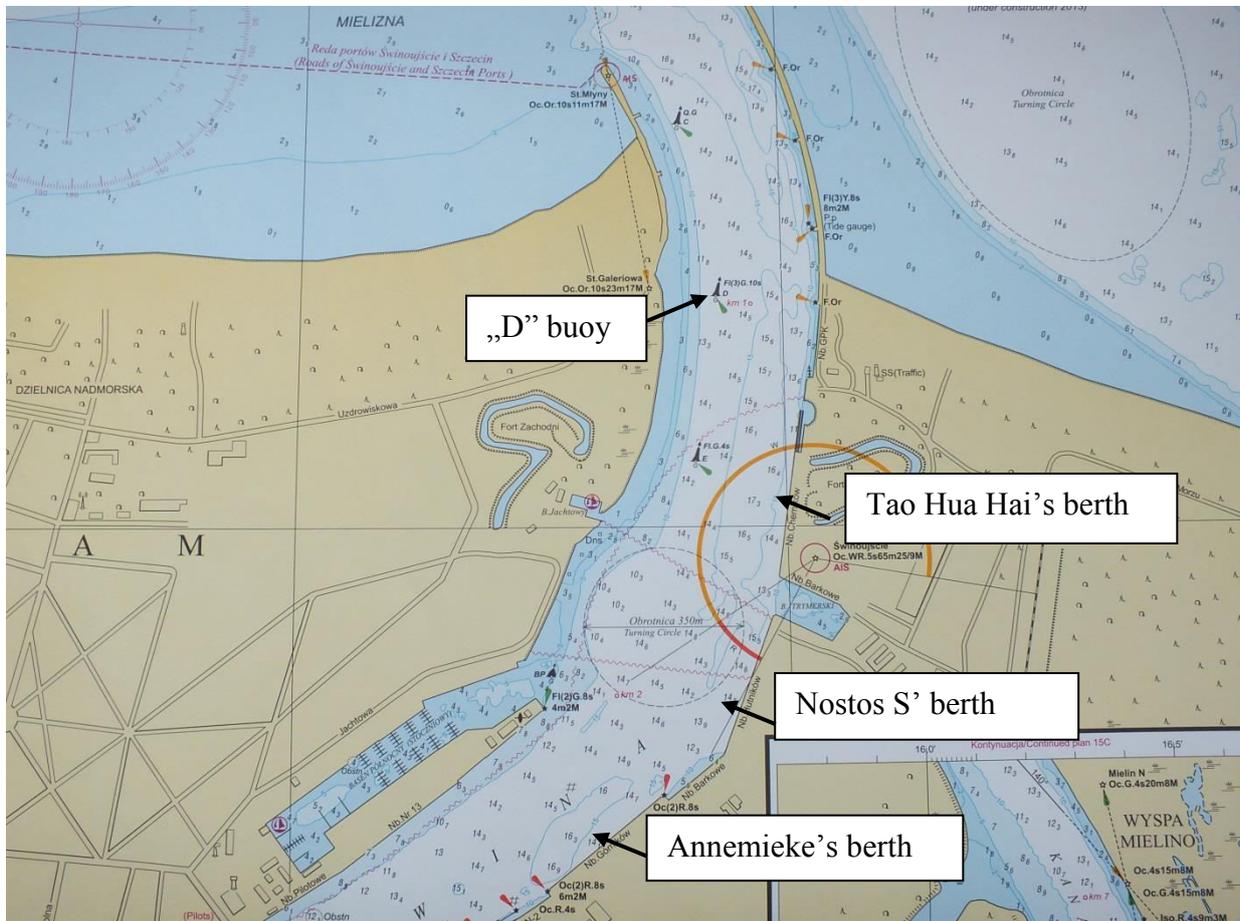
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## 1. Facts

On 19 December 19, 2013, at 22:50 the pilot of the vessel Annemieke mooring at the Górników Wharf in the port of Świnoujście, reported to the VTS operator that the vessel was ready to proceed to sea. The VTS operator allowed Annemieke to unmoor once the vessel Elizabeth K, sailing down the canal towards the port exit, had passed by.

At 22:51 the ferry Wawel, which after leaving the port was at the roadstead of Świnoujście, reported the accident of the passenger and the need to return to port.

During the unmooring manoeuvres of Annemieke, the VTS operator informed the pilot of a new situation on the fairway and informed him that Annemieke may pass by the ferry not before Wawel passed by the “D” buoy on the fairway.



Photograph 1: Section of the HOPN chart no 15C (the plan of the port of Świnoujście) with indicated berths of the vessels that participated in the event

At 22:55, after the vessel Elizabeth K had passed Annemieke, Annemieke unmoored. The pilot informed the captain that they should wait for the return of the ferry Wawel so the vessel was laying off at a distance of approx. 30-40 meters from the Górniczne Wharf.

At ca 23:11 a vessel Malta Cement proceeding to sea passed by the drifting Annemieke. Malta Cement was being followed by Celine at a distance of 6 cables. The pilot informed the captain that he could start manoeuvres. Annemieke started accelerating. The pilot was navigating the vessel between the eastern border of the fairway and the embankment.

At ca 22:14 Wawel passed the stern of Annemieke. After one and a half minutes Annemieke, going at a course of 023° at the speed of 8 knots, passed to starboard a vessel Nostos S mooring at the Hutników Wharf at a distance of ca 40 m. As advised by the pilot, the speed was increased. The bow thruster was working *full to port*, and the main rudder was set to the *midships* position.

Just before 22:17 Annemieke moving at the speed of 10.2 knots rubbed with her starboard side against the vessel Tao Hua Hai laying at the Chemików Wharf. As a result of the impact the ship's side and the elements of two hatches of the hold of Tao Hua Hai were damaged. At Annemieke the cantilever of the crane no 3 at the stern was damaged as well as starboard side fenders.

After Annemieke had passed Tao Hua Hai and decreased her speed, the pilot reported the accident to the VTS Świnoujście and directed the vessel to the anchorage at the roadstead of Świnoujście.

## 2. General Information

### 2.1. Ship Particulars

#### 2.1.1. M/v Annemieke

Flag:	Antigua & Barbuda
Shipowner:	SAL Heavy Lift GmbH, Hamburg, Germany
Classification society:	Germanischer Lloyd
Vessel's type:	General cargo vessel adapted to carry heavy items
Call signal:	V2EM
IMO number:	9147681
Gross tonnage (GT):	8388
Year of built:	1998
Power:	9450 kW

Width: 20,64 m  
 Length overall: 151,67 m  
 Hull material: steel  
 Minimum crew: 14 men  
 Type of the VDR recorder: Furuno VD 3000D



*Photograph 2: Annemieke*

**2.1.2. M/v Tao Hua Hai**

Flag: China  
 Shipowner: Cosco Bulk Carrier Co. Ltd, Tianjin, China  
 Classification society: CCS  
 Vessel's type: bulk carrier  
 Call signal: BOUE  
 IMO number: 9620504  
 Gross tonnage (GT): 64654  
 Year of built: 2012  
 Power: 13080 kW

Width:	43 m
Length overall:	254 m
Hull material:	steel
Minimum crew:	8 men



*Photograph 3: Tao Hua Hai*

## **2.2. Voyage Particulars**

### **2.2.1. Annemieke**

Ports en route:	Pozzallo (Italy), Casablanca (Maroko), Rotterdam (the Netherlands)
Port of destination:	Norkopping (Sweden)
Type of navigation:	unlimited
Cargo information:	vessel under ballast
Manning:	15 Filipinos, 2 Germans, 2 Croats
Passenger information:	no passengers

