



STATE MARINE ACCIDENT INVESTIGATION COMMISSION

FINAL REPORT 07/15

Very serious marine casualty

M/V TRANSFORZA

TUG BOAT KUGUAR

Collision of Transforza and Kugar
in the fairway in Świnoujście on 16 February 2015

June 2016

The examination of a marine casualty of *Transforza* and *Kuguar* was conducted under the State Marine Accident Investigation Commission Act of 31 August 2012 (The Journal of Law of 2012 item 1068 and 2015 item 1320) 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 Marine Accident Investigation Commission does not determine liability nor apportion blame to persons involved in the marine accident or incident.

The following 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 Marine Accident Investigation Commission Act).

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| Table of Contents | str. |
|--|-------------|
| 1. Facts..... | 4 |
| 2. General Information | 5 |
| 2.1 Ship Particulars..... | 5 |
| 2.1.1. <i>Transforza</i> | 5 |
| 2.1.2. <i>Kuguar</i> | 6 |
| 2.2 Voyage Information..... | 7 |
| 2.2.1. <i>Transforza</i> | 7 |
| 2.2.2. <i>Kuguar</i> | 7 |
| 2.3 Accident Information..... | 7 |
| 2.4 Shore Services and Rescue Action Information | 8 |
| 3. Circumstances of the Accident | 10 |
| 4. The Analysis and Comments about Factors Causing the Accident with regard to Examination Results and Expert Opinions | 13 |
| 4.1 The Analysis of the Way of <i>Transforza</i> Immediately before the Collision with <i>Kuguar</i> | 15 |
| 4.1.1. Critical Sequence of AIS Messages | 19 |
| 4.1.2. The Analysis of AIS Data Presented by the Operator of <i>Transforza</i> | 22 |
| 4.2 Human Factors (fault and neglect) | 23 |
| 4.3 Execution of the voyage plan of <i>Transforza</i> | 25 |
| 5. Description of Examination Findings Including the Identification of Safety Issues and Conclusions | 28 |
| 6. Safety Recommendations | 30 |
| 6.1 The Operator of <i>Transforza</i> | 30 |
| 6.2 The Operator of <i>Kuguar</i> | 31 |
| 6.3 Pilot Station in Szczecin | 31 |
| 6.4 Maritime Administration | 32 |
| 7. List of Figures..... | 33 |
| 8. List of Photographs..... | 33 |
| 9. List of Tables | 33 |
| 10. Glossary and Abbreviations..... | 34 |
| 11. Information Sources | 34 |
| 12. Composition of the Accident Investigative Team | 34 |
| Annex 1 | 35 |
| Annex 2 | 38 |

1. Facts

On 16 February 2015 at 21:40 at the roadstead of the port of Świnoujście the motor vessel *Transforza* admitted the pilot on board. After passing the heads of the port of Świnoujście, the vessel entered the fairway of Świnoujście – Szczecin and started heading to Szczecin. The master and the pilot were on the bridge. The vessel was hand steered by the master, who was following the pilot's instructions. The vessel was moving at a speed of ca 8 kn.

At the same time, the tug boat *Kuguar* was moving down the fairway of Świnoujście – Szczecin from the port of Police to the port of Świnoujście. The tug boat was to moor on the eastern side of Świna at the Portowców Wharf. The crew of the tug boat was composed of a master of a tug boat (skipper), chief engineer and two ABs. Additionally, there was a passenger on board the tug boat.

At ca 22:11 *Transforza* passed the lighthouse in Świnoujście and the pilot reported the passage of the vessel to the masters of the city ferries. At 22:14 the skipper of *Kuguar*, while passing the northern headland of the Mielino island, informed the masters of the city ferries about the passage and destination of the tug boat. The tug boat was being steered by the AB under the command of the skipper. She was moving at a speed of ca 7 knots.

At the height of the Władysława IV Wharf, *Transforza* started altering her course to port. First the vessel began to gradually move to the center and then to the eastern side of the fairway. At ca 22:18 abeam the northern tip of the Kosa peninsula she came to the collision with *Kuguar*. The bulbous bow of *Transforza* knocked into the underwater part of the hull of the tug boat on the port side beyond the midship. As a result of the collision the tug boat took on water, lost her buoyancy and sank.

The crew of the tug boat and its passenger found themselves in water. After several minutes they were rescued by a pilot boat *Pilot-63* and a rescue boat *R-2* from the SAR vessel *Pasat*. People rescued from water were directed to paramedics and admitted to hospital in Świnoujście diagnosed with hypothermia.

After the collision, *Transforza* berthed at the Portowców Wharf. The vessel was allowed to continue the voyage to Szczecin once the lack of visible damage and leaks of the hull had been ascertained. On 17 February, 2015 the vessel underwent thorough PSC inspection and was detained at the port due to identified deficiencies.

The area around the sunk wreck of *Kuguar* was surrounded by an oil spill containment boom which was maintained until 26 February, 2015. The wreck was recovered on 11 March, 2015.

2. General Information

2.1 Ship Particulars

2.1.1. *Transforza*

| | |
|-------------------------|---|
| Flag: | Gibraltar |
| Shipowner: | Industrial Shipping AS, Oslo (Norway) |
| Operator: | TransAtlantic Ship Management AB, Göteborg (Sweden) |
| Classification society: | DNV-GL |
| Vessel's type: | general cargo vessel |
| Call signal: | ZDNJ2 |
| IMO number: | 9199402 |
| Gross tonnage (GT): | 3244 |
| Year of built: | 2000 |
| Power: | 2880 kW (MAK 6 M 32) |
| Width: | 16.30 m |
| Length overall: | 99.95 m |
| Hull material: | steel |
| Minimum crew: | 8 men |
| VDR recorder: | S-VDR NetWave NW4000S |



Photograph 1: Transforza

2.1.2. Kuguar

| | |
|-------------------------|--|
| Flag: | Polish |
| Shipowner: | Otto Wulf GmbH & Co KG, Cuxhaven (Germany) |
| Operator: | Zakład Usług Żeglugowych Sp. z o.o. & Co. Sp. k., Szczecin (Poland) |
| Classification society: | PRS |
| Vessel's type: | tug boat |
| Call signal: | SPS2088 |
| Gross tonnage (GT): | 115.19 |
| Year of built: | 1969 |
| Power: | 589 kW (S.K.L. 6NVD 48A-2U) |
| Width: | 6.83 m |
| Length overall: | 25.64 m |
| Hull material: | steel |
| Minimum crew: | 4 men |



Photograph 2: Kuguar

2.2 Voyage Information

2.2.1. *Transforza*

| | |
|----------------------|------------------------|
| Ports en route: | Raahe (Finland) |
| Port of destination: | Szczecin |
| Type of navigation: | international |
| Manning: | 1 Estonian, 7 Russians |
| Passengers: | no passengers |

2.2.2. *Kuguar*

| | |
|----------------------|-----------------------------------|
| Ports en route: | Police |
| Port of destination: | Świnoujście |
| Type of navigation: | coastal, unlimited |
| Manning: | 4 Poles |
| Passengers: | 1 passenger of Polish nationality |

2.3 Accident Information

| | |
|--|---|
| Kind: | very serious marine casualty |
| Date and time of event (UTC): | 16.02.2015 22:18 LT (21:18 UTC) |
| Geographical position of the accident: | $\varphi = 53^{\circ}54,34' N$; $\lambda = 014^{\circ}15,70' E$ |
| Geographical area of the accident: | the Bay of Pomerania – the Świna Straight |
| Nature of the water region: | internal waters, the fairway |
| Weather during the event: | wind S 5–7° B, very good visibility, outgoing current 1,6 <i>kn</i> , air temperature $-1^{\circ}C$, water temperature $+5^{\circ}C$ |
| Operating state of <i>Transforza</i> : | loaded with steel products |
| Operating state of <i>Kuguar</i> : | the tug boat on her way from the port of Police to the port of Świnoujście without a towed object |
| Effects of the accident on <i>Transforza</i> : | no damage |
| Effects of the accident on <i>Kuguar</i> : | the tug boat's plating of the hull was damaged on the port side below the |

waterline at a level of the engine room, the vessel was flooded with water and sank (Photograph 4)



Photograph 3: The protruding mast of sank Kuguar

2.4 Shore Services and Rescue Action Information

The rescue operations involved: MPCK Świnoujście, rescue vessels *Pasat* and *Czesław II*, a pilot boat *Pilot-63*, a rescue boat *R2* and an ambulance of the national emergency services from the emergency station in Świnoujście.

MPCK had received information concerning the accident and men in water on 16 February, 2015 at 22:22. The vessel *Pasat* which was sent to the rescue operation, unmoored from the Wharf No. 13 at 22:35 and sailed towards the site of the accident. At that time, the pilot boat *Pilot-63* approached the tug boat sinking and drifting with the current, it took four survivors from the water and transported them to the shore. At 22:43 the fifth survivor remaining in the water was approached by the rescue boat *R-2* which had been launched from the vessel *Pasat*. That survivor was transferred to the rescue vessel *Czesław II*. At 23:05 *Czesław II* delivered him to the paramedics ashore.

All persons lifted from water were taken to the city hospital in Świnoujście with diagnosed mild hypothermia. Next day they were discharged from hospital.

After the completion of the rescue operation, the rescue vessel *Czesław II* and the rescue boat *R-2* spread an oil spill containment boom around the position where *Kuguar* sank. *Czesław II* started removing oily water.

Once the wreck of *Kuguar* had been sealed up and the leakage of oil stopped by the divers the operation of removing impurities was stopped on 21 February, 2015 at 13:05. It was resumed on 25 February, 2015 and completed the next day at 14:45 when the oil spill containment boom was folded. Totally, 13.2 m³ of oily water were removed.

On the days of 6 to 10 March, 2015 *Czesław II* was running works protecting the area around the wreck of a tug boat in relation to the operation of its recovery being prepared by a floating crane *Maja* by putting oil barriers, and it was removing oily pollution appearing at the place where the tug boat had sunk.

After the recovery of *Kuguar* on 11 March, 2015 in the afternoon, the removal of oil pollution emanating from the wreck was being continued.



Kuguar on lifting slings along the side of the crane

Photograph 4: Oil from the wreck of Kuguar emanating to the surface of water

The operation of removing the fuel impurities from the surface of water and folding the containment boom was completed on the same day at 19:00. An additional 19.2 m³ of oil contaminated water was collected.

3. Circumstances of the Accident

After completing the loading operation of steel products in Raahe, Finland, a general cargo vessel *Transforza* started her journey to Szczecin on 13 February, 2015 at 20:00. After three days of sailing, on 16 February at 21:40, at the roadstead of Świnoujście, the vessel admitted a pilot on board. On the bridge there was only the master who was steering the vessel. The radar was on and there was a computer (laptop) with preloaded uncertified electronic navigation chart. VHF's were turned on channels 12 and 68. The vessel was sailing at a speed of ca 8 knots. The adjustable bridge of the vessel was set in the middle position.

On the same day at 16:10 a dispatcher of the Zakład Usług Żeglugowych (ZUŻ) in Szczecin received a telephone order to provide a service of taking a vessel *Omskiy-137* out of the barge port of Police at 19:00. The dispatcher assigned *Kuguar* to do the job. Once the crew appeared on board of the tug boat and a passenger was taken (who was a pilot assigned to bring from the sea to the port of Szczecin a tug boat *Amon* with a pontoon *Partner-1*), *Kuguar* put off from the Warsztatowe Wharf in Szczecin at 17:20 and went to the port of Police. At 19:30 when *Omskiy-137* was turned and left the port, *Kuguar* was following *Omskiy-137* in the direction of Świnoujście. On the bridge, there was a skipper and a seaman who was steering the tug boat. The radar of the tug boat was not turned on. For navigation there was used a computer with preloaded by the skipper his private electronic navigation chart.

At 22:11, when *Transforza* was passing the lighthouse in Świnoujście, the pilot notified local ferries via VHF channel 12 about the fact of the vessel's approaching the ferry terminal. The same message was transmitted by the skipper of *Kuguar* at 22:14 informing also about her destination (the Portowców Wharf). The pilot of *Transforza* heard the message of *Kuguar*.

At ca 22:15 from the bridge of *Transforza* first there was noticed on the radar screen the echo of the vessel in front of the bow and then visually a masthead light and both sidelights of the tug boat coming from the opposite direction, located at a level of the first ferry station of the Ferry Harbour.

At 22:17 *Omskiy-137* proceeding to sea passed the stern of *Transforza*. *Transforza* started turning to port. After a while, the skipper of *Kuguar* heard on VHF channel 12 the call of the *Transforza*'s pilot to turn to starboard. In the course of turning to starboard it came to an impact. *Transforza* hit with her bulbous bow an underwater part of the port side of *Kuguar* beyond the midship (Photograph 5).



Photograph 5: Damage of the side of Kuguar

The collision took place in the middle of the fourth kilometre of the Świnoujście – Szczecin fairway in the position of $\varphi = 54^{\circ} 54,34'N$; $\lambda = 014^{\circ} 15,70'E$.

