



**SMAIC**

STATE MARINE ACCIDENT  
INVESTIGATION COMMISSION

# FINAL REPORT

# 39/15

**Very serious marine casualty**

## **M/V GREEN EBERSUND**

Damage to the plating of the hull and spill of fuel while  
docking at the Port of Gdynia  
On the day of 27 August 2015

**July 2017**



The investigation of a very serious marine casualty of the vessel *Green Egersund* was conducted under the State Marine Accident Investigation Commission Act of 31 August 2012 (The Journal of Laws 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 casualty or incident under the above-mentioned Act is to ascertain its causes and circumstances to prevent future casualties 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 casualty 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 Marine Accident Investigation Commission Act).

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## 1. Facts

On 27 of August 2015, at 16:48, the vessel *Green Egersund* unmoored from the Południowe Wharf at the Port of Gdynia and went to the “SMW-1” floating dock belonging to the Naval Shipyard S.A. standing in the Basin IX of the port.

The vessel was taken to the dock without its own propulsion, with the help of three tugboats: *Fairplay VII* at the bow, *Mars* at the stern, and *Fairplay IV* assisting at the side.

Once the vessel had been turned at the entrance to the Basin IX it was directed to the dock with its stern to. As the vessel started entering the dock, its stern being pushed from the port side by *Fairplay IV* moved to the right side of the dock and struck the edge of the mooring roll of the right side wall with its buttock. The impact caused damage to the plating of the vessel at a level of a heavy fuel service tank No. 15 and spill of fuel to the port basin.

The spill was reported by the dock master to the dispatcher of the Naval Shipyard who passed information to the Shipyard Rescue Service, harbour master’s office, Port Fire Brigade of the Port Authority of Gdynia as well as “Bonex” and “Delfin RM” companies specializing in the treatment of port water in case of oil spill.

The docking of the vessel was uninterrupted. After passing towlines from the dock and putting them on the vessel’s poles, towing was started by means of winches to the docking position. At ca. 17:40 the dock master set the vessel in a position that would allow the hull to be set on keel blocks. During that time, the leakage of fuel from the damaged tank stopped.

At ca. 19:00 an oil spill containment boom was set between the edge of the Gościnnie Wharf and the Północne Wharf of the Basin IX and at 19:40 the Port Fire Brigade set up an oil spill containment boom and absorption sleeves at the entrance to the inner port to prevent the expansion of oil spill to the external port.

The removal of oil from port basins was carried on at intervals until 6 September 2015. Works in the Basin IX lasted until 11 September 2015. After clearing the dock and hull of the vessel, the oil boom separating the basin from the rest of the port was removed.

## 2. General Information

### 2.1. Ship Particulars

Vessel’s name:	Green Egersund
Flag:	the Bahamas



Owner:	Caiano Shipping II AS, Haugesund (Norway)
Operator:	Green Management Sp. z o. o., Gdynia
Classification society:	DNV - GL, Lloyd`s Register
Vessel`s type:	refrigerated vessel
Call signal:	C6YO8
IMO number:	8804567
Gross tonnage (GT):	5084
Year of built:	1990
Power:	4045 kW (Wartsila AB 5500 HP)
Width:	18 m
Length overall:	109 m
Hull material:	steel
Minimum crew:	11 men
Type of the S-VDR recorder:	Rutter 100 G 25



*Photograph 1: Green Egersund*

## 2.2. Floating Dock Particulars

Dock's name:	SMW-1
Operator:	Naval Shipyard S.A. under liquidation, Gdynia
Classification society:	PRS S.A.
Type:	floating dock
Deadweight capacity:	8000 t
Year of built:	1989
External width:	35.50 m
Internal width:	28.50 m
Length overall:	151.00 m
Length of the pontoon:	140.40 m
Hull material:	steel



*Photograph 2: The "SMW-1" dock*

## 2.3. Voyage Particulars

Port of destination:	Gdynia
Type of navigation:	international
Manning:	10 Russians, 2 Ukrainians, 2 Latvians, 1 Belarusian, 1 Estonian



## 2.4. Accident Information

Kind:	very serious marine casualty
Date and time of event:	27.08.2015 at 17:14 LT (15:14 UTC)
Geographical position of the event:	$\varphi = 57^{\circ} 32.2' N$ ; $\lambda = 18^{\circ} 32.3' E$
Geographical area of the event:	the Port of Gdynia
Nature of the water region:	internal sea waters
Weather during the event:	wind SW $3^{\circ} B$ , very good visibility, air temp. $21.6^{\circ} C$ , water temp. $18^{\circ} C$
Operational status of the vessel during the accident:	vessel under classification survey, without main propulsion, ballasted
Place of the accident on board:	stern of the vessel, starboard, plating of the service tank for heavy fuel no 15
Effects of the accident to the environment:	polluted water and port wharfs with a layer of petroleum substance 0.5 – 2.5 cm thick



*Photograph 3: The Pilotowe Wharf*



*Photograph 4: The Polskie Wharf*



*Photograph 5: The Fińskie Wharf*



*Photograph 6: The Polskie Wharf*

## 2.5. Shore Services and Rescue Action Information

To remove the oil spill the Naval Shipyard employed the Shipyard's Rescue Service as well as "Bonex" and "Delfin R. M." companies, which removed fuel from the surface of water in the shipyard and port basins.