### 2.2.2. Tao Hua Hai

Type of navigation:	unlimited
Cargo information:	under discharge
Informacja o załodze:	25 Chinese
Informacja o pasażerach:	no passengers

### 2.3. Accident Information

Kind:	Marine casualty
Date and time of event (UTC):	19.12.2013 at 23:17 (22:17 UTC)
Geographical position of the accident:	$\varphi = 53^{\circ}55'03''$ N $\lambda = 014^{\circ}16'57''$ E
Geographical area of the accident:	The Bay of Pomerania – Świna Strait
Nature of the water region:	Internal waters (port)
Weather during the accident:	wind SSW 3° B, sea state 2, good visibility 12 NM, water temp. 2°C, air temp. 4°C
The operational status of the vessel during the event:	vessel under ballast
The participation of the human factor in the marine casualty or incident:	pilot and the bridge crew
Consequences of the accident to the vessel which caused the collision:	damage to a cantilever of the crane no 3 at starboard and damage to the starboard plating at the stern in front of the transom at the deck level
The consequences of the accident to the vessel which suffered from the collision:	dented plating at starboard side on the side ballast tank no 3, damage to several stoppers and rollers of the hatch covers of the holds no 5 and 6



Photograph 4: Damages of Tao Hua Hai



Photograph 5: Damages of Annemieke

## 2.4. Shore Services and Rescue Action Information

Rubbing of the vessel Annemieke against the hull of the vessel Tao Hua Hai laying at the wharf did not require conducting rescue operations or engaging any shore services.

## 3. Circumstances of the Accident

On 19 December 2013 at 22:47 the pilot boarded the vessel Annemieke moored starboard at the Górników Wharf in Świnoujście. At 22:50 the pilot reported to the VTS operator that the vessel was ready to unmoor and he got the permission to leave and instructions how to join the traffic flow. Soon after the unmooring started.

The instructions given to the pilot of Annemieke had to be changed because at 22:51 the VTS received information about the accident on the ferry Wawel and the necessity of her return to port. The VTS operator reorganized the traffic on the fairway. At 22:52 the operator allowed ferry Wawel, which at that time was already near the buoys no 15 and 16, to return to port. Then he tried twice on VHF channel 12 to call the Annemieke's pilot. There was no response so the operator called out the ferry Skania and notified her captain about the necessity of staying at the wharf until she was passed by a returning ferry Wawel. The VTS operator also notified the captain of the ferry Wawel about the following vessels coming from the opposite direction on the fairway: Elizabeth M, Malta Cement and Celine. After the conversation with the ferry Wawel had ended the VTS operator again called out twice Annemieke by VHF radio, but there was still no response from the pilot of the vessel.

At 22:54, after the telephone notification of the Annemieke's pilot by the dispatcher of the pilot station that the ship was being called out, the pilot of Annemieke reported by VHF to the VTS operator. After reporting, the pilot was informed about the ferry Wawel returning from the sea and recommended to manoeuvre in such a way as not to sail past the ferry entering the port until the ferry passed "D" buoy. The pilot acknowledged the instruction and informed that the vessel would go slowly, and if necessary she would wait until the ferry Wawel passed the "D" buoy.

The information received from the VTS operator was delivered by the pilot to the captain of Annemieke at 23:01, after unmooring and leaving the berth. The captain decided to keep the ship adrift at a short distance from the Górników Wharf and adjust the position with the thruster and the engine until it would be possible to continue the trip.

At 23:11:30 the vessel Malta Cement passed Annemieke on the way out of the port. The pilot told the captain about the possibility of joining the traffic. Annemieke began to accelerate and at the same time moved away from the wharf with the bow thruster and the main engine with the rudder turned to starboard. The rudder commands of the pilot caused that the vessel started to move parallel to the fairway beyond its eastern border.

At 23:14 ferry Wawel on its way to the ferry terminal in Świnoujście passed Annemieke at portside. After half a minute, when the bow of Annemieke was at a level of the bow of the vessel Nostos S, mooring at the Hutników Wharf, the pilot of Annemieke ordered to increase the speed by commanding *More ahead*. Still using the bow thruster and the rudder the vessel was slowly changing the course to port towards the fairway. At 23:15:21 the pilot made a rudder command *Starboard 10*.

At 23:15:30 Annemieke was abeam of the vessel Nostos S. She was moving at the speed of 7 knots at the course of 028°, parallel to the fairway, with the rudder turned to *Midships*. The pilot re-ordered to increase the speed (*More ahead*), not adjusting a very slow change of the course to port, which in conjunction with the existing curvature of the fairway at that point caused that the vessel was still moving outside the eastern boundary of the fairway, getting away from the axis of the fairway track and approaching other vessels mooring at the wharves. The captain reminded the pilot that the speed of the vessel was too high to benefit from the thruster working to port. In response he heard the pilot giving another command *More ahead*.

At 11:16:07 the stern of Annemieke passed at the side distance of less than 40 m the vessel Nostos S moored at the Hutników Wharf. The speed of the vessel was already 9.3 knots. The bow of Annemieke was approaching at the collision course the ship Tao Hua Hai moored at the Chemików Wharf.

During next 10 seconds, from 23:16:43 till 23:16:53, when the bow of the vessel was passing the midship of Tao Hua Hai, the pilot gave several successive rudder commands (*Starboard 10, Starboard 20, Hard to starboard*) which aimed at pulling the stern of Annemieke to port side and positioning the hull of the vessel parallel in relation to the vessel moored at the wharf to limit the effects of an unavoidable collision.

At 23:16:58 Annemieke at the speed of 10.2 knots hit (rubbed against) the hull of Tao Hua Hai. After the first rebound she bumped and rubbed against that vessel again.

After passing Tao Hua Hai the pilot stabilized the course of the vessel thanks to subsequent rudder commands and ordered to reduce the speed. At 23:19 the pilot notified the VTS about the event and informed about going to the anchorage to check the damages.

#### 4. The Analysis and Comments about Factors Causing the Accident with Regard to Examination Results and Expert Opinions

To examine the way in which Annemieke was manoeuvring at the port, the Commission read out AIS data stream coming from the receiver installed on the vessel at the time of entering and leaving the port of Świnoujście on 19 December 2013.