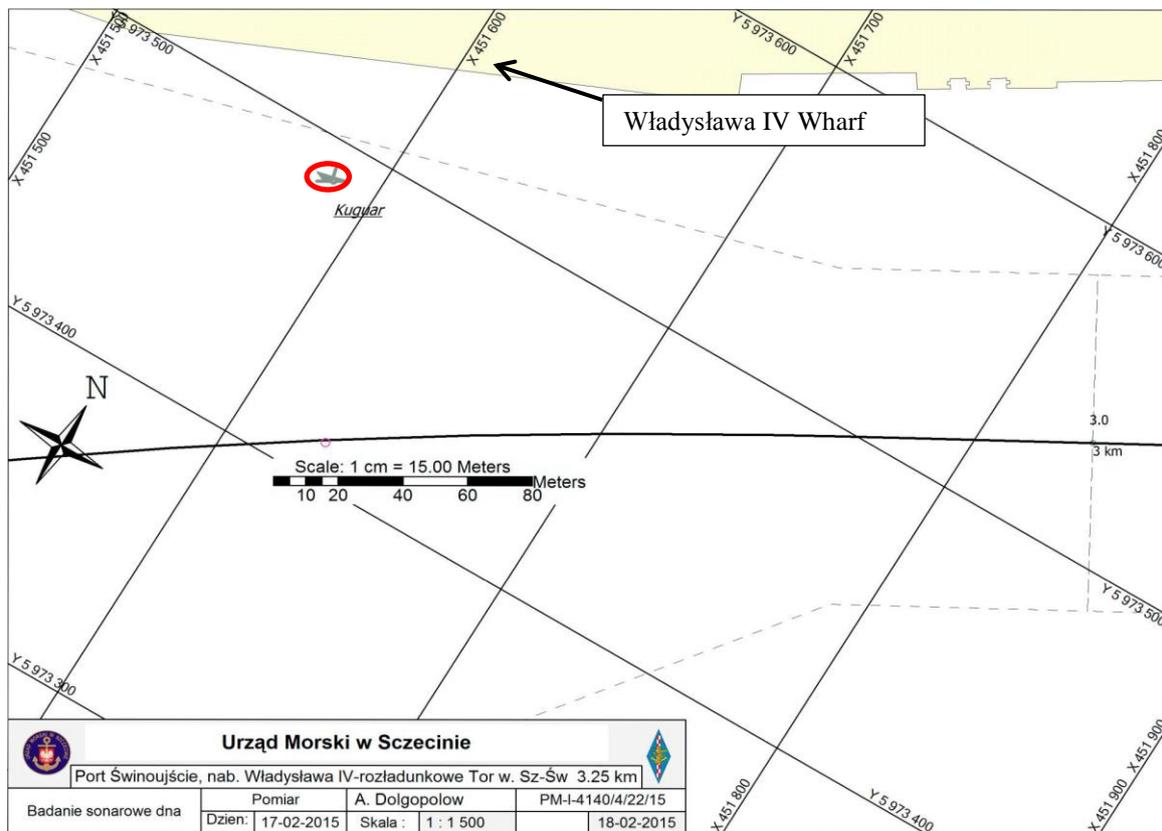
After the collision, *Transforza* with *Kuguar* stuck on the bulbous bow, started rotating to starboard in the direction of the Kosa Peninsula. The master of *Transforza* ordered full astern. *Kuguar* detached from the bow of *Transforza*.



Photograph 6: The bow of Transforza

The engineer of *Kuguar* noticed water flooding the floor in the engine room. Screaming, he warned the crew that the vessel was taking on water, he closed the engine room door and tore off the fuel shut off valve. The skipper of the tug boat ordered the crew to collect lifebuoys and go to the deck in the bow section.

For a few minutes the tug boat was remaining on water and drifting with the current. The crew members and a passenger went up the fender on the bow of the tug boat. Her stern was increasingly immersing in water. The crew and the passenger found themselves in water. *Kuguar* sank in the position of $\phi=54^{\circ}54,4553'N$; $\lambda=014^{\circ}15,7906'E$. She sank on the bottom at a depth of approximately 13.6 m.



Photograph 7: A place where *Kuguar* sank after sonar investigation of the sea bed

During the rescue operation all five survivors were saved from water. All men were taken to the city hospital in Świnoujście diagnosed with mild hypothermia. Earlier, the police had conducted a breath alcohol tests. The test showed that three members of the crew of *Kuguar* were in a state after the use of alcohol. The fourth one – the skipper of the tug boat was intoxicated. They were discharged from hospital on the next day, 17 February, 2015 in a good state.

A similar examination of the master, deck officers and the pilot of *Transforza*, carried out by the police immediately after the accident, showed no presence of alcohol in the exhaled air.

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

On the basis of the analysis of radar images and AIS messages registered by the VTS and data from the VDR recorders it is possible to reproduce vessels movement on the fairway and determine the exact place of the collision.

The Commission has found out that *Kuguar* was equipped neither with a VDR device nor an AIS transponder¹. The experts of the Commission have also established that the vessel's S-VDR had not registered data since March 2014². Accordingly, the movement of the vessel could be determined merely on the basis of AIS messages transmitted by the vessel.

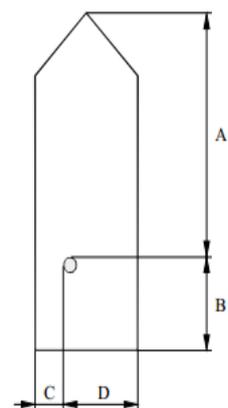
To analyze the movement of *Transforza*, the Commission used AIS messages received and registered by a shore station which is owned by the NavSim company and located in Świnoujście on the position of $\varphi=53^{\circ}54.54'N$; $\lambda=014^{\circ}15.81'E$ (pilot station).

AIS type 5 messages, which were being sent every 6 minutes by the transponder of *Transforza* on 16 February, 2015 during the approach to the port of Świnoujście served the Commission with the static and voyage related information data, helping to determine the identity of the vessel, her parameters (dimensions), the position of the AIS antenna on the vessel, and the port of destination. The decoded data are presented in Table 1 and on Photograph 8.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | A | B | C | D | 8 | 9 | 10 | 11 |
|---|-----------|---|---------|-------|------------|----|----|----|---|---|---|---|-----|---------|
| 5 | 236111943 | 1 | 9199402 | ZDNJ2 | TRANSFORZA | 70 | 86 | 14 | 8 | 8 | 1 | | 3,6 | STETTIN |

Table 1: Static data included in the AIS message

- 1 - Message ID
- 2 - MMSI
- 3 - AIS Version
- 4 - IMO Number
- 5 - Call Sign
- 6 - Name
- 7 - Type of vessel and cargo (7=Cargo ships; 0=All ships of this type)
- A - Distance between the antenna positioning device and the bow [m]
- B - Distance between the antenna positioning device and the stern [m]

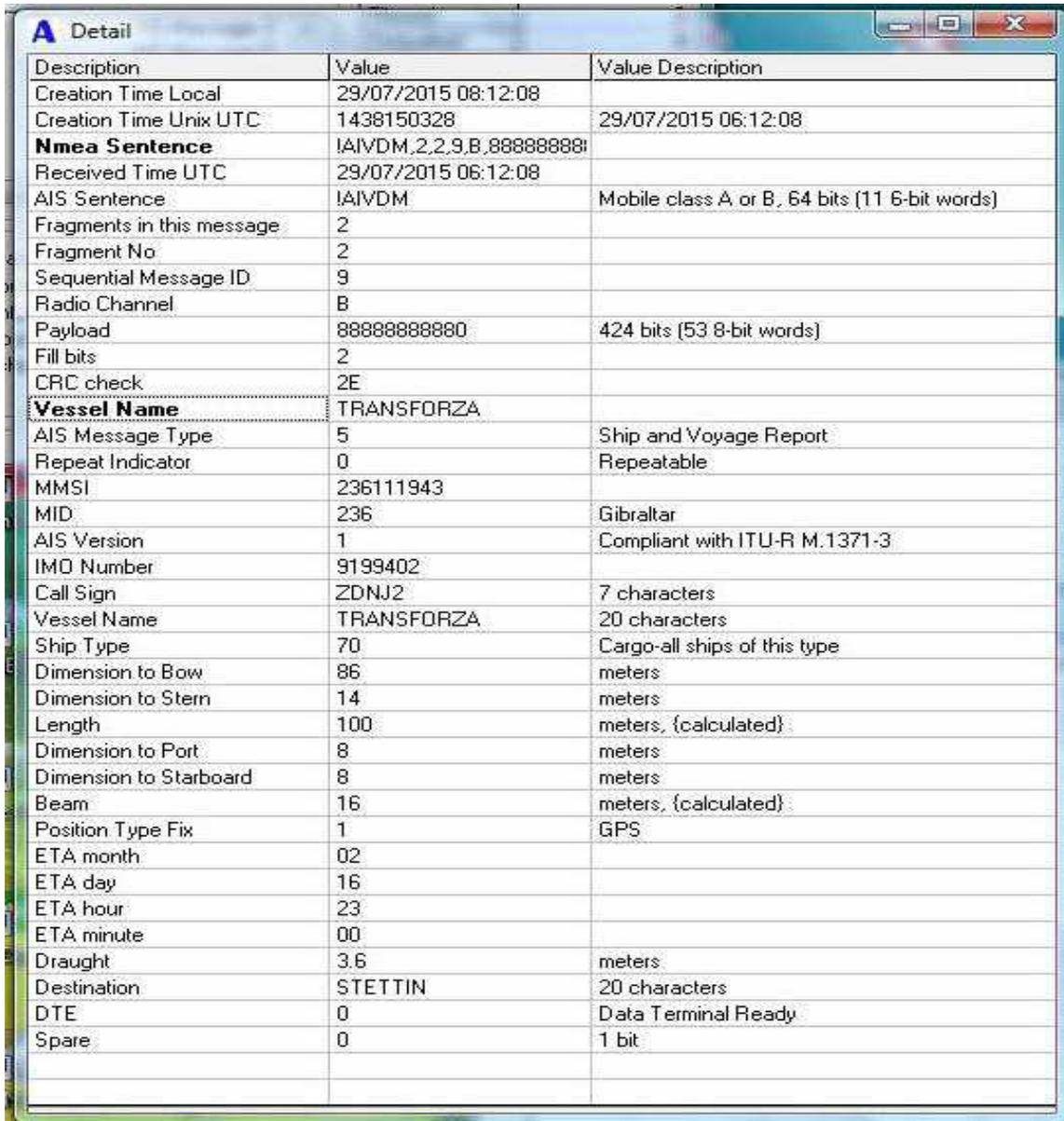


¹ Under the order of the Minister of Transport, Construction and Maritime Economy of 25 January, 2012 on furnishing vessels with VDR recorders (Journal of Laws item 120) a vessel of the gross tonnage of less than 3000 units does not have to be equipped with a VDR or S-VDR device.

Under the order of the Minister of Transport, Construction and Maritime Economy of 29 November 2011 on the categories of vessels exempt from the requirement of possessing automatic identification (AIS) devices (Journal of Laws of 2014 item 651) a vessel of the gross tonnage of less than 300 units does not have to be equipped with the AIS device.

² Besides, the Commission has established that the on-board S-VDR capsule had an outdated acoustic beacon.

- C - Distance between the antenna positioning device and the port side [m]
- D - Distance between the antenna positioning device and the starboard [m]
- 8 – Positioning device (1=GPS)
- 9 - ETA (estimated time to reach the destination) [month, day, hour]
- 10 - Draught [m]
- 11 - Destination



| Description | Value | Value Description |
|---------------------------|---------------------------|---|
| Creation Time Local | 29/07/2015 08:12:08 | |
| Creation Time Unix UTC | 1438150328 | 29/07/2015 06:12:08 |
| Nmea Sentence | !AIVDM,2,2,9,B,8888888888 | |
| Received Time UTC | 29/07/2015 06:12:08 | |
| AIS Sentence | !AIVDM | Mobile class A or B, 64 bits (11 6-bit words) |
| Fragments in this message | 2 | |
| Fragment No | 2 | |
| Sequential Message ID | 9 | |
| Radio Channel | B | |
| Payload | 888888888880 | 424 bits (53 8-bit words) |
| Fill bits | 2 | |
| CRC check | 2E | |
| Vessel Name | TRANSFORZA | |
| AIS Message Type | 5 | Ship and Voyage Report |
| Repeat Indicator | 0 | Repeatable |
| MMSI | 236111943 | |
| MID | 236 | Gibraltar |
| AIS Version | 1 | Compliant with ITU-R M.1371-3 |
| IMO Number | 9199402 | |
| Call Sign | ZDNJ2 | 7 characters |
| Vessel Name | TRANSFORZA | 20 characters |
| Ship Type | 70 | Cargo-all ships of this type |
| Dimension to Bow | 86 | meters |
| Dimension to Stern | 14 | meters |
| Length | 100 | meters, {calculated} |
| Dimension to Port | 8 | meters |
| Dimension to Starboard | 8 | meters |
| Beam | 16 | meters, {calculated} |
| Position Type Fix | 1 | GPS |
| ETA month | 02 | |
| ETA day | 16 | |
| ETA hour | 23 | |
| ETA minute | 00 | |
| Draught | 3.6 | meters |
| Destination | STETTIN | 20 characters |
| DTE | 0 | Data Terminal Ready |
| Spare | 0 | 1 bit |

Photograph 8: Static data and those related to the journey of Transforza³

On the day of the accident, *Transforza* was equipped with an AIS device type A working according to the ITU-R M.1371-3 protocol, whereby vessels, depending on their speed, should transmit their reports at time intervals shown in Table 2.