Owing to the size and spread of oil spill in adjacent port areas, in the action of securing and clearing port basins there were included units of the Port Fire Brigade of the Port of Gdynia Authority, which set up oil booms at the entrance to the outer port.



*Photograph 7: The „Delfin” catcher*



*Photograph 8: The oil boom*



*Photograph 9: Removal of oil spill by SAR vessel „Kapitan Poinc”*



*Photograph 10: Devices of the Port Fire Brigade at the Pilotowe Wharf*

After inspecting the polluted port basins by the marine environment inspector of the Maritime Office in Gdynia responsible for coordinating actions to safeguard port basins against the spread of spill and discovering significant quantities of oil-derived substances on the surface



of water, on 28 August 2015 at 08:20 a multipurpose SAR rescue vessel *Kapitan Poinc* equipped with specialized equipment to remove oil contaminants from the water surface was included in the cleaning action.

At the request of the Naval Shipyard the floating dock and the hull of the vessel were cleaned by a specialist company “Fast SA” and an entrepreneur under the name “Łukowicz Serwis”.

### 3. Circumstances of the Accident

On 27 August 27 2015 at 16:20 the pilot boarded *Green Egersund* moored with its starboard at the Południowe Wharf at the Port of Gdynia, to lead the vessel into the “SMW-1” floating dock in the Basin IX. The master, the chief officer, and the ship repair manager from the Naval Shipyard were on the bridge. At the stern manoeuvring station there was the second officer with two seamen, whereas at the bow there was the boatswain and a seaman.

After reviewing the manoeuvrability of the vessel, the pilot discussed with the master the unmooring plan<sup>1</sup>, the way and place to fix the towlines, and informed him of the need to prepare heaving lines at the bow and stern to take lines from the dock. At the same time the pilot evaluated the weather conditions as difficult and ordered the additional, third tugboat to help. Then he informed the repair manager of the vessel’s current draught and obtained information on the depth of the floating dock immersion.

At 16:23 tugboats *Mars*, *Fairplay VII*, and *Fairplay IV* approached the vessel. On VHF channel 17 the pilot discussed the mode of manoeuvres with tugboat managers. At 16:48 on VHF channel 12, after reporting to the harbour master’s office that it was ready, the vessel was allowed to leave the Południowe Wharf and enter the *SMW-1* floating dock.

The vessel departed from the wharf with the help of *Fairplay VII* tugboat at the bow and *Mars* tugboat at the stern. In addition, *Fairplay IV* tugboat was helping at the midship, pushing the vessel to the wharf when the lines were being moved from the poles at the wharf to tugboats.

After unmooring and towing the vessel to the entrance into the Basin IX, the tugboats turned the vessel around, brought it into the basin with its stern, set the vessel slightly to the

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<sup>1</sup> Power generators on board were not working so it was decided that the mooring lines taken from poles would be taken directly from the wharf to the tugboats at the bow and at the stern.

south of the dock's axis of symmetry, and at ca. 17:11 started to bring the vessel into the dock on the 305° course (Figure 1).