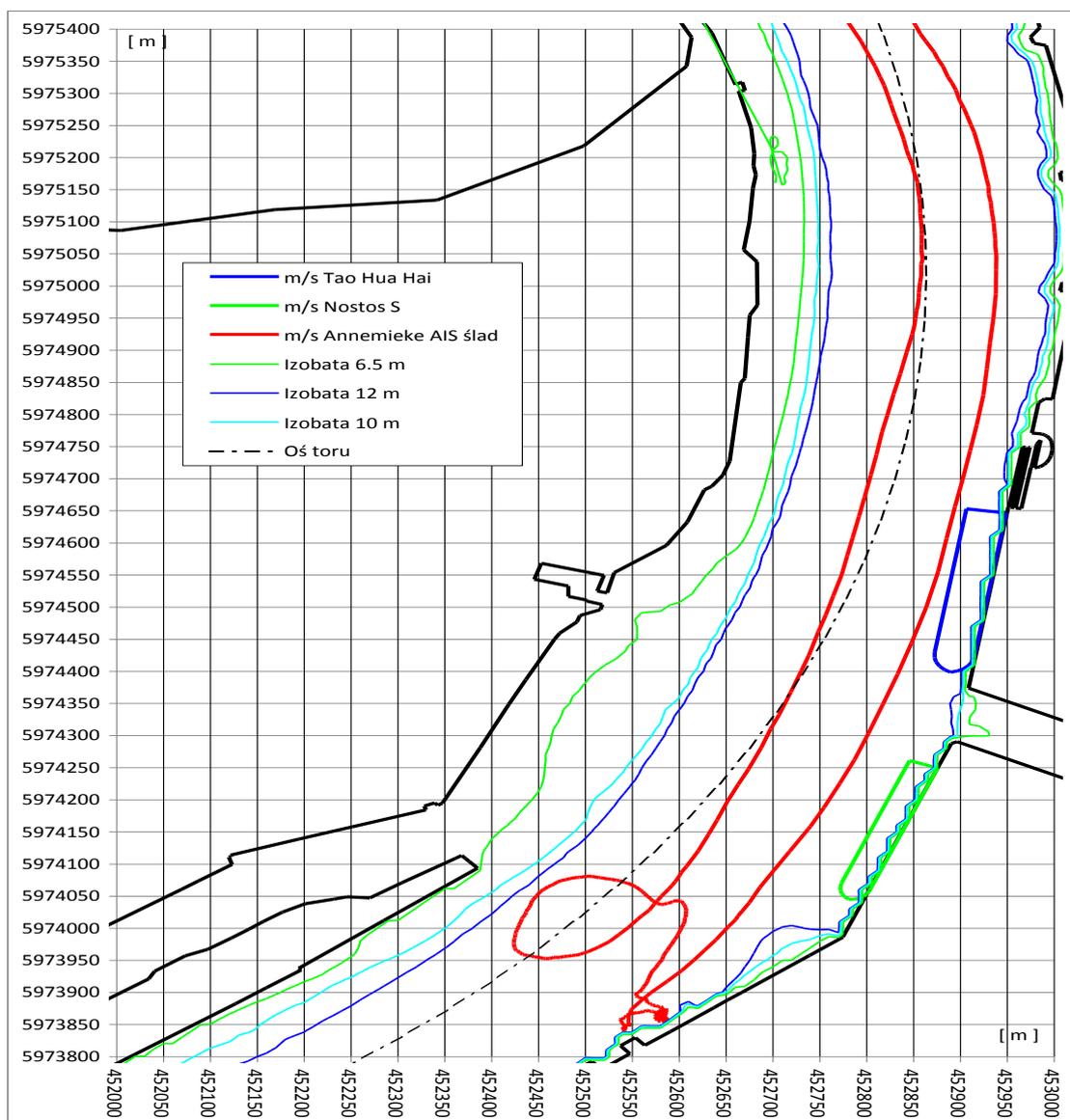


Figure 1: Trajectory of movement of Annemieke while calling at the port of Świnoujście



north and it is approaching Hua Hai Tao. From the south there are navigating two vessels to the exit from the port: Malta Cement (approaching Annemieke) sailing at the speed of 9.0 knots, and Celine sailing at the speed of the 6.4 knots.

Upon joining the traffic Annemieke began to navigate beyond the eastern border of the fairway. Small and initially constant change of the course to port caused by the work of the bow thruster and rudder commands (*Port 20, Midships, Port 10*) did not, however, compensate for the curvature of the fairway in this section and caused that the vessel was slowly moving away from the axis of the fairway approaching the embankment.

At 23:15:21 the pilot gave a rudder command *Port 10* which slowed down even more the change of the course to port.



Figure 3: VTS image of 23:15:29

Fig. 3 presents the VTS image of 23:15:29 showing the navigational situation at the time when Annemieke was approaching the Hutników Wharf at which the ship Nostos S was moored. The ferry Wawel had already passed the stern of Annemieke going in the opposite

direction at a safe distance on her (western) side of the fairway. At the port entrance there were no other vessels. Annemieke was moving at a course of 023° at the speed of ca 8 knots<sup>1</sup> and the main rudder in the midship position.

At 23:15:36 the pilot ordered to speed up (*More ahead*). He did not give any rudder command to direct the bow of the vessel to the fairway or at least to keep the vessel at a constant distance from the embankment because of a distinct curvature of the fairway at that point, because of which the vessel was moving away from the fairway and approaching other vessels mooring in front of her at the wharves. Instead, the pilot noticed that the ship’s bow was moving to port too slowly and ordered to set the thruster to port (*Full port*). The captain confirmed, but reminded the pilot that the speed of the vessel was too high to benefit from the thruster. In response he heard the pilot commanding *More ahead*.

#### 4.2. The Analysis of the Speed Over Ground and Angular speed of the Vessel; Human Factors (fault and neglect)

Fig. 4 shows a histogram representing speed over ground and the angular velocity of the vessel as a function of time for several minutes critical for Annemieke’s manoeuvres.

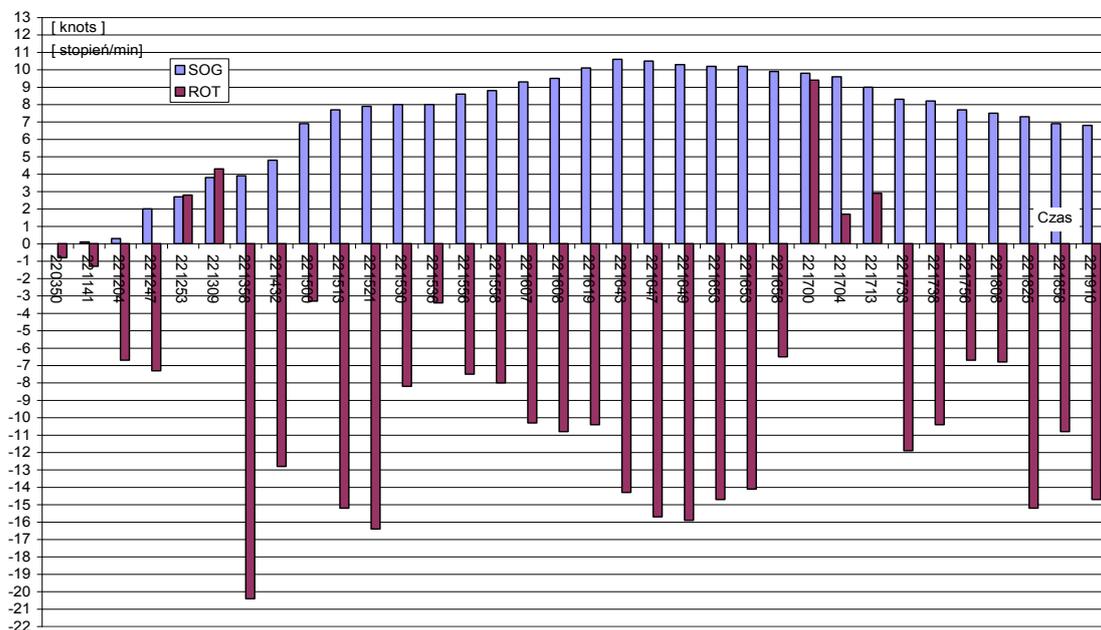


Figure 4: Diagrams of the speed over ground (SOG) and angular velocity (ROT) of Annemieke as a function of the manoeuvre duration

<sup>1</sup> Value of the vessel’s speed was taken from the ship’s VDR. They differ from the values shown on the monitor screen of the VTS. That system “shapes” echo sounds with certain delay in relation to actual parameters.