³ Data read by means of the AIS Decoder (author: Neil Arundale).

| <i>Ship's dynamic conditions</i> | <i>Nominal reporting interval</i> |
|--|-----------------------------------|
| <i>A vessel at anchor or moored and not moving faster than 3 knots</i> | <i>3 min</i> |
| <i>A vessel at anchor or moored and moving faster than 3 knots</i> | <i>10 s</i> |
| <i>A vessel moving at a speed of 0 to 14 knots</i> | <i>10 s</i> |
| <i>A vessel moving at a speed of 0 to 14 knots and changing its course</i> | <i>3.3 s</i> |
| <i>A vessel moving at a speed of 14-23 knots</i> | <i>6 s</i> |
| <i>A vessel moving at a speed of 14-23 knots and changing its course</i> | <i>2 s</i> |
| <i>A vessel moving at a speed above 23 knots</i> | <i>2 s</i> |
| <i>A vessel moving at a speed above 23 knots and changing its course</i> | <i>2 s</i> |

Table 2: Time intervals at which the vessels should transmit AIS data

Table 2 shows that the AIS device on *Transforza* should transmit AIS messages every 10 seconds – when the vessel is moving on a steady course; if the vessel is changing its course - three times faster.

4.1 The Analysis of the Way of *Transforza* Immediately before the Collision with *Kuguar*

To analyse the track of *Transforza* in the Świnoujście - Szczecin fairway, the map of the port of Świnoujście⁴ was used with marked boundaries of the fairway. These boundaries are not marked on navigational charts but they are (or at least should be) known to local pilots.

The analysis of *Transforza*'s track was performed by processing the record of AIS messages received and recorded in Świnoujście by NavSim receivers using the navigational programmes OpenCPN 4.2.0 and NavCruiser Professional 3.3.0.2. It helped to get a graphic illustration of the movement of vessels and illustrate the position and motion parameters of *Transforza* in the key moments of the event. In addition, selected AIS messages were decoded for additional verification of the images and for reading the parameters unavailable directly from the program. No modifications were made in the files including AIS messages. The full

⁴ For the analysis there was used a chart of "The Border of the Sea Port in Świnoujście" in a 1:5000 scale developed on the basis of data from the resources of the Maritime Office in Szczecin and MODGiK in Świnoujście as of February 2010. The map in the PDF format has been processed to get the image of the map in the PNG format. This image was then calibrated (see Annex 2) using six points marked on the map that became benchmarks in the WGS84 coordinate system. In addition, two other points were adopted for calibration arranged in the center of the map in the vicinity of the place of event. These two additional points are beacons with navigation lights and well known coordinates: on the northern tip of the Kosa Peninsula and in the north-eastern corner of the Ferry Terminal No. 6. The resulting map was saved in a standard format of BSB/KAP, which makes the map available in the majority of navigation programs. The verification of the adopted calibration was based on a comparison of additional calibration points introduced to the BSB/KAP map of the coordinates of the same objects from the official chart S57. The difference of coordinates at any point did not exceed the accepted accuracy of GPS. Thus the map created in such a way could be considered suitable for this type of analysis.

NMEA data stream received by the AIS shore station during the critical moment of the event is shown in Annex 1 to the report.

The Commission's analysis shows that on 16 February 2015 at ca 22:06 *Transforza* came from the sea to the port of Świnoujście. She was approaching up to the Pilotowe Wharf on the western side of the fairway, sometimes going down off the track to her starboard side. At the level of the Pilotowe Wharf the vessel changed her course to port and the resultant angle of 231° led further in the direction of the axis of the fairway.

Abeam of the Harbour Master's Office in Świnoujście *Transforza*, going at a speed of 8.3 *kn* sailed past a vessel *Omskiy-137*. Each of the vessels was sailing on their side of the fairway and the vessels passed by each other at a distance of about 45 meters (between the sides). Shortly after passing *Omskiy-137*, at 22:17:10 (Figure 1), *Transforza* changed the course again to port. The alteration of the course was slight, but larger than it would appear from the curvature of the fairway in that section.

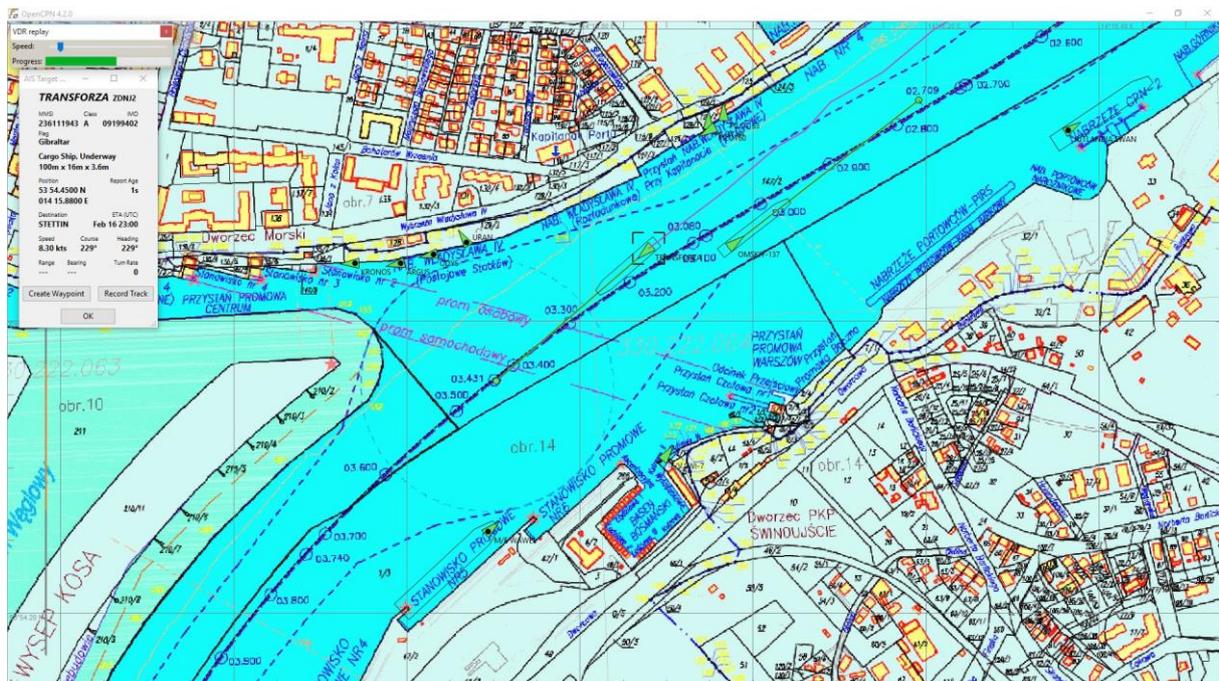


Figure 1: Message and position (T1): *Transforza* after sailing past *Omskiy-137*

Turning action and maintaining the adopted course meant that soon *Transforza* crossed the axis of the fairway (at the position of $\varphi=53^{\circ}54.4221'N$, $\lambda=014^{\circ}15.8467'E$), and went into the east side of the fairway (Figure 2).

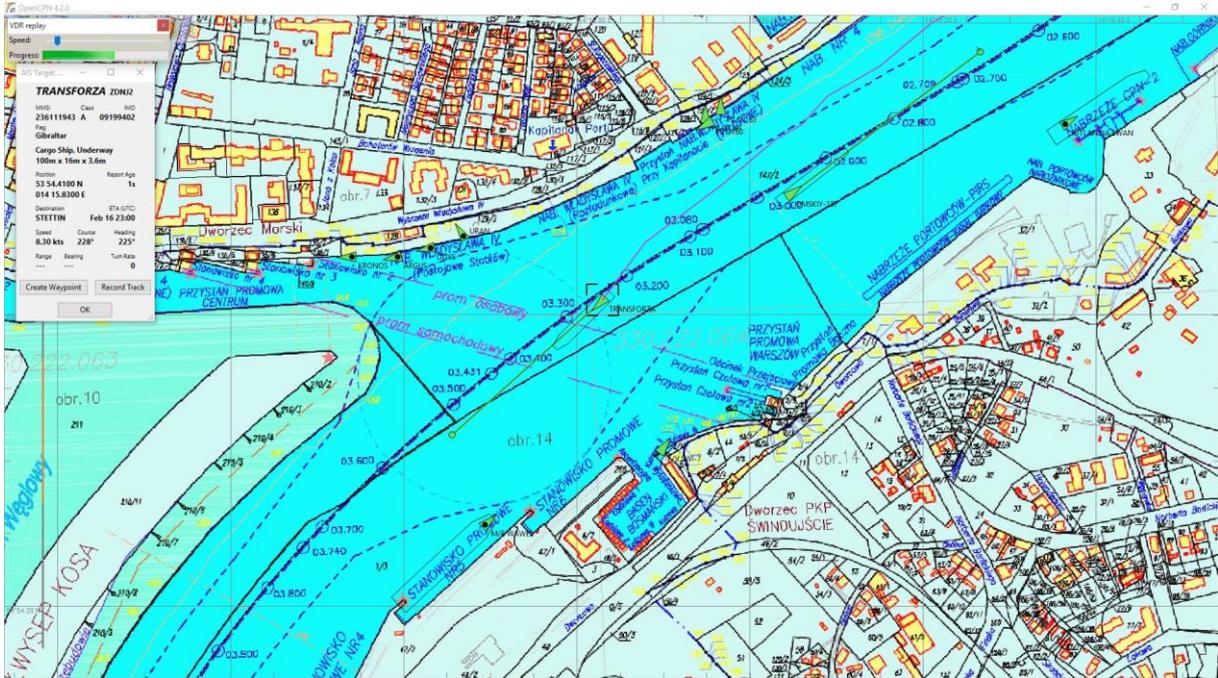


Figure 2: Message and position (T2): crossing of the fairway axis by *Transforza*

When *Transforza* was at ca 1.5 ship's length in front of *Kuguar*, the *Transforza*'s AIS transmitter sent a message about the turn to port being in progress at a speed of at least 5°/30s (Figure 3 and line (T3) in Table 3)⁵.

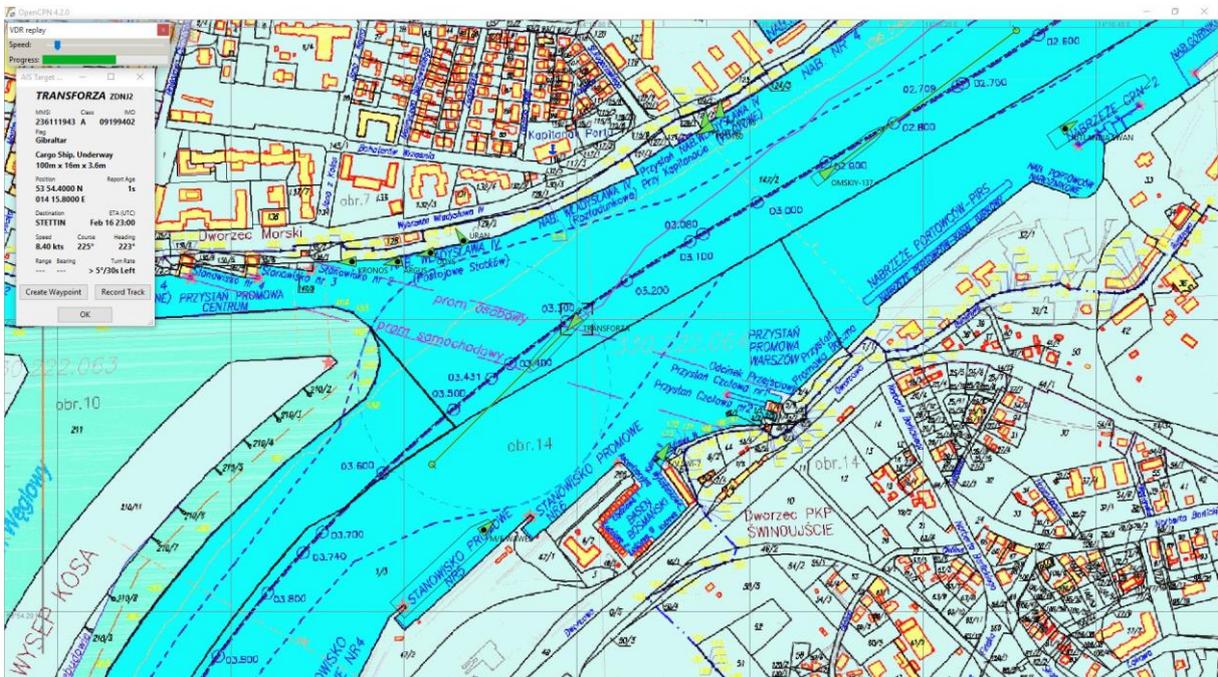


Figure 3: Message and position (T3): reported turning of *Transforza* to port side

⁵ Transmitted element of the AIS message ($ROT_{AIS} = -127$) means „turn to port >5°/30s”. The value of rotation does not come from a measurement by a device but from a difference between gyrocompass courses, because the vessel had „No Turn Indicator available” (see also dynamic data in Photograph 9).

The analysis of the following AIS message did not show further turning by the vessel but it indicated that *Transforza* was navigating on the eastern side of the fairway (Figure 4).