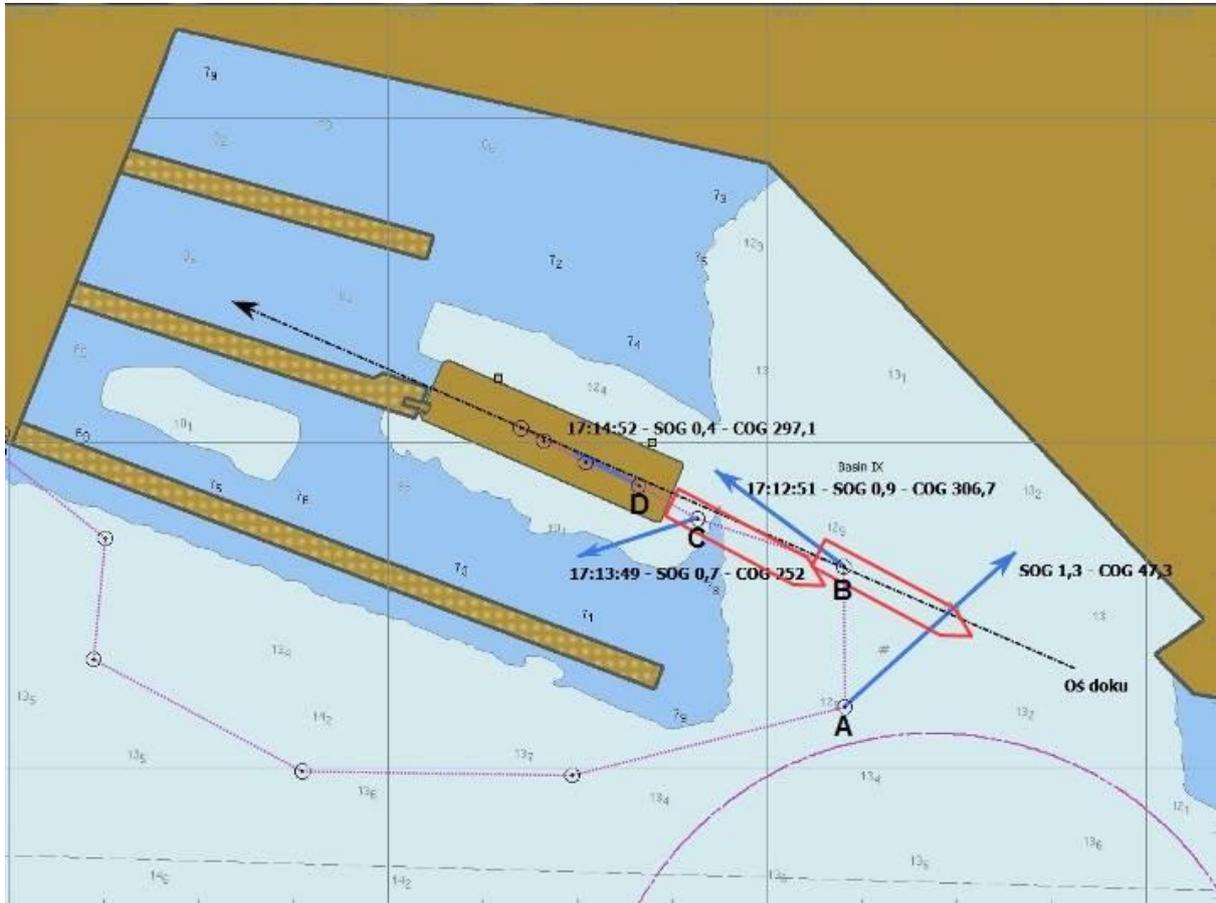


Figure 1

: The route of the towing unit from the Południowe Wharf to the entrance to the dock

The initial speed of the towing unit was about 1 kn and it was decreasing as the boat was approaching the front of the dock.<sup>2</sup>

At the distance of about 10 m before entering the dock, second officer reported to the bridge that the stern was not entering the dock correctly and it was too close to the northern side wall. As a result, the pilot instructed *Fairplay IV*, which was at the level of the hold no.3, to lean against the port side and push the hull southward. At the same time, at 17:13:28,

<sup>2</sup> Figure 1 shows the eleven positions of *Green Egersund* (since the departure of the vessel from the Południowe Wharf to the docking position in the dock) based on the signal transmitted by the vessel's AIS device. Four critical positions (position of the AIS antenna of the vessel) were marked with letters A, B, C, and D. For each of them, at a given time the course (COG) and the speed (SOG) of the vessel were shown. The position of the vessel's red silhouette is only approximate as the signal indicating the course of the ship, i.e. the direction of the bow (HDG), was locked in the VDR device and was indicating the value of 151° during the entire time of manoeuvres.

*Fairplay VII* was ordered by the pilot to go south.<sup>3</sup> The vessel's stern, and then the whole hull began to move south. *Mars* tugboat, which was inside the dock, at 17:13:45 was commanded to go north.