The analysis of angular velocity shows that when the vessel was setting off from her parking space near the Górników Wharf, she had a minimum angular velocity to port. That speed increased considerably by the use of the bow thruster at 23:11:41. If the tendency to rotate to port ( $7^{\circ}/\text{min.}$ ) was maintained it would allow the vessel to slowly enter the fairway however the rudder command *Starboard 20* given at 23:12:47 caused that the vessel lost her angular velocity to port and started rotating in the opposite direction. The analysis of VDR shows that at that time the ferry Wawel was approaching the bow of the vessel. Probably it was the reason why the pilot “aligned” the course of the vessel parallel to the fairway.

Then, the subsequent manoeuvres of the rudder (*Port 20, Midships, Port 10*) restored angular velocity to port. Nevertheless it was too low (at 23:15:21 the pilot ordered again to turn the rudder *Starboard 10*, which once again significantly reduced the angular velocity to port) in combination with increasing longitudinal speed to move the vessel closer to the axis of the fairway and let her safely sail past the vessel mooring at the Chemików Wharf.

No action on the part of the pilot and the captain to move the vessel to port to the fairway is all the more incomprehensible that after passing the ferry Wawel at ca 23:14 on the fairway there was no other vessel entering the port, which could interfere with the safe passage of Annemieke down the middle of the fairway on her way out to sea.

The analysis of the histogram presented above makes it possible to determine precisely the time of the collision. The impact occurred at 23:16:58. Then there was a sudden change of the direction of the angular velocity from port to starboard, due to the rebound of the Annemieke’s stern from the ship’s side of Tao Hua Hai. The impact must have been significant, because the angular velocity amplitude was as high as  $16^{\circ}/\text{min.}$

#### **4.3. Heading and Course Over Ground Analysis; Influence of External Factors on the Occurrence of the Accident**

Fig. 5 shows a histogram representing the values of the vessel’s heading and the course over ground in the function of manoeuvres’ duration. The analysis shows that from 23:12:47, that is since the vessel was set on the course of  $027^{\circ}$  towards the exit from the port of Świnoujście, until 23:18:25 i.e. when the heading of the vessel stabilized after the collision, the heading did not differ much from the course over ground which indicates that the influence of hydro-meteorological conditions on manoeuvring of the vessel was small and they did not have to be counteracted.

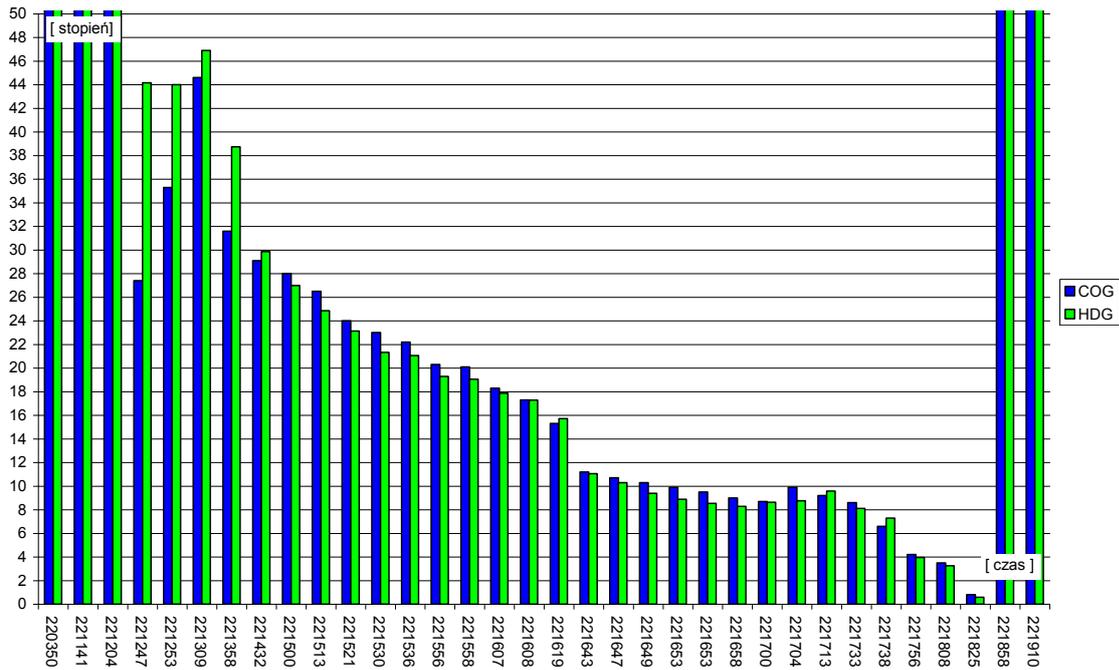


Figure 5: Diagrams of the course over ground (COG) and heading (HDG) of Annemieke as a function of duration of a manoeuvre

Also, the Commission noticed that the manoeuvres performed by the vessel in respect of its course-keeping stability were not prominent, as in any of the positions listed in the chart no turn was registered in which the vessel would move with the drift angle. For a vessel to safely enter the fairway, such turn (to port) had to be done at 23:15:21 at the latest. However, at that time the pilot commanded *Starboard 10*.

According to the Commission it was a completely incomprehensible decision that was neither questioned nor commented by the captain, and that was carried out by the helmsman. Turning the rudder to starboard caused that Annemieke found herself in extremity and later there was no other manoeuvre which could be carried out in order to avoid the collision.

#### 4.4. The Analysis of Last Moment Manoeuvres of Annemieke

Fig. 6 shows the positions of the Annemieke’s outlines (which are maximum waterlines) in the ship’s manoeuvring water region of the northern part of the fairway at the port of Świnoujście and a table of commands (the left side of the figure) given by the pilot or description of events that took place during the corresponding positions of each outline, in the chronological order, starting from 22:14:32 (blue waterline at the bottom of the figure and the corresponding pilot’s command *More ahead* in the table).

A reference point for further analysis is a red (bold) waterline of the vessel, which refers to 23:16:29 hrs. corresponding to the position of the vessel in which the captain was already convinced that the collision was unavoidable (correlated in the table on the left with what the captain said: *We will catch this one*). All actions taken by the vessel after that time were the evasive ones aiming only to minimize the effects of the collision.