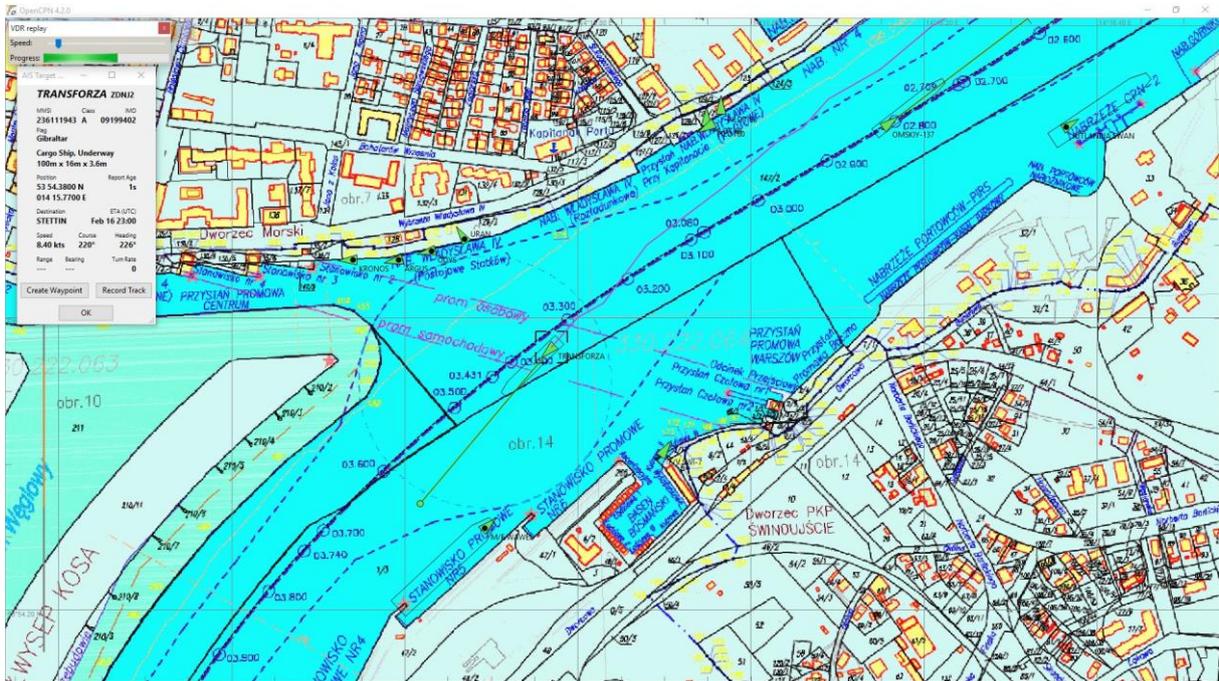


Figure 4: Message and position (T4): navigating of *Transforza* on the eastern side of the fairway

Another AIS message, sent probably 2-3 seconds after the collision, and subsequent messages indicated a permanent turn to starboard. *Transforza* started turning to starboard as a result of the *hard a starboard* manoeuvre (Figure 5 and Table 3).

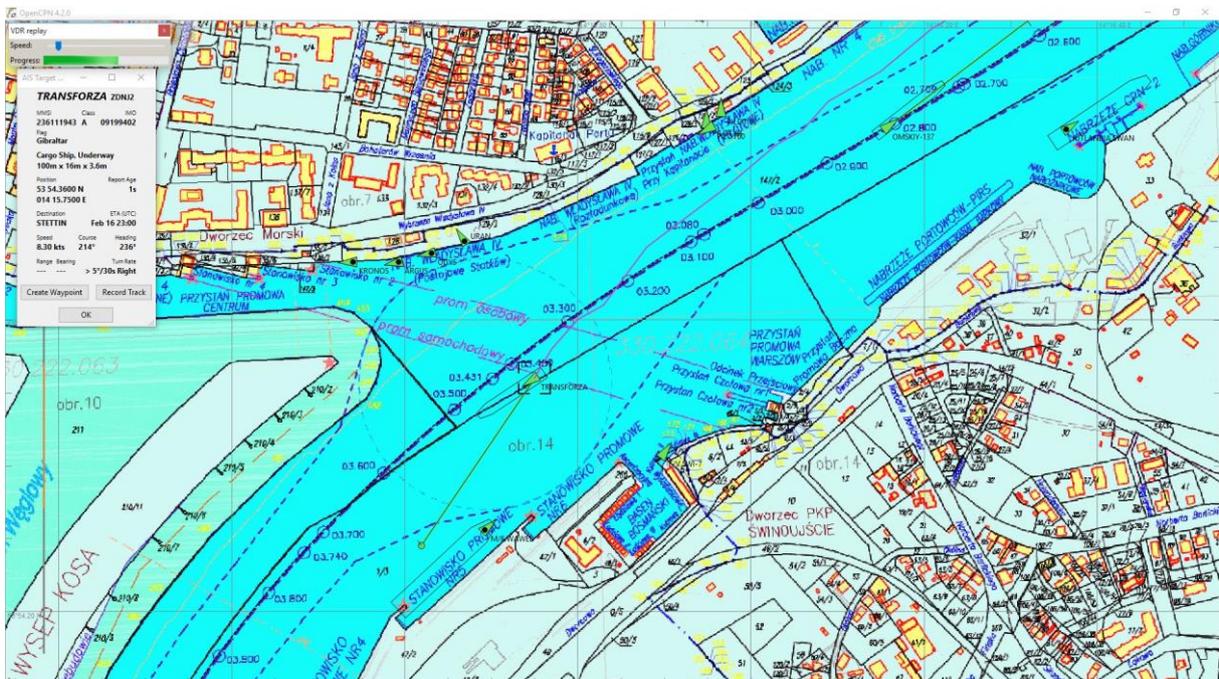


Figure 5: Message and position (T5): positioning of *Transforza* a few seconds after the collision

Figure 6 shows the situation after the collision of the vessel with the tug boat. The AIS message formulated 10 seconds after the previous message recorded a decrease of speed of *Transforza* by two knots (down to 6.3 kn) as a result of the collision and astern motion of the engine.

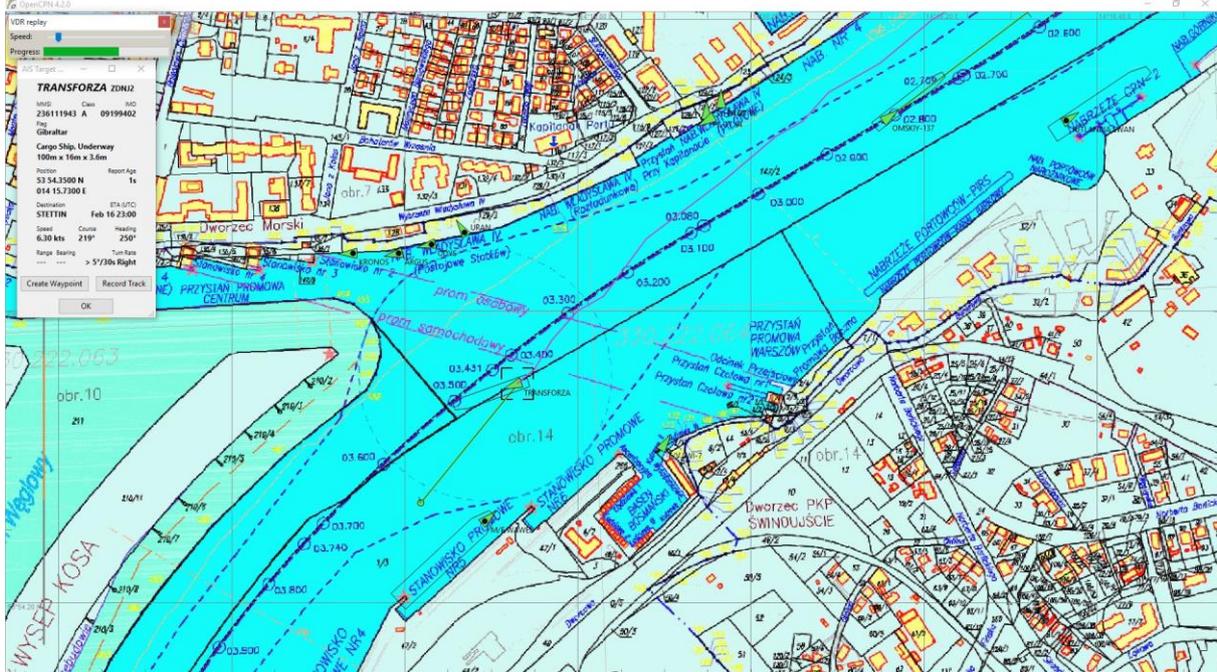


Figure 6: Message and position (T6): *Transforza* when turning to starboard after the collision

4.1.1. Critical Sequence of AIS Messages

The critical sequence of AIS messages covers messages sent by the *Transforza*'s AIS transmitter and received by the NavSim shore station in Świnoujście from the moment *Transforza* and *Omskiy-137* had sailed past each other to the moment the bow of *Transforza* crossed the axis of the fairway again turning to starboard after the collision with the tug boat. In that sequence there are 6 messages from the NMEA data stream received by the AIS monitoring station, shown in Annex 1 to the report:

1. 22:17:10: !AIVDM,1,1,,A,13Q;8Ah01C11C6PNn9e8tW:B00Ro,0*1A
2. 22:17:29: !AIVDM,1,1,,A,13Q;8Ah01C11BnpNn898r72p08A4,0*22
3. 22:17:40: !AIVDM,1,1,,B,13Q;8AhPAD11BePNn7h8jVw<0HG?,0*4E
4. 22:17:51: !AIVDM,1,1,,A,13Q;8Ah01D11BT8Nn6v8V75R0L0W,0*71
5. 22:17:59: !AIVDM,1,1,,B,13Q;8AhOiC11BMpNn6<8G7II06a4,0*52
6. 22:18:10: !AIVDM,1,1,,A,33Q;8AhOhw11BG'Nn5k8SWIB013A,0*77

The above data after decoding are shown in Table 3.

| | ϕ | Λ | SOG | COG | HDG | ROT _{AIS} | t _{xmit} ⁶ | t _{rcv} ⁷ |
|------|--------------|--------------|-----|-----|-----|--------------------|--------------------------------|-------------------------------|
| (T1) | 53°54.4500'N | 14°15.8800'E | 8.3 | 229 | 229 | 0 | 09 | 22:17:10 |
| (T2) | 53°54.4100'N | 14°15.8300'E | 8.3 | 228 | 225 | 0 | 28 | 22:17:29 |
| (T3) | 53°54.4000'N | 14°15.8000'E | 8.4 | 225 | 223 | -127 | 38 | 22:17:40 |
| (T4) | 53°54.3800'N | 14°15.7700'E | 8.4 | 220 | 226 | 0 | 49 | 22:17:51 |
| (T5) | 53°54.3600'N | 14°15.7500'E | 8.3 | 214 | 236 | +127 | 21:17:58 | 22:17:59 |
| (T6) | 53°54.3500'N | 14°15.7300'E | 6.3 | 219 | 250 | +127 | 09 | 22:18:10 |

Table 3: Data included in the messages of the critical sequence

Special attention should be drawn to the message (T3) containing the ROT_{AIS} report (-127) about the turn > 5° to port when the vessel was already on the eastern side of the fairway. The change of course produced an effective change of COG by 11° to port (225° - 214°). Further messages indicate that there was sudden deceleration and that the turn to starboard was being maintained. The position of *Transforza* at the time (T4) and (T5) and the most likely position of the collision with *Kuguar* is shown in Figure 7.