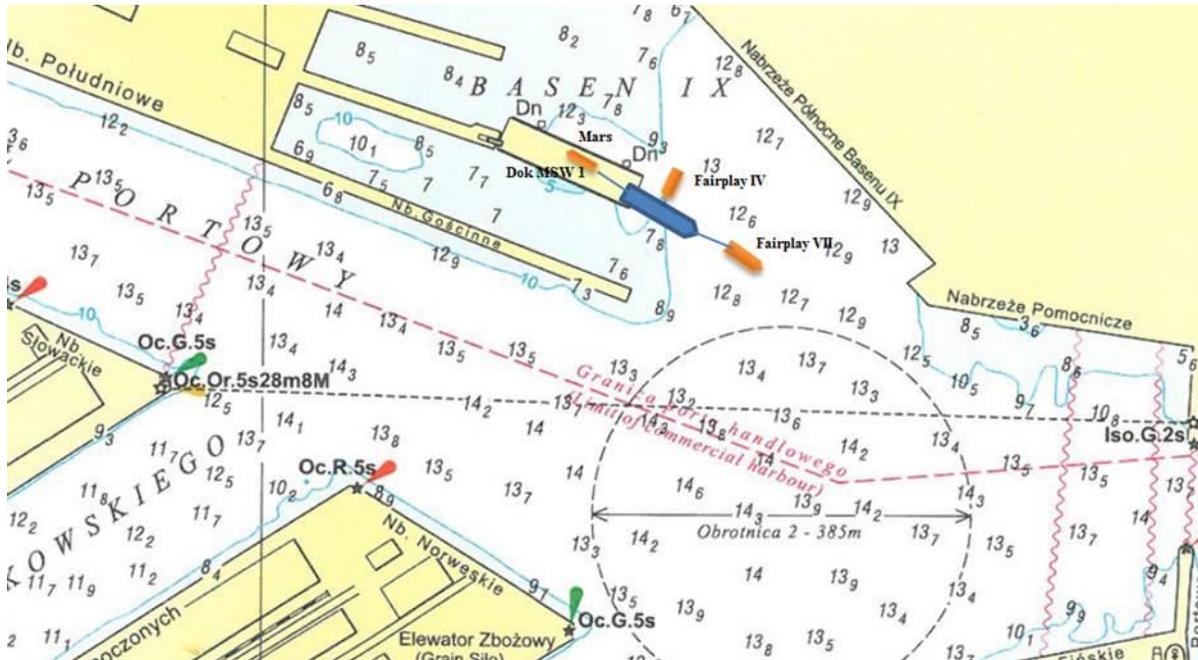


Figure 2: A situational sketch of the manoeuvres of „Green Egersund” entering the dock with “Fairplay IV”, “Fairplay VII”, and “Mars” tugboats

The dock master who was observing the manoeuvres of the vessel from the right (south) side wall, seeing the fast side movement of the hull southwards made a remark to the pilot that the *Fairplay IV* tugboat should stop pushing the vessel from the port side. At 17:13:59 at the command of the pilot the tugboat departed from port side of the vessel.

Despite the departure manoeuvre, at 17:14:10 the vessel bumped its curved part of the stern at starboard against a foundation of the mooring roll on the front (Photograph 11) of the southern side wall and damaged the plating of the hull (Photograph 12).

The speed with which *Green Egersund* was entering the “SMW-1” dock just before the collision was 0.7 kn (Photograph 20).

<sup>3</sup> According to the recording of the audio path of the *Green Egersund*'s VDR, the command was repeated four times in the period of 40 seconds preceding the impact of the vessel against the dock.



*Photograph 11: Traces of paint from the hull of the vessel at the edge of the foundation of the mooring roll*



*Photograph 12: Damaged (pierced) plating of „Green Egersund” hull plating*

The pilot was informed on VHF channel 17 by the dockmaster on the damage to the hull plating and the leakage of petroleum-derived substance into the shipyard's basin. The dockmaster reported the accident and fuel leakage to the Naval Shipyard dispatcher.

The chief engineer of *Green Egersund* informed the master that the leakage from the damaged hull plating came from the heavy fuel service tank No. 15. With no possibility of pumping fuel into another tank, the chief engineer discarded some of the fuel to the engine bilge and to the oil waste tank.

The pilot informed on VHF channel 12 the harbour master's office in Gdynia about the spill of fuel from the damaged service tank.

At ca. 17:15 two towlines from the dock were secured on the bollards of the vessel at the starboard and port side of the stern. They started to pull the vessel into the dock by means of winches.