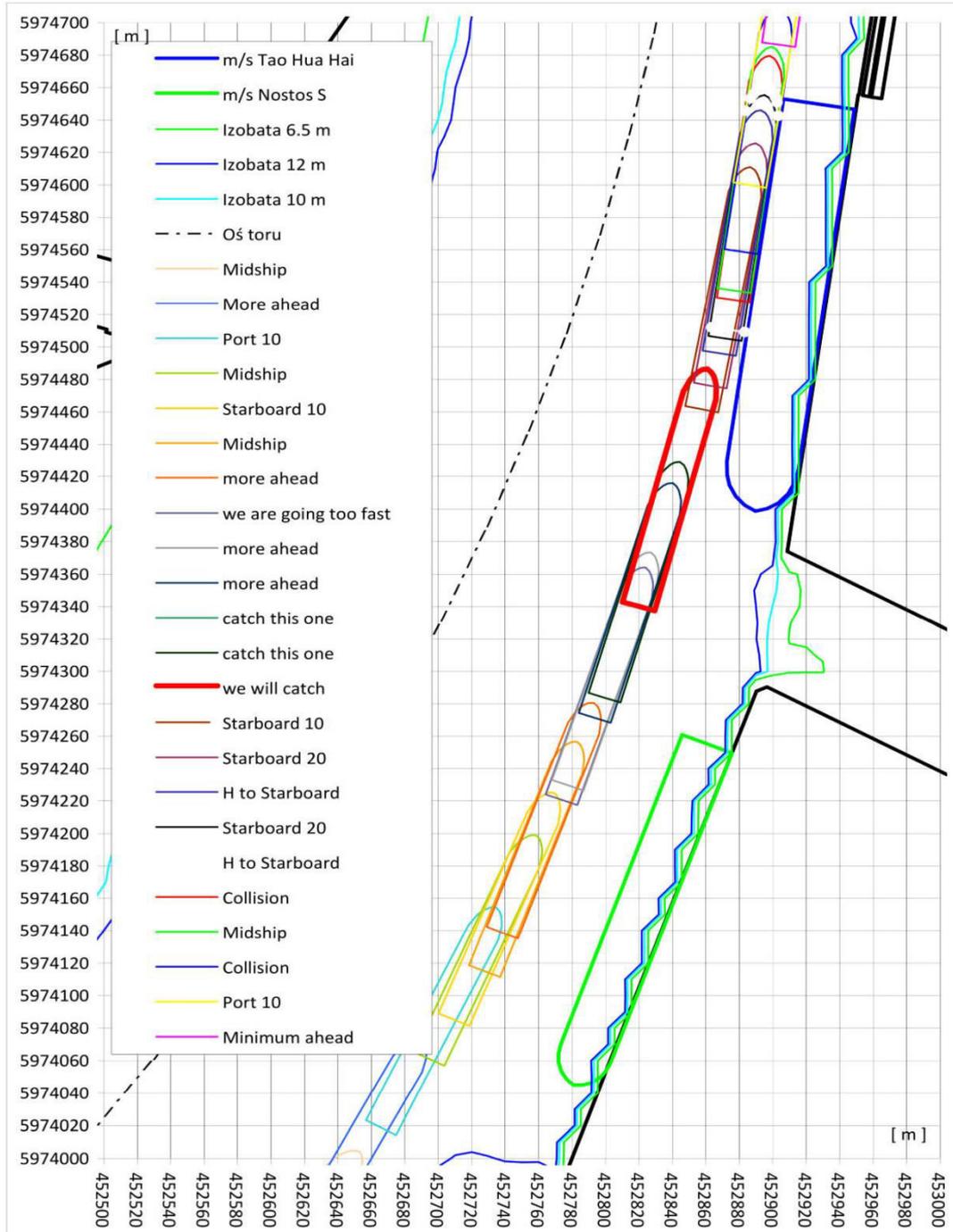


Figure 6: Annemieke's watelines when passing by Nostos S and the collision with Tao Hua Hai

For more than two minutes, from 23:13:58 (when the vessel was at the level of the Barkowe Wharf) till 23:16:08 (when the stern of Annemieke passed the stern of Nostos S), Annemieke was navigated as if she was to be maintained at a constant heading. The rudder was being turned once to port once to starboard (the pilot gave the commands: *Midships, Port 10, Midships, Starboard 10, Midships*). At 23:15:36 when the Annemieke's bow was approaching the stern of Nostos S the pilot ordered to increase the speed of the vessel, which has already been rather significant (8 knots), giving an ambiguous command *More ahead*. Right after the pilot ordered to use the thruster to port, and the captain fulfilled it (*Full to port*) and made a comment that the ship was moving too fast to use the thruster. On one hand, such a command of the pilot may indicate that he realized he should have made a considerable turn to port, on the other, it shows the lack of awareness and expertise of the pilot about the rules of using the bow thruster<sup>2</sup>, and in the third place it means that the pilot did not control the speed of the vessel and did not watch the indicators at the bridge.

At 23:15:58, when the bow of the vessel was at the level of the Trymerski Basin, several dozen of meters from the bow of Hua Hai Tao, the pilot did not give any rudder command which could increase its lift, but ordered again to increase the speed (*More ahead*). This speed increase contributed to the expansion of the effects of the collision.

At 23:16:08 for the first time the captain expressed his concern that the vessel would catch on the vessel standing in front of them (*We will catch this one*). After several seconds the captain again, tensely stated that the collision could occur. At 23:16:29 he was sure of it.

At 22:16:43 the pilot decided to move back the stern, first by issuing the command *Starboard 10* to position the hull of Annemieke parallel to the ship standing at the wharf<sup>3</sup> and after 6 seconds, the command *Hard to starboard*. At 22:16:58 Annemieke, with the speed of 10.2 knots, hit for the first time Tao Hua Hai mooring at the Chemików Wharf. After another hit at 22:17:33 the pilot commanded *Minimum ahead*.

Last commands to the rudder recommended by the pilot was aimed only at setting the hull of Annemieke parallel to Tao Hua Hai to limit the effects of the collision.

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<sup>2</sup> The effectiveness of thrusters decreases with increasing vessel speed. This efficiency is close to 100% in the speed range from 1.0 knots forwards to 1.0 knots backwards. In the speed range from 1.0 to 3.5 knots the efficiency is reduced by half. At the speed of the vessel from 3.5 to 8 knots the efficiency decreases to 15%. The reason for the decrease in the effectiveness of bow thrusters is the creation of a vacuum and pressure areas in the direct vicinity of the helm side openings. Differences in pressure are caused by tilting of water jets generated by the rudder wheel under the influence of the forward motion of the vessel.

<sup>3</sup> In such setting, the maximum torque is obtained of adherence by suction of the hulls resulting from a channel effect.

## 5. Description of Examination Findings Including the Identification of Safety Issues and Conclusions

The port of Świnoujście is located over the Świna Strait, which joins the sea in its northern part. The curvature of the fairway and configuration of wharves causes that the currents there have different directions and strength. On the outer edge, closer to the shore, the values of currents can be increased whereas on the inner edge they can be decreased. Furthermore, in relation to the vessels navigating down the strait there occurs a phenomenon of a channel effect with variable intensity, as well as the effect of interaction of passing ships. Both phenomena may impair the steering ability of the vessel because of the asymmetrical flow of water along the hull. Due to a difference in the profiles of the flow of water along the sides of the vessel, the flow rate of a water jet is greater on the side of a shore or the hull of another ship. Therefore, in the vicinity of the stern, where the flow of water is greatly increased by the sucking action of the screw, there appears a great force attracting the stern towards a nearer shore or ship.