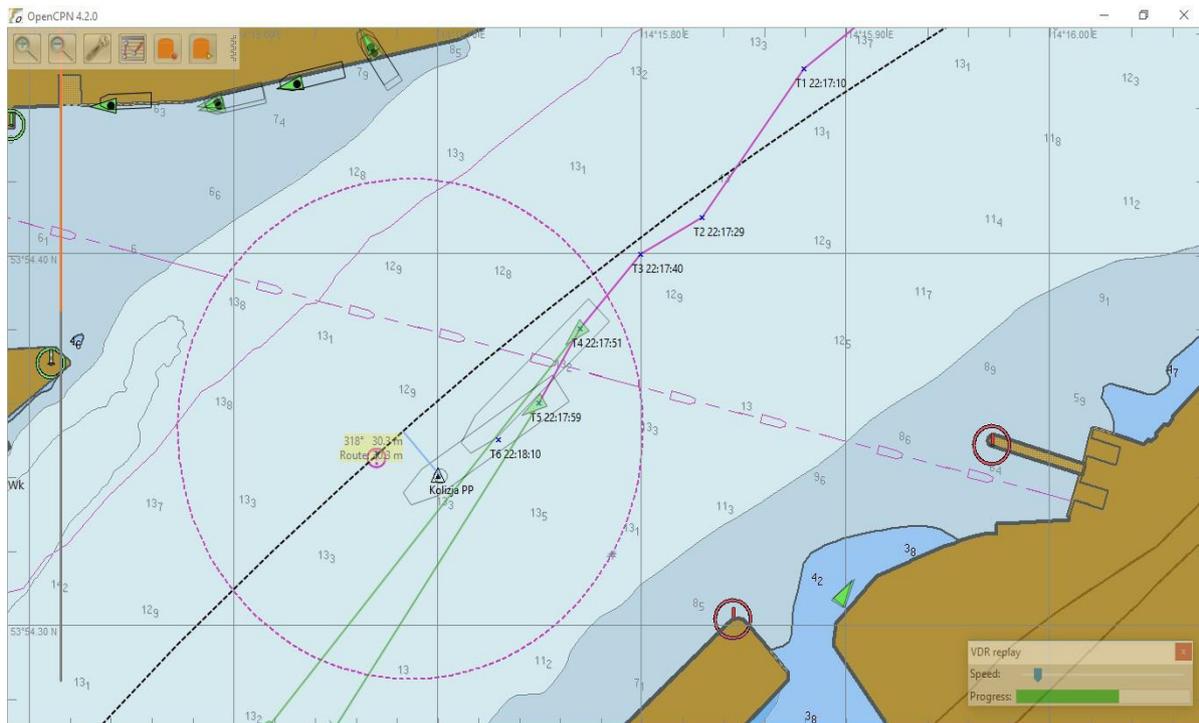


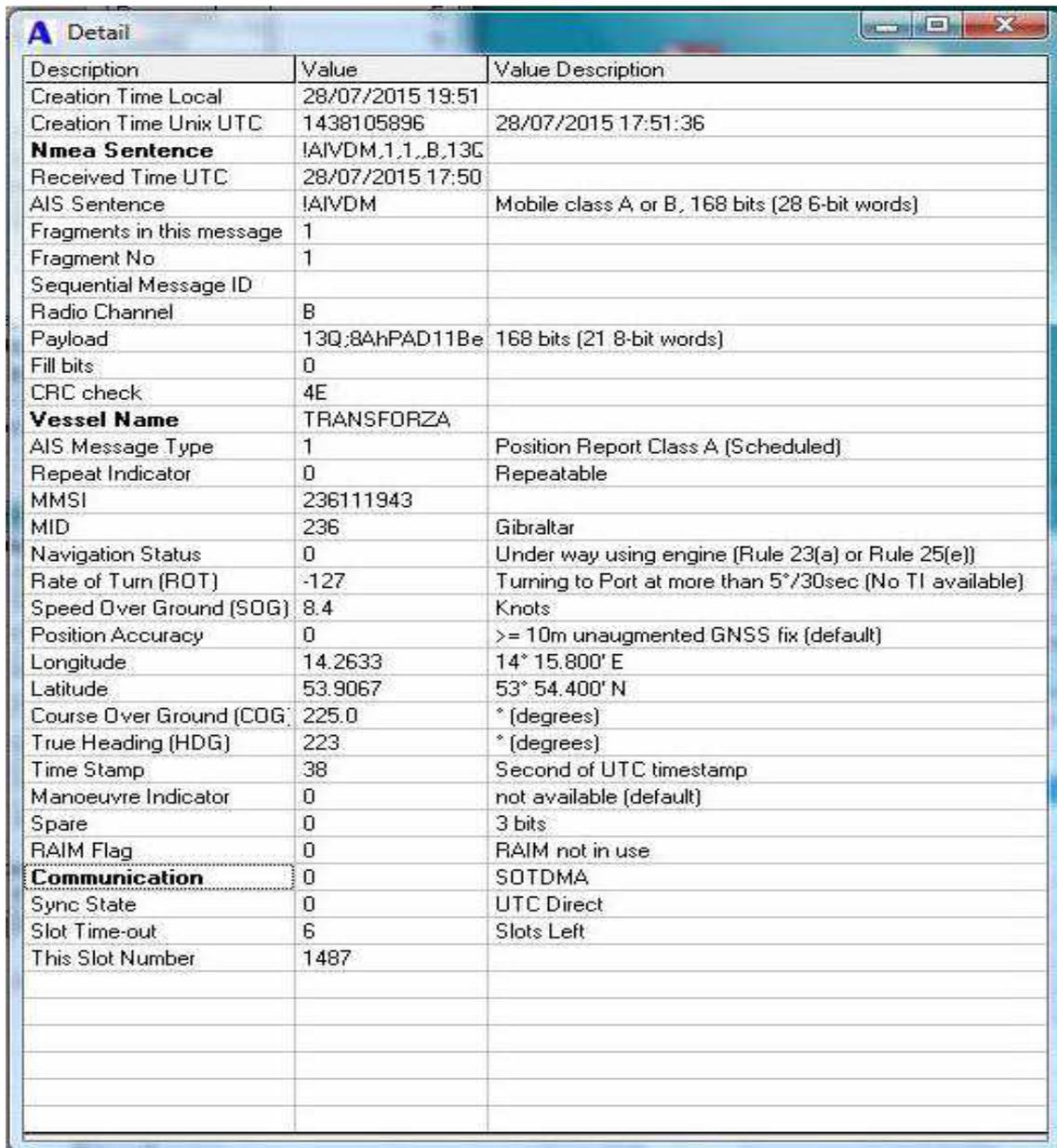
Figure 7: Position where *Transforza* had a collision with *Kuguar*

⁶ The Time Stamp placed in the message of the AIS transmitter indicates the time of formulating the message in the transmitter. It expresses only the value of seconds of the current reading of the clock. The values of *hours* and *minutes* of the current reading of the clock, which do not change with every message, are placed in the *Radio Status* field only in one or another message when the *Slot Time-Out* parameter is set to 1. In the investigated sequence, the message (T5) includes full UTC time stamp: 9:17:58. This marks the exact time of forming all messages in the entire sequence.

⁷ The time (LT) when the message is received, registered by the NavSim receiving station in Świnoujście. As one can see from the comparison of the last two columns (t_{xmit}; t_{rcv}) the delay in transmitting, receiving, and recording the messages takes usually 1 or 2 seconds

The axis of the fairway (dotted black line) and the AIS signal path of *Transforza* (dark pink solid line) are marked on the BHMW S-57 chart, shown in Figure 7. According to calculations made by the Commission, *Transforza* hit with her bow the side of the tug boat *Kuguar* which was located about 30 m to the right (eastwards) from the axis of the fairway.

It results from the value =0 for the information contained in the line *Position accuracy* (Photograph 9) which was defined in the AIS message type 1 (position report - dynamic data), that the on-board GPS device was not equipped with a differential adapter. To determine the accuracy of the vessel's position a standard accuracy of about 10 m was adopted.



| Description | Value | Value Description |
|---------------------------|-------------------|---|
| Creation Time Local | 28/07/2015 19:51 | |
| Creation Time Unix UTC | 1438105896 | 28/07/2015 17:51:36 |
| Nmea Sentence | IAIVDM,1,1,,B,13G | |
| Received Time UTC | 28/07/2015 17:50 | |
| AIS Sentence | IAIVDM | Mobile class A or B, 168 bits (28 6-bit words) |
| Fragments in this message | 1 | |
| Fragment No | 1 | |
| Sequential Message ID | | |
| Radio Channel | B | |
| Payload | 13Q:8AhPAD11Be | 168 bits (21 8-bit words) |
| Fill bits | 0 | |
| CRC check | 4E | |
| Vessel Name | TRANSFORZA | |
| AIS Message Type | 1 | Position Report Class A (Scheduled) |
| Repeat Indicator | 0 | Repeatable |
| MMSI | 236111943 | |
| MID | 236 | Gibraltar |
| Navigation Status | 0 | Under way using engine (Rule 23(a) or Rule 25(e)) |
| Rate of Turn (ROT) | -127 | Turning to Port at more than 5°/30sec (No TI available) |
| Speed Over Ground (SOG) | 8.4 | Knots |
| Position Accuracy | 0 | >= 10m unaugmented GNSS fix (default) |
| Longitude | 14.2633 | 14° 15.800' E |
| Latitude | 53.9067 | 53° 54.400' N |
| Course Over Ground (COG) | 225.0 | ° (degrees) |
| True Heading (HDG) | 223 | ° (degrees) |
| Time Stamp | 38 | Second of UTC timestamp |
| Manoeuvre Indicator | 0 | not available (default) |
| Spare | 0 | 3 bits |
| RAIM Flag | 0 | RAIM not in use |
| Communication | 0 | SOTDMA |
| Sync State | 0 | UTC Direct |
| Slot Time-out | 6 | Slots Left |
| This Slot Number | 1487 | |

Photograph 9: Dynamic data included in the AIS message transmitted by *Transforza* – selection from critical sequence for position (T3)

4.1.2. The Analysis of AIS Data Presented by the Operator of *Transforza*

The operator of *Transforza* presented the analysis of the vessel's movement when entering the port of Świnoujście on 16 February, 2015, on the basis of the register of AIS signals received from the shore AIS stations. The information shown in the left column in Table 4, has been compared by the Commission with information contained in AIS messages recorded by NavSim AIS station in Świnoujście. Several such decoded messages, including the critical sequence of AIS messages (see section 4.1.1) are shown in the right column in Table 4.

| MMSI | | 236111943 | | | | | | | | | |
|---------------------|-----------|-----------|-----|-------|-------|---------------------|-----------|-----------|-----|-----|-----|
| Date and UTC Time | Lat | Lon | SOG | HDG | COG | Date and UTC Time | Lat | Lon | SOG | HDG | COG |
| 16/02/2015 21:06:51 | 53.926500 | 14.279500 | 8.6 | 159.0 | 156.0 | | | | | | |
| 16/02/2015 21:07:30 | 53.925082 | 14.280372 | 8.4 | 164.0 | 161.2 | | | | | | |
| 16/02/2015 21:07:51 | 53.924333 | 14.280833 | 8.3 | 167.0 | 164.0 | | | | | | |
| 16/02/2015 21:08:30 | 53.922917 | 14.281487 | 8.3 | 174.0 | 167.3 | | | | | | |
| 16/02/2015 21:08:51 | 53.922167 | 14.281833 | 8.3 | 177.0 | 169.0 | | | | | | |
| 16/02/2015 21:09:30 | 53.920647 | 14.281723 | 8.0 | 189.0 | 184.0 | | | | | | |
| 16/02/2015 21:09:51 | 53.919833 | 14.281667 | 7.9 | 196.0 | 192.0 | | | | | | |
| 16/02/2015 21:10:30 | 53.918525 | 14.280825 | 8.0 | 199.0 | 197.6 | | | | | | |
| 16/02/2015 21:11:01 | 53.917500 | 14.280167 | 8.1 | 202.0 | 202.0 | | | | | | |
| 16/02/2015 21:11:30 | 53.916437 | 14.279430 | 8.2 | 204.0 | 203.0 | | | | | | |
| 16/02/2015 21:12:01 | 53.915333 | 14.278667 | 8.4 | 206.0 | 204.0 | | | | | | |
| 16/02/2015 21:12:30 | 53.914350 | 14.277765 | 8.3 | 214.0 | 209.9 | | | | | | |
| 16/02/2015 21:13:00 | 53.913333 | 14.276833 | 8.1 | 223.0 | 216.0 | | | | | | |
| 16/02/2015 21:13:30 | 53.912633 | 14.275503 | 8.0 | 226.0 | 221.9 | | | | | | |
| 16/02/2015 21:14:11 | 53.911667 | 14.273667 | 7.9 | 230.0 | 230.0 | | | | | | |
| 16/02/2015 21:14:30 | 53.911185 | 14.272705 | 7.9 | 231.0 | 230.6 | | | | | | |
| 16/02/2015 21:15:11 | 53.910167 | 14.270667 | 8.0 | 232.0 | 232.0 | | | | | | |
| 16/02/2015 21:15:30 | 53.909738 | 14.269703 | 8.0 | 232.0 | 232.0 | | | | | | |
| 16/02/2015 21:16:11 | 53.908833 | 14.267667 | 8.1 | 231.0 | 232.0 | | | | | | |
| 16/02/2015 21:16:30 | 53.908407 | 14.266707 | 8.2 | 230.0 | 231.0 | | | | | | |
| 16/02/2015 21:17:11 | 53.907500 | 14.264667 | 8.3 | 229.0 | 229.0 | 16/02/2015 21:17:10 | 53.907500 | 14.264667 | 8.3 | 229 | 229 |
| 16/02/2015 21:17:30 | 53.906968 | 14.263868 | 7.7 | 236.0 | 225.8 | 16/02/2015 21:17:29 | 53.906833 | 14.263833 | 8.3 | 225 | 228 |
| | | | | | | 16/02/2015 21:17:40 | 53.906667 | 14.263333 | 8.4 | 223 | 225 |
| | | | | | | 16/02/2015 21:17:51 | 53.908000 | 14.262833 | 8.4 | 226 | 220 |
| | | | | | | 16/02/2015 21:17:59 | 53.906000 | 14.262500 | 8.3 | 236 | 214 |
| | | | | | | 16/02/2015 21:18:10 | 53.905833 | 14.262167 | 6.3 | 250 | 219 |
| 16/02/2015 21:18:11 | 53.905833 | 14.262167 | 6.3 | 250.0 | 219.0 | | | | | | |
| 16/02/2015 21:18:30 | 53.905727 | 14.261795 | 4.7 | 263.0 | 236.4 | | | | | | |
| 16/02/2015 21:19:11 | 53.905500 | 14.261000 | 1.1 | 291.0 | 274.0 | | | | | | |
| 16/02/2015 21:19:30 | 53.905498 | 14.261053 | 1.1 | 297.0 | 329.5 | | | | | | |
| 16/02/2015 21:20:11 | 53.905500 | 14.261167 | 1.0 | 311.0 | 87.0 | | | | | | |
| 16/02/2015 21:20:30 | 53.905498 | 14.261350 | 1.1 | 313.0 | 84.5 | | | | | | |
| 16/02/2015 21:21:00 | 53.905498 | 14.261635 | 1.3 | 317.0 | 80.7 | | | | | | |

Table 4: Register of AIS messages presented by the operator and obtained by the Commission

The Commission noted that the data relating to the position and motion parameters of *Transforza* given in the left column have been recorded regularly: every 41 and 19 seconds. The Commission considers that this is not a record of actual messages coming from the shore AIS station, but it is a result of some kind of simulation with the use of a decoding program. As shown in Table 2 the AIS transponder on board should be capable of (and a shore station should receive) AIS messages at intervals of approximately 10 seconds, or 3.3 seconds, depending on whether a vessel was navigating on a steady course or maneuvering. The decoded data in the left column of Table 4, shown at intervals of 41 and 19 seconds, above all, do not represent all the messages transmitted by *Transforza*'s AIS device. There were

omitted, among other things, the most important messages of the critical sequence transmitted at 21:17:40, 21:17:51, and 21:17:59 (UTC), which are shown in the right column in Table 4. The data presented in the left column lack the message containing an important parameter of $ROT_{AIS-127}$ (direction and the speed of turn) sent by the AIS device 22:17:38 and received by the monitoring station at 22:17:40 (see line (T3) in Table 3). The Commission has considered the data presented in the left column of Table 4 for 21:17:30 (UTC) to be unreliable in relation to the speed and heading of *Transforza* (deceleration down to 7.7 kn and a change of the course to 236°).