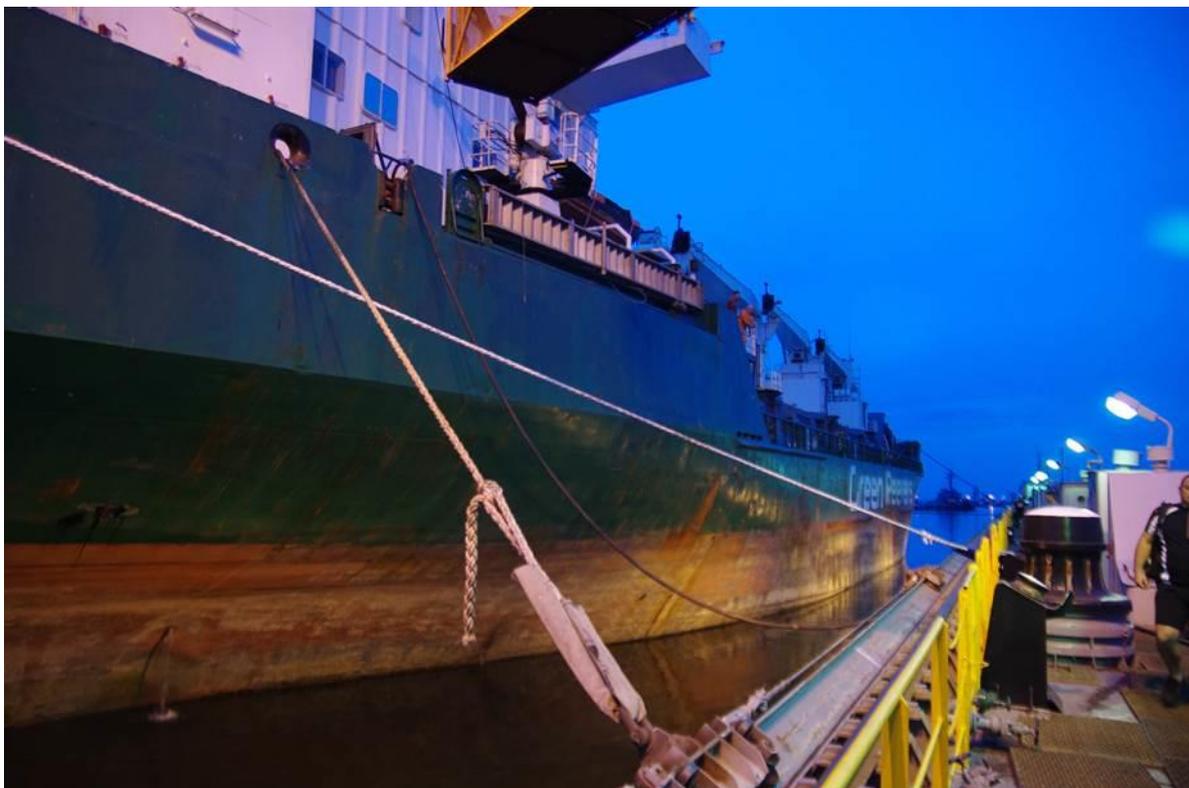
At 17:17 the dispatcher of the Naval Shipyard informed the Shipyard's Rescue Service about the leak of fuel and sent it to the dock. Then he informed the specialist company "Bonex" about the need to set up oil booms.

At 17:25 two mooring lines from the dock were fastened on the bollards of the vessel at the bow from both sides. The stern tugboat was released.

At 17:30 the remaining two tugboats were released. At 17:31 the pilot informed the duty officer of the harbour master's office of Gdynia that the fuel from the damaged heavy fuel service tank continued to leak.



At ca. 17:40 the vessel was set at the position (Photograph 13). The Naval Shipyard dispatcher informed “Delfin R.M.” company about the spill and the necessity of starting to collect spilled fuel as soon as possible.



*Photograph 13: „Green Egersund” held in the position; at starboard stern there is a towline (passed from the winch) and mooring line (passed from the vessel)*

The pilot who a few minutes later was leaving the vessel noticed that the leak had stopped.

Shipyard’s Rescue Service arrived at the dock and together with the dock’s crew began activities neutralizing spilled fuel on the southern side wall of the dock.

At 18:15 the Maritime Environment Protection Inspector from the Gdynia Maritime Office, notified of the accident, came to the dock. Once the situation had been assessed, in cooperation with the Naval Shipyard dispatcher, “Bondex” company was ordered to unroll the oil spill containment boom between the end of the Gościnnie Wharf, across the Basin IX to the opposite wharf, where the site of the Naval Shipyard adjoins the site of the Naval Port in Gdynia (Photograph 14).



*Photograph 14: Basin IX separated from the rest of the port by an oil spill containment boom*

At 18:45 two specialized boats (the so called “catchers”): *Delfin I* and *Delfin II* belonging to the “Delfin R.M.” company started collecting fuel spilled near the dock.