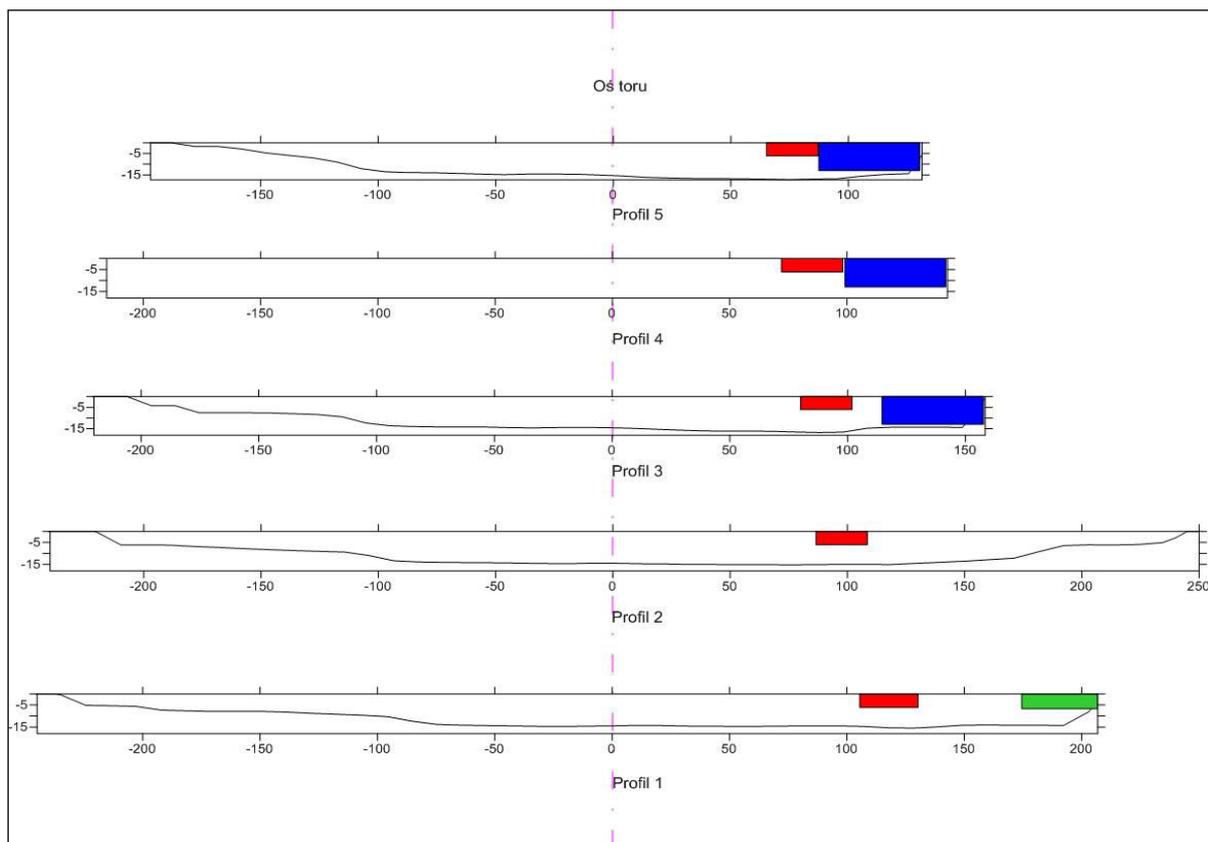


Figure 7: Profiles of the ground of the port channel with outlines of vessels: *Nostos S* (green), *Tao Hua Hai* (blue), and *Annemieke* (red)

The basic principle in preventing the channel effect, that is attracting the stern of the ship to the shore, is to navigate at the greatest possible distance from it, which in case of the port of Świnoujście means navigating in the middle of the fairway. As one can see from the presented figures No. 7 and No. 8 Annemieke was navigating away from the axis of the fairway.

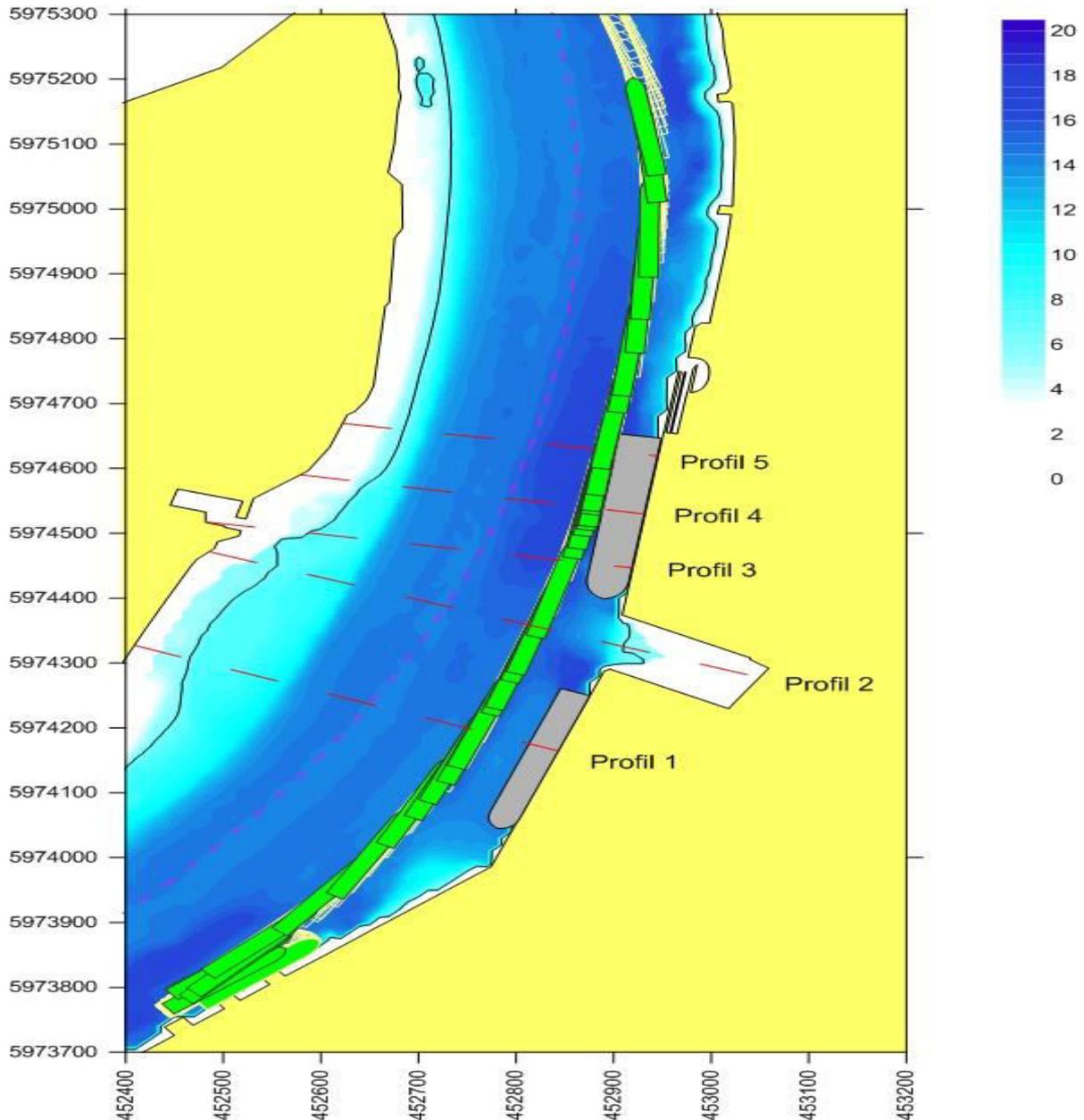


Figure 8: Trajectory of movement of Annemieke and indicated bottom profiles

For vessels of the size of Annemieke pilotage in the port of Świnoujście is compulsory. The pilot, who is aware of local phenomena described above, should be able to assess the risk properly when leading the vessel. Having experience in ship's manoeuvring, having

knowledge of local hydro meteorological conditions and port regulations, the pilot should be an important advisor to the captain.