The decoded data presented in the right column of Table 4, obtained by the Commission during the investigation, are not processed in any way. They are presented more or less every 11 seconds (so in such time intervals that are expected in Table 2 for the type A AIS device). They show the exact content of the messages transmitted by *Transforza*'s AIS transponder as they were received by NavSim shore station in Świnoujście (full data stream is shown in Annex 1).

In spite of the differences in the data shown in Table 4 decoded for the needs of the operator and obtained by the Commission, it results from both columns that between 21:17:30 and 21:18:11 (UTC), namely before the accident, at the moment of the impact, and for some time after the collision, *Transforza* had been on the wrong (for southbound shipping), eastern side of the fairway.

4.2 Human Factors (fault and neglect)

The Commission has recognized that the following factors contributed to the accident: insufficient observation and navigation errors committed by the crews of both vessels, as well as errors in the voyage plan of *Transforza* on the section going through the Świna channel.

The master of *Transforza* did not provide a lookout on the bridge. The radar of the vessel had detected the echo of the tug boat at a distance of ca 8 cables, but no action had been taken to determine the passing maneuvers or to move to starboard to the outer limit of the fairway. Aboard *Kuguar* the radar had not been switched on at all and the crew more than observing and navigating, had been busy talking in the wheelhouse.

The collision of the vessel with the tug boat took place on the eastern side of the fairway in a place where *Transforza* should not have been navigating. The pilot of *Transforza* had allowed to cut a corner while taking a turn to port and had not prevented the vessel from

going to the other side of the fairway. Also he decided too late to call out *Kuguar* on the radio.

According to the Commission, in the last phase of the movement of both vessels before the accident, the master of *Transforza* - several seconds before the collision – had turned to port (hoping, to have left the tug boat on the starboard side) in order to avoid the collision with the tug boat which for a short while had been in a blind spot under the overhang of *Transforza*'s bow. Shortly after the master of *Transforza* had seen on her port side the tug boat that had turned and had been sailing to starboard in the easterly direction (as suggested by the pilot of *Transforza*), he made *hard-a-starboard* turn. Such behaviour of the master has been demonstrated by *Transforza*'s track indicated in Figure 7 (position (T3) and (T4)) on the basis of messages from the onboard AIS device.

The Commission also considered that a state of intoxication of the skipper navigating the tug boat and the helmsman in a state after the use of alcohol may have impaired their efficiency necessary to control the course and position and have contributed to a belated awareness of the risk of collision⁸.

⁸ As indicated in Part 3 of the report on p. 12 the examination of the state of sobriety immediately after the accident showed that three members of the crew of *Kuguar* were in a state after use of alcohol, and the fourth one - a tugboat skipper - was intoxicated. Under Polish law the state after use of alcohol is when the blood alcohol concentration is from 0.2‰ to 0.5‰ or the breath alcohol content is from 0.1mg to 0.25mg of alcohol in 1 dm³ of exhaled air, while the state of intoxication is when the blood alcohol concentration is above 0.5‰ of alcohol or its presence in exhaled air above 0.25mg of alcohol in 1 dm³ of exhaled air (art. 46 par. 2 and 3 of the act of 26 October, 1982 on sobriety and counteracting alcoholism – Journal of Laws of 2015, item 1286 and art. 115 par. 16 of the Criminal Code). The Commission compared the alcohol limits provided for in the Polish, British (applying to the crew of *Transforza*) and international law – resulting from the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978, signed in London on 7 July 1978. (Journal of Laws of 1984, item 201 and 202, 1999, item 286 and 2013, item 1092) – the STCW Convention (*Standards of Training, Certification and Watchkeeping*). According to guidelines issued in February 2015 By the UK executive agency MCA (Maritime and Coastguard Agency) for the master of a British vessel (*A Master's Guide to the UK Flag, Version 5 - February 2015*) permissible limits of alcohol applicable to the master and crew members of a British vessel were the same as those provided for in relation to the drivers and were either 0.35mg of alcohol in 1 dm³ of exhaled air, or 0.8‰ of alcohol in the blood. The results of breathalyzer tests, which had all members of the crew of *Kuguar* including its skipper, were within the range allowed by British standards. However MCA has stipulated in that document that the limits set out in par. 14.1 will be updated after implementing the UK Manila amendments to the STCW Convention. The Commission has observed that two years earlier MCA had issued guidelines to shipowners, masters and sailors - MGN 448 (M) *Standards of Training, Certification and Watchkeeping Convention, 1978 as Amended. Manila Amendments: Medical Certification, Hours of Work and Alcohol Limits*, in which it indicated that after validating the amendments to the STCW Convention, alcohol limits for crew members of British vessels would equal 0.25mg of alcohol in 1 dm³ of exhaled air, or 0.5‰ in blood. Since at that time the British law has not yet been amended (the *Railway and Transport Safety Act 2003* was changed only in October 2015) in this regard, MCA recommended in its guidelines that the crews of vessels in international journeys to comply with these new limits, under international law, and the shipowners of such vessels to take into account new limits in general terms of alcohol consumption, which apply to their vessels. These new limits provide for the provisions contained in Chapter VIII of the STCW Convention Section A-VIII/1 point 10. In the Polish maritime law the alcohol limits on board were not introduced but there was introduced a penalty for navigating a vessel in a state of intoxication (art. 127 of the act of 18 August 2011 on safety at sea – Journal of Laws of 2016, item 281). The penalties apply only to intoxicated persons and not those who are in a state after use of alcohol.

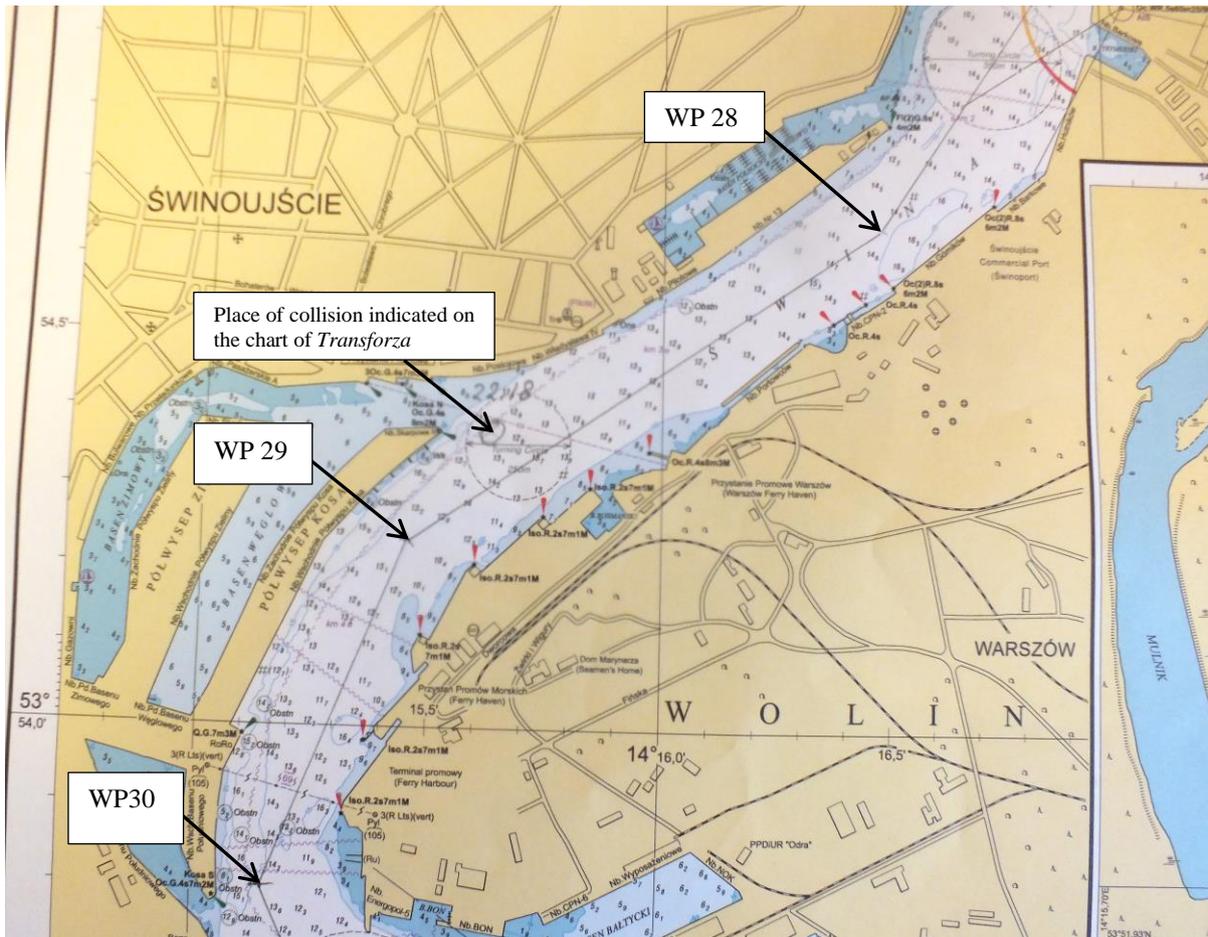
4.3 Execution of the voyage plan of *Transforza*

The Commission has carried out an analysis of the voyage plan prepared by the crew of *Transforza* (Photograph 10) laid down in accordance with the requirements from the berth in the port of departure (Raahe) to the berth in the port of destination (Szczecin) and has compared its data with way points and headings laid out on BA 2686 chart (Photograph 11) which the vessel used when entering the port of Świnoujście on 16 February, 2015.

Route: <Raahe - SZCZECIN>

| WP | Name | Lat | Lon | Distance | Course | Total Distance |
|----|--------------------|---------------|----------------|-----------|---------|----------------|
| 0 | 355a Raahe Berth | 64° 39.299' N | 024° 24.609' E | XXXX | XXXX | XXXX |
| 1 | 240z | 64° 39.509' N | 024° 24.496' E | 0.22 nm | 346.9 ° | 0.22 nm |
| 2 | 355b | 64° 39.610' N | 024° 24.102' E | 0.20 nm | 300.9 ° | 0.41 nm |
| 3 | 355c | 64° 39.572' N | 024° 22.222' E | 0.81 nm | 267.3 ° | 1.22 nm |
| 4 | 355d | 64° 39.017' N | 024° 19.758' E | 1.20 nm | 242.3 ° | 2.42 nm |
| 5 | wp 355 raahe pilot | 64° 38.780' N | 024° 12.320' E | 3.21 nm | 265.7 ° | 5.63 nm |
| 6 | 452 | 64° 39.300' N | 023° 53.900' E | 7.94 nm | 273.8 ° | 13.57 nm |
| 7 | 453 | 64° 37.000' N | 023° 42.000' E | 5.62 nm | 245.7 ° | 19.18 nm |
| 8 | 400 | 63° 35.600' N | 021° 05.200' E | 92.33 nm | 228.2 ° | 111.51 nm |
| 9 | 525 | 63° 33.404' N | 020° 52.470' E | 6.10 nm | 248.8 ° | 117.62 nm |
| 10 | 382 | 63° 32.110' N | 020° 42.150' E | 4.80 nm | 254.3 ° | 122.41 nm |
| 11 | 383 | 63° 28.200' N | 020° 38.600' E | 4.23 nm | 202.1 ° | 126.65 nm |
| 12 | 384 | 63° 24.800' N | 020° 33.400' E | 4.13 nm | 214.4 ° | 130.78 nm |
| 13 | wp 860 | 60° 32.500' N | 018° 58.100' E | 178.55 nm | 194.6 ° | 309.33 nm |
| 14 | wp 344 | 60° 10.300' N | 019° 00.800' E | 22.30 nm | 176.6 ° | 331.63 nm |
| 15 | wp 808 | 59° 40.000' N | 019° 52.200' E | 39.90 nm | 139.6 ° | 371.53 nm |
| 16 | wp 764 | 59° 34.500' N | 019° 58.000' E | 6.25 nm | 151.9 ° | 377.79 nm |
| 17 | wp 907 | 59° 30.000' N | 019° 55.200' E | 4.73 nm | 197.5 ° | 382.52 nm |
| 18 | wp 783 | 57° 51.000' N | 018° 00.000' E | 116.04 nm | 211.2 ° | 498.55 nm |
| 19 | wp 47 | 56° 08.500' N | 016° 42.500' E | 111.12 nm | 202.4 ° | 609.67 nm |
| 20 | 769 | 56° 02.300' N | 016° 30.000' E | 9.36 nm | 228.4 ° | 619.03 nm |
| 21 | 770 | 54° 15.000' N | 014° 39.200' E | 124.89 nm | 210.6 ° | 743.92 nm |
| 22 | 632 | 54° 01.500' N | 014° 18.100' E | 18.35 nm | 222.5 ° | 762.28 nm |
| 23 | 419 | 54° 00.200' N | 014° 14.800' E | 2.34 nm | 236.2 ° | 764.62 nm |
| 24 | 436 SWIN PILOT | 53° 58.800' N | 014° 15.270' E | 1.43 nm | 168.8 ° | 766.05 nm |
| 25 | 433 | 53° 56.600' N | 014° 16.000' E | 2.25 nm | 168.9 ° | 768.29 nm |
| 26 | 633 | 53° 55.900' N | 014° 16.550' E | 0.77 nm | 155.1 ° | 769.07 nm |
| 27 | 634 | 53° 55.370' N | 014° 16.960' E | 0.58 nm | 155.5 ° | 769.65 nm |
| 28 | 635 | 53° 54.800' N | 014° 16.760' E | 0.58 nm | 191.7 ° | 770.23 nm |
| 29 | 636 | 53° 54.149' N | 014° 15.324' E | 1.07 nm | 232.5 ° | 771.30 nm |
| 30 | 637 | 53° 53.720' N | 014° 15.200' E | 0.44 nm | 189.7 ° | 771.74 nm |
| 31 | 638 | 53° 53.609' N | 014° 15.221' E | 0.11 nm | 173.6 ° | 771.85 nm |
| 32 | 639 | 53° 52.779' N | 014° 16.284' E | 1.04 nm | 142.9 ° | 772.89 nm |
| 33 | 640 | 53° 52.415' N | 014° 16.516' E | 0.39 nm | 159.4 ° | 773.28 nm |
| 34 | 641 | 53° 51.089' N | 014° 16.957' E | 1.35 nm | 168.9 ° | 774.64 nm |
| 35 | 642 | 53° 50.861' N | 014° 17.122' E | 0.25 nm | 156.8 ° | 774.89 nm |
| 36 | 643 | 53° 37.799' N | 014° 34.701' E | 16.74 nm | 141.4 ° | 791.62 nm |
| 37 | 644 | 53° 37.302' N | 014° 34.994' E | 0.53 nm | 160.7 ° | 792.15 nm |
| 38 | 645 | 53° 35.360' N | 014° 35.680' E | 1.99 nm | 168.1 ° | 794.14 nm |
| 39 | 646 | 53° 33.470' N | 014° 35.900' E | 1.90 nm | 176.0 ° | 796.04 nm |
| 40 | 647 | 53° 32.400' N | 014° 37.810' E | 1.56 nm | 133.2 ° | 797.60 nm |
| 41 | 648 | 53° 30.980' N | 014° 38.060' E | 1.43 nm | 174.0 ° | 799.03 nm |
| 42 | 649 | 53° 28.750' N | 014° 36.850' E | 2.35 nm | 197.9 ° | 801.38 nm |
| 43 | 650 | 53° 28.450' N | 014° 36.450' E | 0.38 nm | 218.5 ° | 801.76 nm |
| 44 | 651 | 53° 28.162' N | 014° 36.195' E | 0.33 nm | 207.8 ° | 802.09 nm |