The oil spill containment boom was deployed at 18:55, but even before it was set, the wind had changed the direction and had caused that some spilled fuel had moved out of the shipyard’s waters to the inner port. Consequently, the Marine Environment Protection Inspector issued a command to set up the boom between the end of the Pilotowe Wharf and the opposite pier deviating from the wharf of the Naval Port. The Port Fire Brigade came to the port and at 20:00 deployed another oil spill containment boom.<sup>4</sup>

The next day, on 28 August 2015, in the morning, the water of the port basin was inspected and significant amounts of heavy fuel were found at the Polskie Wharf. At 07:15 the SAR vessel, *Kapitan Poinc* joined the action of collecting spilled fuel. At 08:10 the vessel departed the Norweskie Wharf and after 10 minutes berthed port side to the Polskie Wharf. Doors to the Lamor system were opened, Desmi Skimmer Disc was fixed overboard and the recovery of spilled fuel was started. At 09:00, a decision was taken to remove the oil spill containment boom at the entrance to the inner port to allow for free movement of vessels in the port.

At ca. 12:00 the master of the SAR vessel launched a utility boat and positioned it at the stern so that the boat by its working engine would “drive” the spill near the collecting device.

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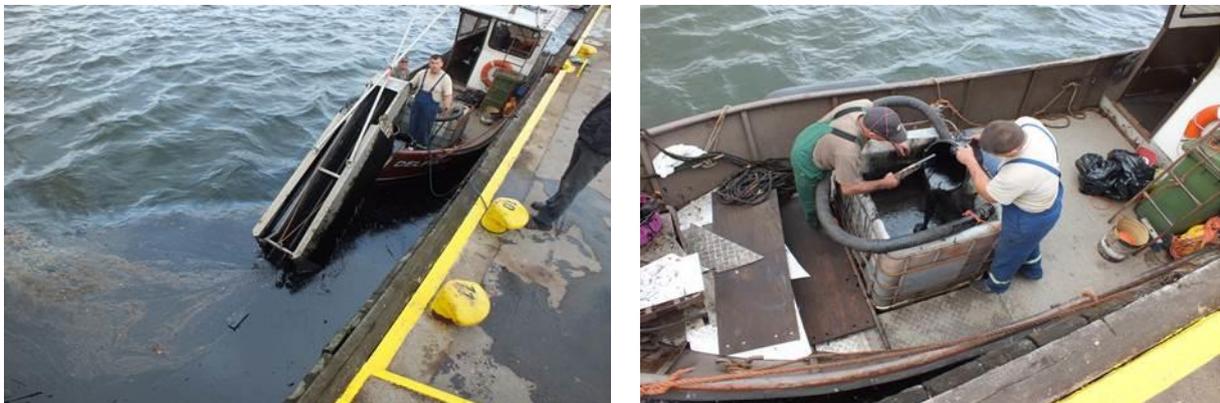
<sup>4</sup> Strong currents caused the oil spill containment boom to break five times so that the Port Fire Brigade had to reposition it. In addition, it was necessary to open the boom for the time of vessels’ entering and leaving the port.



*Photograph 15: The collecting device Skimmer Disc removing fuel at the side of “Kapitan Poinc”*

The following crafts were helping to direct contaminated water to the collecting device of the vessel: the surveying motor boat *Kontroler 9* and the hydrographic vessel *Zodiak* belonging to the Maritime Office in Gdynia and occasional port tugboats passing by.

*Kapitan Poinc* was collecting fuel near the Polskie Wharf until 19:30 on 28 August 2015. On the very same day and afterwards spilled fuel from *Green Egersund* was being collected by specialist boats *Delfin I* and *Delfin II*.



*Photograph 16: The crew of the “Delfin II” catcher is collecting fuel on 31 August 2015*

RIB of the Port Fire Brigaded participated in the removal of oil film in the port basins and in the outer port the traces of oil were being removed for a couple of days by *Zodiak*.



Photograph 17: A craft of the State Fire Brigade of the Port of Gdynia Authority neutralizing the spill of oil in the inner port



Photograph 18: The hydrographic vessel “Zodiak” neutralizing the spill of oil in the outer port

The oil spill containment boom closing the Basin IX of the Port of Gdynia was removed on 11 September 2014 after the dock and the hull of the vessel under repair had been cleaned.

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

The method of introducing vessels to the “SMW-1” floating dock is defined in the “Docking Instructions”<sup>5</sup>, adopted in 1988 by the Naval Shipyard and made available to the classifier (PRS). The manual was revised twice, in February and March 1999, and sent to the Maritime Office in Gdynia<sup>6</sup>.

Clause 2.12 of the instruction (as amended) entitled “Towing a Vessel in Front of the Dock” states as follows: *“The responsibility for towing of a vessel in front of the dock shall rest with the vessel’s master, who, among other things, shall choose the quantity and location of the tugboats and the trajectory of movement of the vessel. Just as the dock’s crew takes over the towlines, the responsibility for towing shall be taken over by the dockmaster, except that:*

<sup>5</sup> „Floating Dock 8000T. Docking Instructions”. Document No. 13587/102-00 developed by the Marine Technology and Design Company “PROREM” in August 1988.