Annemieke has got the 9450 kW engine, adjustable blade propeller, the bow thruster of the power of 750 kW and the Becker<sup>4</sup> type rudder. In a loaded state the vessel may reach the maximum speed of 19 knots. All these data manifest good maneuvering characteristics of the vessel. Comments of the pilot about a of sluggish reaction of the vessel to the rudder and too slow acceleration can hardly be regarded as reliable. The analysis of hydro and meteorological conditions does not indicate their negative impact on ship's manoeuvring. The vessel was easily being hove to by the captain after unmooring from the wharf, in the same position for almost 15 minutes. When the vessel was moving she precisely responded to the rudder and engine commands issued by the pilot. These good manoeuvring qualities of the vessel allowed the pilot, at the passive attitude of the captain, to bring the vessel up on a very short distance to speed completely inadequate to the existing area of safe manoeuvring.

By increasing the speed of the vessel in such a violent manner (within 4.5 min. the speed increased by more than 10 knots<sup>5</sup>) the pilot deprived himself and the captain of the time necessary to conduct observation and plan maneuvers (not taking into account that the maneuvers were being held at night). The rudder commands issued by the pilot did not sufficiently caused the change of the heading, in order to adapt it to the curvature of the port channel twisting to the left<sup>6</sup>, where the vessel should go down to the port exit in accordance with good seamanship.

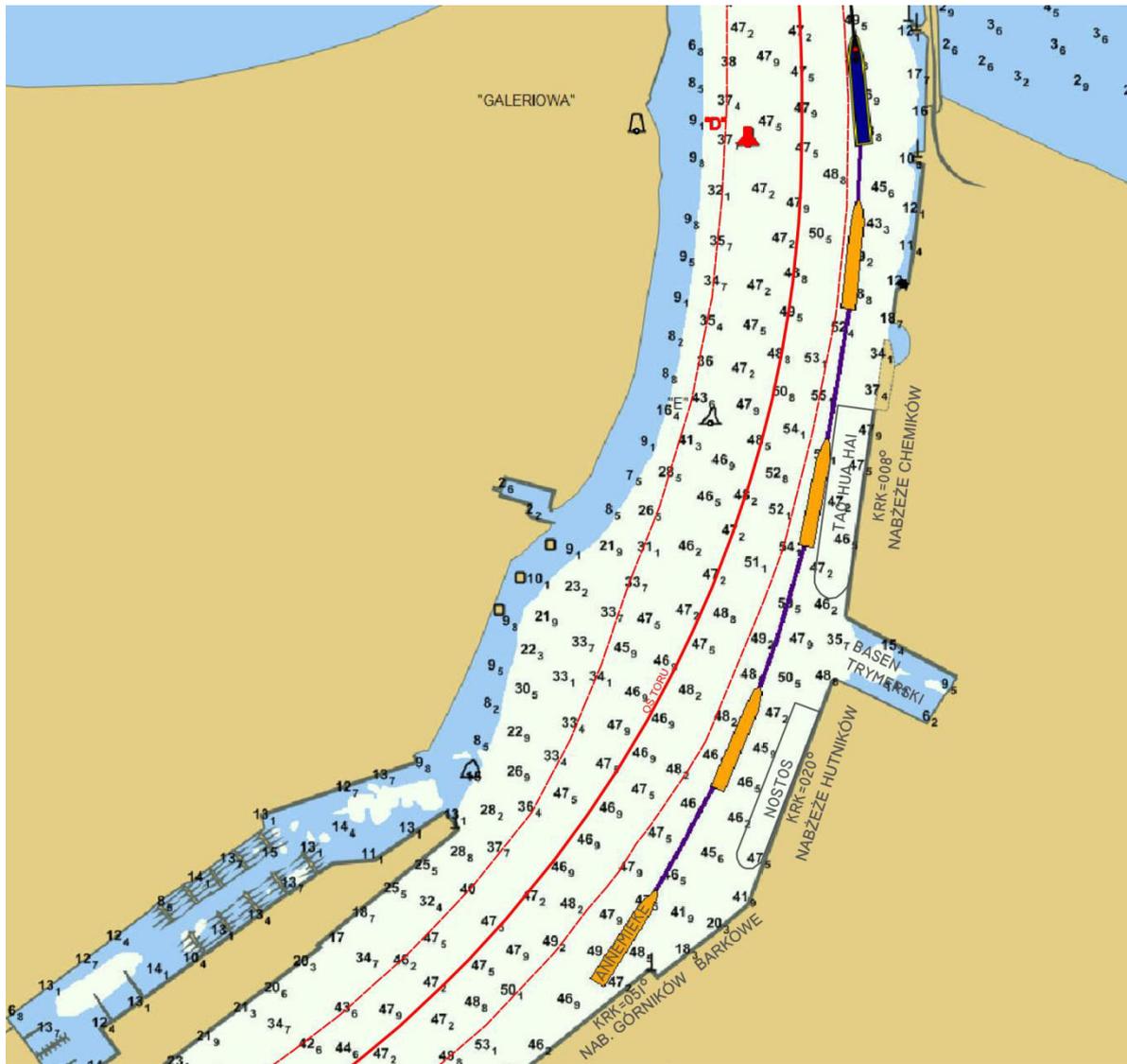
Photograph No. 6 shows an image of the electronic chart with outlined northern part of the fairway in the port of Świnoujście and the trajectory of movement of Annemieke, set with the help of the program NavCruiser PRO based on data read from the VDR recorder, covering the period just after the vessel started moving from the drift at the Górnice Wharf (23:13:28) until she appeared at the level of the base of the central breakwater (23:19:04) after the collision with Tao Hua Hai.

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<sup>4</sup> Becker Flap Rudder gives greater steering efficiency than a conventional rudder. In a typical construction of the Becker rudder, the upper blade can be tilted to 45° to the side and the additional blade can also be tilted to the same angle of 45°.

<sup>5</sup> According to the ship's VDR data at 22:12:04 the vessel's speed was 0.3 knots, at 22:16:43 she was moving at a speed of 10.6 knots. These data contradict the opinion expressed by the pilot at the hearing, when he indicated that too slow acceleration of the vessel was the cause of the accident.

<sup>6</sup> The course of the fairway and its width are defined in §3.1 of the Regulation of the Minister of Infrastructure of 9 December 2002 on defining objects, devices and installations included in the infrastructure providing access to the port of fundamental importance for the national economy (Journal of Law of 2014. item 1017).



Photograph 6: Trajectory of movement of Annemieke in relation to the shape of the fairway and mooring vessels

The map in the photograph No. 6, clearly shows that Annemieke was being led all the time outside the fairway, even after the collision and after passing Tao Hua Hai.

If the vessel was sailing at a slower speed than imposed by the pilot's commands, she would retain power reserve for a determined main rudder manoeuvre. That reserve is needed especially when the turns are made on restricted areas due to shallow water. Neither the captain nor the pilot took into account the phenomenon of squat, which may significantly worsen the manoeuvrability of the vessel on shallow water, and whose value increases with the increasing speed. They also forgot about the channel effect that accompanied the vessel from the very beginning and was intensifying its value, the closer to the shore.

In the view of the Commission the collision was caused by mistakes in Annemieke's manoeuvring.

One of the factors that contributed to the accident was the lack of proper cooperation of the captain and the pilot during manoeuvring. The captain passively accepted the commands given by the pilot for the rudder and for the machine. Even when he saw the collision hazard, he accepted further pilot's decisions as to the erroneous maneuvers of the rudder and the decision to increase the speed when the collision was inevitable.