Photograph 10: Voyage plan of *Transforza* with marked section (WP 28-30)



Photograph 11: BA 2686 chart from *Transforza*'s bridge with routes marked out by the crew with three planned points of turn No 28, 29 and 30

The Commission concluded that way points on the BA 2686 chart on the fairway near the scene of the collision, marked in the voyage plan and on the photograph of the chart with numbers 28, 29, and 30, have been marked by the crew incorrectly. The coordinates and the courses laid out on the chart did not correspond to the way points and courses provided for in the journey plan. The navigation officer of *Transforza* laid out the route of the vessels on the fairway in Świnoujście “more or less” in the middle of the fairway which was both inconsistent with the journey plan and contrary to the principle, which required vessels navigating in narrow passages or on fairways to keep as close as possible to the outer limit of such a passage or fairway.

Figure 8 shows the track of *Transforza* planned by the crew (marked with a continuous blue line) between points of turn marked with numbers 27 - 30, according to the data specified in the voyage plan (Photograph 10, WP 27-30). In addition, a black dotted line shows the axis of the fairway.

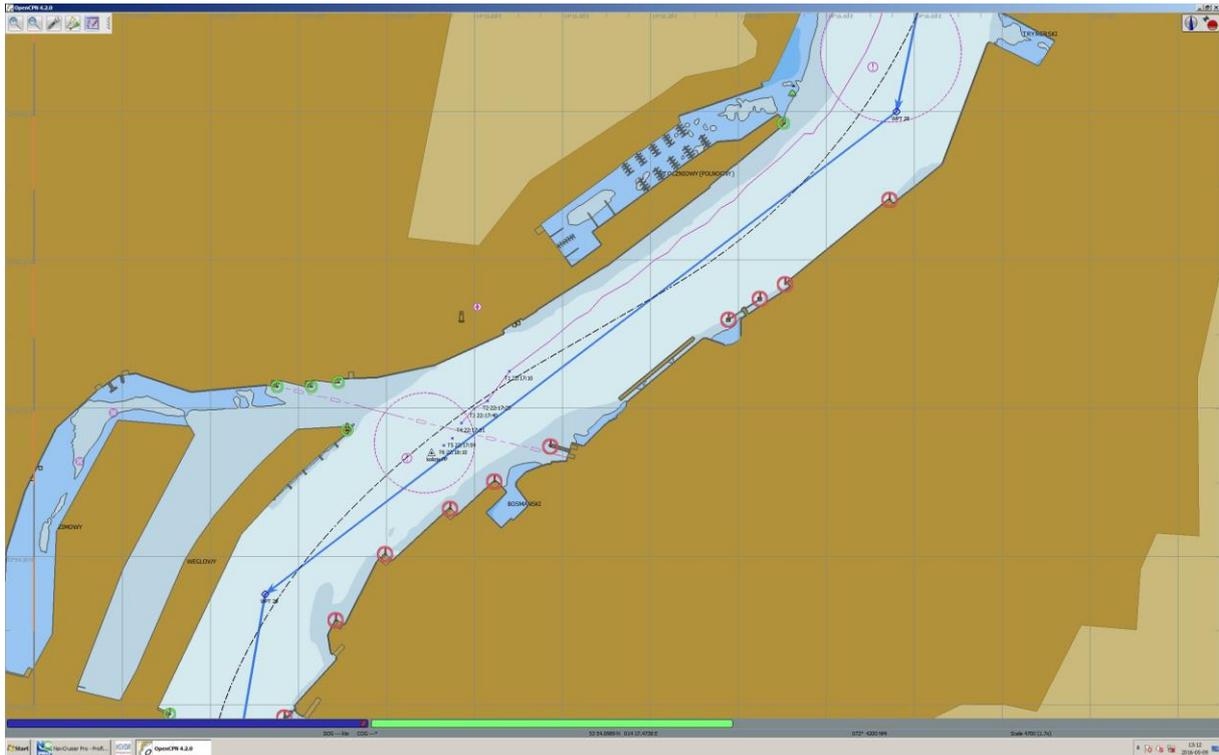


Figure 8: Planned route of *Transforza* on the electronic chart (blue line)

The enlarged image of the chart on Figure 9 clearly shows that the planned route of the vessel in the area where the accident happened, was clearly on the eastern side of the fairway.

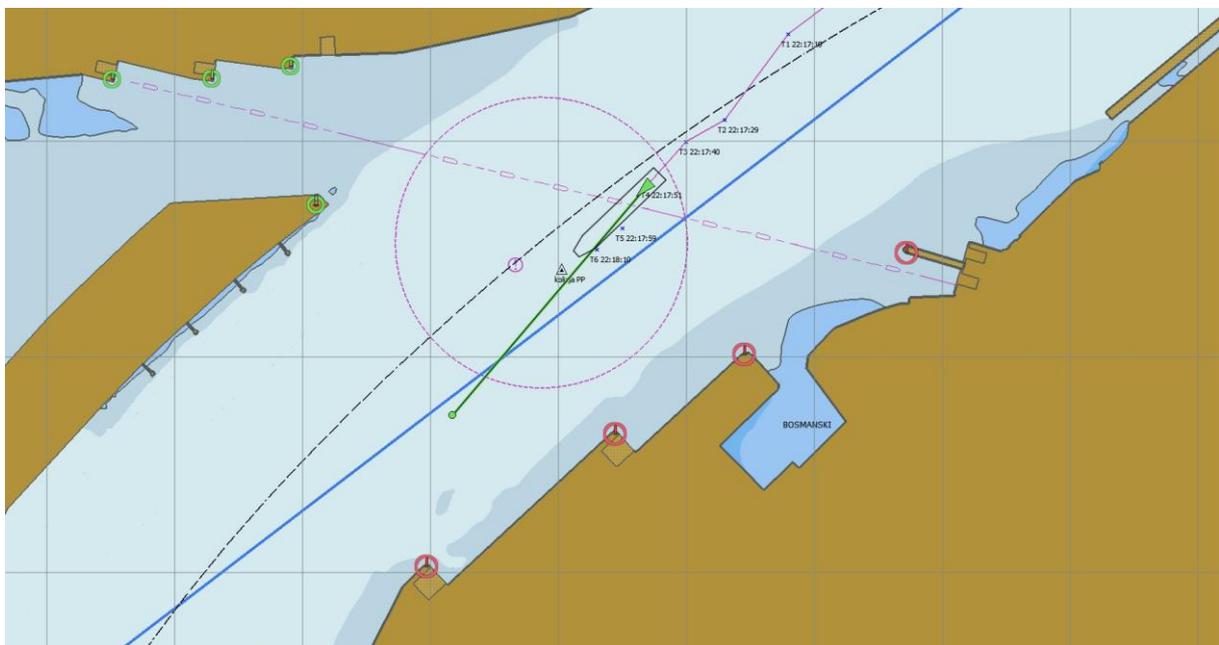


Figure 9: Planned route of *Transforza* in the vicinity of the place of collision

According to the Commission's findings the master of *Transforza* was steering the vessel by himself in the Świna channel and he was navigating with the help of an electronic chart

loaded to the laptop computer. On that chart there were probably introduced the way points and courses in accordance with a pre-planned voyage and, therefore, the planned route of the vessel on that chart looked like the one shown in Figures 8 and 9 (blue line).

The Commission considered it very likely that after passing *Omskiy-137*, the master of *Transforza* - to execute the voyage plan - gradually started changing the course of the vessel to port in order to enter the pre-planned route (marked in Figures 8 and 9 with a blue line). Keeping these courses led the vessel to the eastern side of the fairway. The pilot, who was watching the movement of the vessel on the electronic chart used by the master, did not point out to the master that the route laid out of the chart was incorrect and that the vessel should keep to the right (western) side of the fairway.

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

The Commission has recognized that the collision of *Transforza* and *Kuguar* on the fairway in Świnoujście on 16 February, 2015 was caused by a deviation of the vessel sailing to the port of Szczecin from the western to the eastern side of the fairway (because of a wrong voyage plan, i.e. incorrectly planned approach through the Świna channel) and a knock into the side of the tug boat sailing on the eastern side of the fairway to Świnoujście.

The Commission has also found that *Kuguar* was sailing too close to the middle of the fairway instead of moving close to its outer limit as required by Regulation 9(a) of the COLREG⁹ Convention, applicable also in the internal waters¹⁰.

No proper visual observation had been carried out on either vessel. In the case of *Transforza* there had been no lookout on the bridge¹¹ who could have kept the observation or steer the vessel and the master, acting as a watch officer at the same time, would have had

⁹ Rule 9 (a) stipulates that “A vessel proceeding along the course of a narrow channel or fairway shall keep as near to the outer limit of the channel or fairway which lies on her starboard side as is safe and practicable”. The application of this rule ensures that the passage is used in a safe way and hazardous encounters with vessels navigating opposite courses are avoided.

¹⁰ The obligation to comply with the COLREGs provisions in the water regions of the port of Świnoujście results from §3.1 of the order No. 3 of the Director of the Maritime Office in Szczecin of 26 July 2013 - Port Regulations (Official Journal of the Province of West Pomerania of 6 August 2013, item 2932).

¹¹ Under current shipboard working arrangements approved by the master and posted up on the bridge, apart from a watch officer there should be an duty AB on a bridge between 22:00 and 06:00. The Commission has noted however, that in accordance with the STCW Code (Section A-VIII/2 Part 4-1 of point 14 *Lookout*), the officer may be the only observer on the bridge only during the day. This means that after dark (according to the terminology used in the STCW Convention during *darkness hours*) in addition to the watch officer or the master, there should also be a seaman on the bridge, who will act as an observer. According to point 18 of section A-VIII/2, part 4-1 of the STCW Convention proper organization of the watch belongs to the master of the vessel.

better conditions for observation and navigation. In the case of *Kuguar* there were more people than necessary on the bridge, and they were busy with private conversations, not observation and navigation. Their efficiency could have been impaired due to consumed alcohol¹², which could have precluded them from detecting the risk of collision and taking appropriate steps when the danger of collision was imminent.

The pilot of *Transforza* did not pay attention to the fact that there was no lookout man on the bridge, in spite of the night. He did not advise the master not to alter the course after passing *Omskiy-137* by cutting the corner and going to the opposite side of the fairway; and he was belated with his decision to call out *Kuguar* on the radio¹³.

Both vessels, when reporting by VHF to the city ferries about their approach at an interval of 3 minutes (at 22:11 and 22:14) heard about the other vessel going from the opposite direction, but they did not intensify observation, did not check their own position and the position of the other vessel did not attempt to seek contact. It led to excessive proximity and collision.

In the course of the investigation the Commission has also highlighted the fact that had not affected the occurrence of the accident but it could have had negative consequences if the course of events had been different or the collision would have taken place elsewhere. It is about the order given by the dispatcher of the operating company to the skipper of the tug boat and the skipper's consent to take a passenger, a marine pilot, to be transported to the port in Świnoujście. The skipper agreed to take the passenger despite the fact that the safety certificate¹⁴ of the tug boat did not provide for passengers on board, and a maximum number of people on board specified in the safety certificate and the anticipated number of individual rescue measures (belts and lifebuoys) was 4.