<sup>6</sup> The first amendment of the „Docking Instructions” correcting the content of clause 2.12 referring to towing of a vessel in front of the dock was made on 18 February 1999, a day after the Maritime Board of Gdynia had issued a judgment against the Naval Shipyard concerning “the impact of *m/ s Kopalnia Zofiówka* vessel against the inner part of the side wall of the floating dock 8000T in Naval Shipyard in Gdynia on 20 October 1998.” The second amendment, which introduced the wind power constraints during docking from 5 to 4° B (in paragraph 2.10 of the Instructions) and changed clause 2.12 of the Instructions, which had been radically changed a month earlier, entitled “Towing a Vessel in Front of the Dock” was introduced by the management of the Naval Shipyard on 18 March 1999.



- *heaving lines should not be passed later than when intersecting the edge of the vessel with a line joining the extreme bow points of the dock,*
- *main propulsion, propellers, and active rudders are switched off,*
- *the docking tugboat is permitted to cross the dock.”*

The reading of this clause of the “Docking Instruction” was agreed with the pilot station in Gdynia<sup>7</sup>. The pilot who was piloting *Green Egersund* into the dock was obliged to inform the master of the vessel about the rules of docking a vessel. The Commission has determined that the pilot discussed the docking plan with the master of the vessel. The master was informed of the necessity to give heaving lines to the dock in order to take over the lines from the dock, before the stern would have reached the line of side walls, and the fact that the vessel would have docked stern to. The master did not object to the method of docking.

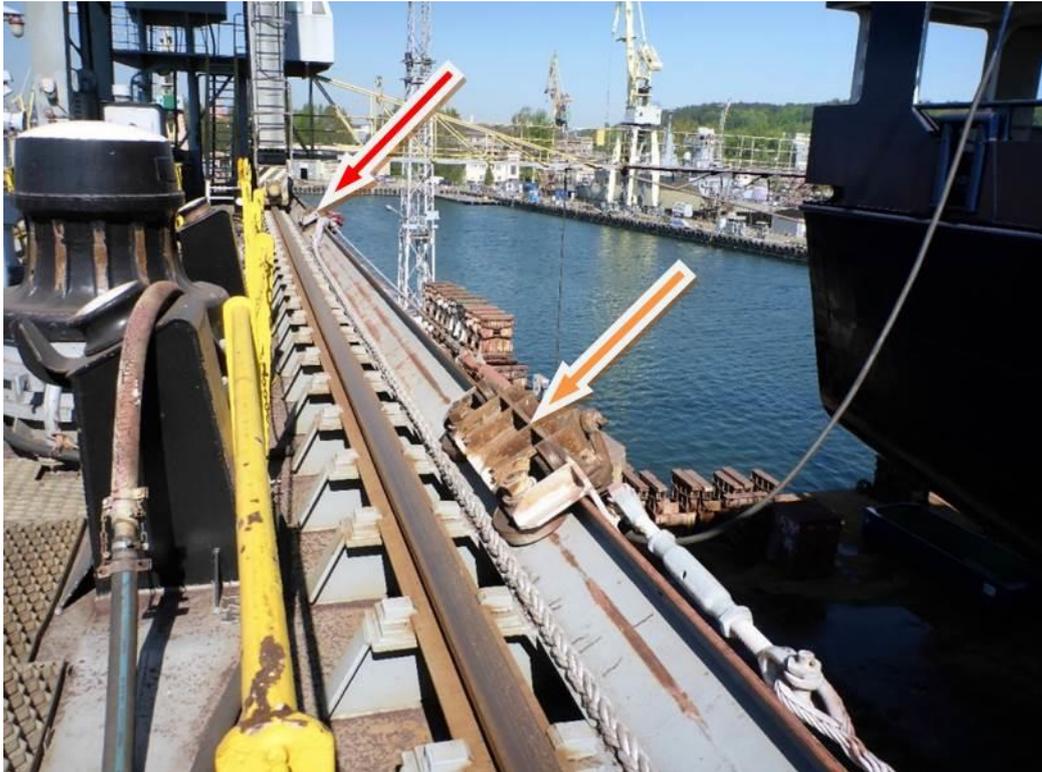
The operation of stern to docking in the floating dock of the Naval Shipyard in Gdynia is determined by the position of the dock in the shipyard, the location of the cranes on the dock, the size of the vessel and the extent of repair works.