In the course of leading Annemieke through the port channel the pilot was repeatedly infringing the applicable port regulations. He was leading the vessel in close proximity to the wharves and other ships mooring there at a speed exceeding the permitted value in that area of the port channel and created imminence due to formation of dangerous waves<sup>7</sup>. After unmooring from the Górnice Wharf he was not monitoring a VHF watch, as required by regulations, on a frequency designated for ships using the VTS, and he did not inform the ship Celine going from the south to the port exit about his intention to join the traffic. Moreover the pilot did not inform the VTS duty officer about his intention to join the traffic between Malta Cement and Celine going closely and he did it (joined the traffic) without his consent.

According to the Commission, it was the desire to join the traffic before Celine, directly after Malta Cement, which resulted in the necessity to accelerate Annemieke rapidly in the initial phase of her movement. At the same time the fear of collision with Celine kept Annemieke away from the fairway after unmooring from the Górnice Wharf and keeping away from its eastern border. In the opinion of the Commission, wrong timing with respect to joining the traffic was that factor, which indirectly had an impact on the occurrence of a marine casualty.

The Commission also pointed to an additional aspect of the analyzed event - the lack of response from the VTS operator to improper movement of Annemieke, i.e. her excessive speed and going beyond the fairway, and concluded that a proper response of the operator at the right time could prevent the accident.

The VTS service was created for the purpose of increasing the safety of navigation and protection of the marine environment. Among the many tasks imposed on VTS operators by port regulations, the most important, in the context of the analyzed case, is the traffic

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<sup>7</sup> The pilot violated § 66 item 3 and § 66 item 8 point 2 of the Order No. 3 of the Director of the Maritime Office in Szczecin of 26 July 2013 Port Regulations (Journal of Law of the West Pomeranian Province of 6 August 2013 item 2932).

management and traffic control by giving instructions, recommendations and orders. The VTS operator on duty during the event efficiently arranged the situation on the fairway when there appeared the need for the ferry Wawel to return to the port, but he failed to call Annemieke's pilot attention to the fact that he was not doing an obligatory VHF watch on designated frequencies, and that the vessel:

- 1) did not enter the fairway, on which she should be navigating;
- 2) was joining the traffic right in front of Celine going behind Malta Cement;
- 3) was gaining the speed rapidly, and after some time was moving with excessive speed, unacceptable by port regulations in this part of the fairway.

The VTS operator knew that the vessel was in motion (though he might not know when Annemieke left the wharf because the pilot had not reported this fact) because on the VTS screens one can see that traffic acquisition marks were set up to track echoes of the ferry Wawel, Malta Cement, Annemieke and Celine. Even considering the delay in data processing because of refreshing the image of the VTS monitoring system, the VTS operator saw current situation in the port channel and was able to read at any time the motion parameters of observed vessels. Despite this, the operator did not take any preventive actions and did not forbid the pilot to join the traffic in front of Celine, and even if that moment escaped his attention<sup>8</sup>, then later he did not demand from Annemieke (the pilot) proper navigation on the fairway i.e. compliant with regulations about the speed limit.<sup>9</sup>

In the opinion of the Commission the VTS operator might not notice the first phase of movement of Annemieke because of the fact there was a change of operators during the incident and there are no specific, detailed internal procedures of the VTS Service concerning the transfer of responsibilities at the end of the duty, resulting from a lack of a developed set of regulations of operation of the VTS Service, despite the obligation to do so under § 6.3 of the regulation of the Minister of Transport, Building Industry and Maritime Economy of 14 December 2012 on the National System of Traffic Flow Control and Transfer of Information<sup>10</sup>.

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<sup>8</sup> The Commission does not assume that the VTS operator was not watching the screen for 5 minutes (from 22:11:41 to 22:16:58) however it considers that for the first 20-40 seconds since the vessel moved from the Górnice Wharf, the VTS operator might not see on the screen the movement of Annemieke.

<sup>9</sup> The Commission also noticed that Malta Cement also was moving with greater speed than permitted on that section of the fairway and the VTS operator did not respond to that fact correctly.

<sup>10</sup> Journal of Law item 1412.

## 6. Safety Recommendations

Many circumstances influenced the accident of Annemieke. Two of them are particularly important according to the Commission. They form the basis for formulating recommendations that can help to prevent similar accidents in the future. It is the routine, in the negative sense of the word, in the behaviour of the pilot navigating the vessel and the lack of due diligence in the fulfillment of their obligations by the operators of VTS Service.

From the materials about the event collected by the Commission and data stored in audio channels in the VDR recorder it results that the pilot of Annemieke after speaking with the VTS operator during the unmooring manoeuvres from the Górnice Wharf, he failed to maintain further radio contact with the VTS service and did not inform them (contrary to the port regulations) about unmooring and the intention to join the traffic. The pilot behaved like it was his duty not the VTS, to control traffic in the port. He failed to inform the vessel Celine navigating to the port exit, about his intention to join the traffic, believing that a distance of several cables to the approaching vessel was suitable and the maneuver would not create a hazardous situation. The Commission also found that the pilot navigating Annemieke has not used the portable computer, purchased for the purpose of the pilotage by the company Szczecin-Pilot, fitted with an appropriate electronic chart including information about the configuration of the fairway, GPS module and specialized software, but relied solely on his own experience and knowledge about the borders of the fairway.

The experience and knowledge of the pilot proved insufficient for the safe navigation of the vessel from the port. The subsequent increase of speed, when there was already a risk of collision with the ship standing at the wharf, manifests that the pilot has a bad habit of avoiding collisions by increasing the speed. In the opinion of the Commission, such behavior violates the principles of good seamanship.

Making recommendations with the aim of instructing the pilot to perform his duties in a prudent and professional way would be pointless according to the Commission. In this situation, the State Commission on Maritime Accident Investigation decided to send a recommendation to the Head Pilot of the pilot station Szczecin-Pilot, which organizes and coordinates pilot services in the port of Świnoujście, to call the station pilots' attention to misconduct of the pilot navigating Annemieke on 19 December 2013 during the accident analyzed in the report and to encourage them to use any additional devices at their disposal that may help them manoeuvre and navigate correctly the ships under their care.

The State Commission on Maritime Accident Investigation recommends the VTS Service of the Harbour Master of Świnoujście to conduct a more thorough control of the traffic flow by VTS duty officers over the supervised area which would ensure full safety of navigation, and to react firmly to violation of the port regulations regarding speed limits on individual parts of the fairway by issuing to captains or pilots of vessels which exceed speed limits orders to limit speed and to enforce these orders consistently.

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## **9. Glossary and Abbreviations**

CCS - China Classification Society

PRS – Polish Register of Shipping

UTC – Universal Coordinated Time

VDR - voyage data recorder

HOPN – Hydrographic Office of the Polish Navy

## **10. Information Sources**

Notification of the accident

Materials from hearing of witnesses

Data from the VDR of Annemieke

Documents of the Annemieke and Tao Hua Hai

Expert opinion of Wojciech Ślęczka, D. Eng., Professor of the Maritime Academy of Szczecin

Register of the traffic flow by VTS Świnoujście

## **11. Composition of the Accident Investigative Team**

The team conducting the examination was composed of:

The Team Leader: Marek Szymankiewicz – a Secretary of the State Commission on Maritime Accident Investigation

The Team Member: Tadeusz Gontarek – a member of the State Commission on Maritime Accident Investigation