After the collision of the vessels all people from the tug boat ended up in water. Rescue services involved in the rescue action were aware of 4 people on the tug boat, since that was

¹² It should be noted that, in accordance with art. 127 par. 1 point 7 of the Act of 18 August 2011 on Safety at Sea (Journal of Laws of 2016, item 281) a person who navigates a vessel or performs their duties with regard to the safety of the vessel in a state of intoxication, is liable to a fine to the amount not exceeding twenty times the average monthly salary in the preceding year, announced by the President of the Central Statistical Office in the Official Journal of the Republic of Poland "Monitor Polski" for the purpose of pensions and annuities. According to such wording of the act, it is possible to assess the behavior and effects of alcohol on the *Kuguar*'s skipper alone and not other members of the crew of the tug boat (on the day of the accident in Świnoujście on 16 February 2015 this wording was slightly different and made reference only to the manager of the vessel, i.e. the skipper of the tug boat).

¹³ The Commission points out that similar omissions were made and shown in a simplified report on the collision of *Fast Jef* and *Alora* on 14 May, 2015 in the Świna channel published by the Commission in March 2016. (www.pkbwm.gov.pl).

¹⁴ Safety certificate No. 218/KB/SZC/14 issued on 30.05.2014 by the Maritime Office in Szczecin.

the number given by the skipper to the VTS services when going through the Szczecin Lagoon at the Brama Torowa No. 1. It is not difficult to imagine a situation in which, as a result of the collision, part of the tug boat's crew gets drowned, their bodies are taken out of water, and the remaining survivors are not able to give information about the actual number of people on board because of exhaustion or suffered trauma and the rescue emergency services stop the rescue action after determining that they have already had all four members of the crew.

The Commission finds unacceptable the practice used by the tug boat operator (their dispatcher) of taking aboard additional people without entering them on a crew or passenger list. Transportation of pilots by tug boats is considered by the Commission to be a regular practice used in the pilot regions however, it should be "approved" by the maritime administration by making appropriate changes in the safety data sheets of vessels used for transportation of pilots after providing them with the necessary additional rescue measures.

6. Safety Recommendations

State Commission on Maritime Accident Investigation has found it reasonable to formulate safety recommendations, forming the proposal of actions which may contribute to prevention of similar accidents in the future to the following bodies.

6.1 The Operator of *Transforza*

State Commission on Maritime Accident Investigation has recommended that the Company TransAtlantic Ship Management AB should:

- 1) instruct masters to prepare and implement watchkeeping schedules at port and at sea in such a way that, in accordance with the STCW Convention requirements, there was a duty seaman as a lookout on the bridge, apart from a watch officer, at night (in hours of darkness) and not only between 22:00 and 06:00;
- 2) instruct masters and officers responsible for preparing the voyage plan, when preparing the plan through narrow channels or fairways, to take into account the curvature of a track or passage by a sufficiently frequent changes of the course in order to observe the requirement of the COLREGS Regulation 9(a) to keep to the outer limit of a narrow channel or fairway.

6.2 The Operator of *Kuguar*

The State Commission on Maritime Accident Investigation has recommended that the Zakład Usług Żeglugowych Sp. o. o. & Co. Sp. K. should:

- 1) make changes to the scope of responsibilities set out in the work chart of the dispatcher who is responsible for supervising the work of the tug boat crews, allowing the dispatcher to check the condition of the crew members (not only on sobriety), in particular a skipper of a tug boat, before their commencement of towing services;
- 2) take other measures, in consultation with the JSG - FACH Sp. o. o. company responsible for hiring the crews of tug boats, including control measures, which would prevent bringing and consuming alcoholic beverages on board of owner's tug boats;
- 3) carry out systematic trainings and inform crew members of tug boats and, in particular, their skippers, about the consequences of performing their duties after consuming alcohol, including those stipulated in art. 87 § 1 of the Act of 20 May 1971 – the Code of Offences¹⁵; or in a state of intoxication, stipulated in art. 178a of the Act of 6 June 1997 – the Criminal Code¹⁶ and art. 108 § 2 of the Act of 26 June 1974 – the Labour Code¹⁷ and in art. 127 § 1 point 7 of the Act of 18 August 2011 on Safety at Sea;
- 4) abandon the practice of taking passengers aboard vessels unfit for that purpose.

Moreover, the Commission has submitted for further consideration of the operator the possibility of equipping the vessels in AIS transponders. The introduction of AIS devices, which are compulsory, for example, on small fishing vessels¹⁸ which are smaller than tug boats, would increase safety of navigation in water regions with heavy traffic. The operator's tug boats could be sooner detected and shown on AIS monitors of the sea going vessels, and the AIS messages received by AIS devices on tug boats.

6.3 Pilot Station Szczecin

Regarding identified by the Commission repeated cases of cutting corners in the Świna channel by vessels piloted by pilots from the Station and the practice of piloting vessels

¹⁵ Journal of Laws of 2015, items 1094, 1485, 1634, 1707.

¹⁶ Journal of Laws No. 88, item 553 as amended.

¹⁷ Journal of Laws of 2014, item 1502 as amended.

¹⁸ Since 31 May, 2014 a fishing vessel exceeding 15 metres' length overall shall be fitted with and maintain in operation an automatic identification system (art. 10 of the Council Regulation (EC) No 1224/2009 of 20 November, 2009 which establishes a common control system to ensure the observance of common policy in fishery).

contrary to the requirements of the COLREG Convention, the State Commission on Marine Accidents Investigation has recommended:

- 1) to instruct the pilots of the Station to advise the masters of piloted vessels whose size allows it, to keep as close as possible to the outer limit of the fairway in accordance with the requirements of Rule 9(a) of the COLREG Convention;
- 2) to encourage the pilots of the Station to use pilot electronic charts bearing the profile of the fairway, with which the pilots of the Station have been provided by the Szczecin Pilot company;
- 3) to instruct the pilots of the Station about the need of more frequent communication with the vessels navigating in the Świna channel from the opposite direction if they are not certain about the behaviour of a vessel or need to co-ordinate passing manoeuvres.

6.4 Maritime Administration

After analyzing the provisions on alcohol limits (permissible content of alcohol in blood or breath) binding in Polish law, the Commission noticed that in the Article 127 paragraph 1 point 7 of the Act of 18 August, 2011 on Safety at Sea there is a provision about a penalty establishing a fine for navigating a sea-going vessel or performing duties in the field of safety of the vessel, its protection and prevention of pollution of the marine environment, in a state of intoxication.

The provision about the penalty should refer to the order or prohibition expressed in a substantive provision. In other words, the penalty provided for in the act should refer to the violation of the order or prohibition clearly formulated in the Act (or binding international convention). There is no such provision - requiring specific behavior or prohibiting certain behavior – in the Act. The law on maritime safety has not provided for alcohol limits which should be observed by the crews of the sea-going vessels but it has provided for penalties for failure to comply with these limits. Such a solution is incompatible with the rules of legislative technique.

The State Commission on Maritime Accident Investigation has submitted for further consideration of the minister responsible for maritime economy the possibility of supplementing the provisions of the Act on Safety at Sea with substantive provision specifying in accordance with the provisions of the STCW Convention the limits of alcohol for crew members of sea-going vessels while performing their duties on board.

7. List of Figures

| | |
|---|----|
| Figure 1: Message and position (T1): <i>Transforza</i> after sailing past <i>Omskiy-137</i> | 16 |
| Figure 2: Message and position (T2): Crossing of the fairway axis by <i>Transforza</i> | 17 |
| Figure 3: Message and position (T3): Reported turning of <i>Transforza</i> to port side | 17 |
| Figure 4: Message and position (T4): Navigating of <i>Transforza</i> on the eastern side of the fairway..... | 18 |
| Figure 5: Message and position (T5): Positioning of <i>Transforza</i> a few seconds after the collision | 18 |
| Figure 6: Message and position (T6): <i>Transforza</i> when turning to starboard after the collision | 19 |
| Figure 7: Position where <i>Transforza</i> had a collision with <i>Kuguar</i> | 20 |
| Figure 8: Planned route of <i>Transforza</i> on the electronic chart (blue line) | 27 |
| Figure 9: Planned route of <i>Transforza</i> in the vicinity of the place of collision | 27 |

8. List of Photographs

| | |
|---|----|
| Photograph 1: <i>Transforza</i> | 5 |
| Photograph 2: <i>Kuguar</i> | 6 |
| Photograph 3: The protruding mast of sank <i>Kuguar</i> | 8 |
| Photograph 4: Oil from the wreck of <i>Kuguar</i> emanating to the surface of water | 9 |
| Photograph 5: Damage of the side of <i>Kuguar</i> | 11 |
| Photograph 6: The bow of <i>Transforza</i> | 11 |
| Photograph 7: A place where <i>Kuguar</i> sank after sonar investigation of the sea bed..... | 12 |
| Photograph 8: Static data and those related to the journey of <i>Transforza</i> | 14 |
| Photograph 9: Dynamic data included in the AIS message transmitted by <i>Transforza</i> – selection from critical sequence for position (T3) | 21 |
| Photograph 10: Voyage plan of <i>Transforza</i> with marked section (WP 28-30)..... | 25 |
| Photograph 11: BA 2686 chart from <i>Transforza</i> 's bridge with routes marked out by the crew with three planned points of turn No 28, 29 and 30 | 26 |

9. List of Tables

| | |
|--|----|
| Table 1: Static data included in the AIS message | 13 |
| Table 2: Time intervals at which the vessels should transmit AIS data..... | 15 |

| | |
|--|----|
| Table 3: Data included in the messages of the critical sequence | 20 |
| Table 4: Register of AIS messages presented by the operator and obtained by the Commission | 22 |

10. Glossary and Abbreviations

AIS – Automatic Identification System

BHMW – (*Polish abbreviation*) Hydrographic Office of the Polish Navy

COLREGs (collision regulations) – International Regulations for Preventing Collisions at Sea

kn – knots

LT – local time

MODGiK – (*Polish abbreviation*) Municipal Centre for Land-Surveying and Cartography in Świnoujście

MPCK – (*Polish abbreviation*) Marine Ancillary Coordination Centre

PNG – Portable Network Graphics

S-VDR – Simplified Voyage Data Recorder

UTC – United Time Coordinated

VDR – Voyage Data Recorder

WP – way point

11. Information Sources

Notification about the accident

Documents of Transforza and Kuguar

Materials from hearing of witnesses

Recording of ships' movements by VTS Szczecin

Expert opinion of P. Carlson

Expert opinion of NavSim Polska Sp. z o.o.

12. Composition of the Accident Investigative Team

The team conducting the examination was composed of:

the Team Leader - Krzysztof Kuropieska, a Member of the State Commission on Maritime Accident Investigation,

the Team Member – Tadeusz Gontarek, a Member of the State Commission on Maritime Accident Investigation.

Annex 1
Image of the AIS data

Selected fragment of the NMEA data stream from 22:17:10 till 22:18:10 on the day of 16 February 2016 received by AIS Navsim monitoring station in Świnoujście, used by the Commission to analyze the movement of *Transforza*. In the stream there were selected and marked with (T1) to (T6) the sentences to which part 4.1.1 of the report applies.

```

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!AIVDM,1,1,,B,4@2OV41ut'EA912gUJNpo0A000S:,0*21
!AIVDM,1,1,,B,14aFID002:Q1?6<NqFhnPm<DJ6a4,0*44
!AIVDM,1,1,,B,13pr=V0P0011CKnNn<wP0?vD0D0V,0*5C
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----- LT 22:17:40 (T3) -----

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!AIVDM,2,1,3,A,53qHhB400001<q8622105<5B2222222222220k2@C534JUN74mjCSmBThj,0*5E
!AIVDM,2,2,3,A,AH888888880,2*2E
!AIVDM,1,1,,A,13P7AP@01V113LTNuBKLoJIN0d0E,0*13
!AIVDM,1,1,,A,13prCJP00011lj'NkpP'5W=N2<0R,0*14
!AIVDM,1,1,,B,13q5DOWP00Q1Lk2NkUiFEwwPR<0V,0*78
!AIVDM,1,1,,B,13bfAj001J11J9nNkpHdTr1T2HM2,0*51
!AIVDM,1,1,,B,4@2OV41ut'Eai12gUJNpo0A00<0h,0*4C

----- LT 22:17:51 (T4) -----

!AIVDM,1,1,,A,13Q;8Ah01D11BT8Nn6v8V75R0LOW,0*71
!AIVDM,1,1,,A,10:w3:0P00Q1AFtNmgW@0?wVRHN8,0*01
!AIVDM,1,1,,A,14aFID0028Q1?l:Nq@l6Q5=VJ<0',0*23
!AIVDM,1,1,,B,13pr=V0P0011CKrNn<wP0?wV0@Nk,0*14
!AIVDM,1,1,,B,13pr='RP0G11G0PNo:'4pgw'00SD,0*72
!AIVDM,1,1,,A,144ahK01ASQ1DLtNn<pj3iaV28O>,0*4A
!AIVDM,1,1,,B,402OFL1ut'EAm11IP@NnVGi00<0w,0*15
!AIVDM,1,1,,A,14SK04001vQ1l:0NqkC2<1of06a4,0*29
!AIVDM,1,1,,A,14'VGp0001Q1A34NmrEaSiGb0<0W,0*04
!AIVDM,1,1,,B,14'VGp0001Q1A34NmrEaSiGb0<0W,0*07

Annex 2

Image of the calibration data