The vessel's position in the dock with stern to the pier gives convenient access to the stern of the repaired vessel and its components such as the main shaft of the engine, propeller and rudder and ensures safe transport of these items and other devices and equipment from the vessel to shore repair stations. Such arrangement guarantees a good balance between the dock and the vessel, which is related to maintaining proper longitudinal stability of the dock. All these conditions caused that for many years docking of vessels in the “SMW-1” has been stern to instead of the bow in.

According to the accepted practice of docking the vessels, they are usually pulled stern to by tugboats up to the depth of a dozen or so meters and take one towline from each of the side walls from the winch (towing carriage), which is situated further in the dock. There are two winches on each side wall (Photograph 19).

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<sup>7</sup> The amendment sheet No. 2 to the “Docking Instructions” was issued on 18 March 1999, handed over to the Chief Pilot and agreed with the Pilot Station in Gdynia on 19 March 1999.



*Photograph 19: Towing and mooring winches at the right side wall of the floating dock*

Winches are about 10 m apart and connected in such a way that they move at the same time and speed. The speed of a pair of winches on each side wall may vary. The first of the winches (marked with an orange arrow on Photograph 19) stops at a short distance from the dock front face, but is not used in practice. The towline is given to the vessel from the other winch (marked with a red arrow; the towline is shown on Photograph 13). If the towline was given to the vessel from the first winch, then it would not be possible to pull the vessel to the end of the dock<sup>8</sup>.

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<sup>8</sup> Primary way of docking and positioning a vessel on keel blocks was different. The first version of the “Docking Instructions”, 1988, stated that “*When a vessel enters the shipyard’s basin it is being towed by at least three tugboats into the dock so that the first sideboard bitts at the bow of the vessel entered the dock at a distance of 10 m from the bow edge of the dock. During this manoeuvre two tugboats are pushing the vessel on the port side and starboard and one is keeping it at the stern in a proper position. Having reached the point of waiting in the strong side wind, one tugboat is pushing the vessel in the direction opposite to the wind. In this position, the vessel is taken by 4 ropes passed from towing winches*”.

The first amendment introduced to the “Instructions” in 1999 made it possible to dock a vessel stern to adding that “*hauling lines should be passed to the dock not later than when the vessel’s edge crosses the line connecting extreme bow point of the dock.*”

To understand the concept of docking a vessel deep in the dock and passing lines only after the bow (or stern) will reach the point of certain distance from the front of the dock, the Commission quotes a fragment of another document issued by the Naval Shipyard shortly after the “Docking Instruction” had been issued. The document entitled “User’s Manual for Docking Devices. Mechanical Part” No. 13587/102-03 issued in September 1988, states the following in clause 4.2, entitled “Preliminary Docking of a Vessel”: “*First enter the vessel into the*



Also, the Commission has found out that docking vessels were not stopped before the line of side walls and the mooring lines were not taken or given to capstans in order to stabilize the stern and prevent its uncontrolled transverse movement when entering the dock.

#### 4.1. Human Factors (faults and negligence)

Displacement of the stern of *Green Egersund* while docking towards the right side wall of the dock and hitting the hull against the foundation of the mooring roll resulted from the pilot's errors in tugboat manoeuvres.

According to the Commission, *Fairplay IV*, which was in the area of the port side third cargo hold, was ordered too late to stop pushing the vessel southwards and to depart from the vessel. The command to stop pushing was given at 17:13:57 after receiving a warning of the dockmaster. The impact against the dock occurred 13 seconds later. A command to go northwards given to *Mars* at 17:13:45, was not fully effective, as the tugboat pulling the vessel by means of a thirty-meters long towline at the stern had limited room and manoeuvrability. Being close to the southern side wall it could not move northwards in such a short time to stop the vessel's lateral movement of the stern towards the south side wall.

Moreover, the Commission has noted that the commands given to *Fairplay VII* by the pilot to pull the bow southwards, especially in the final phase when the stern of the vessel was already in the dock, just before the impact, intensified the impact forces.

Figure 3 shows the AIS signals of vessels staying in the vicinity of the Basin IX put on the map of the Port of Gdynia when the stern of *Green Egersund* hit the side wall of the "SMW-1" dock (17:14:10). On the basis of information about heading courses from AIS devices it appears that *Mars* was heading in the north-westerly direction, whereas *Fairplay IV*

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*dock bow or stern to by means of tugboats at such a distance that the mooring pipes at the bow are situated in the centre of winches. This distance is 10 m. As far as possible, the vessel should stop at this distance, and with the aid of tugboats and capstans through mooring lines the bow of the vessel should be positioned as far as possible in the plane of symmetry of the dock.*" Subsequent clause 4.3 of this Instruction, entitled: "Assembling Towing and Braking Lines on a Vessel," states that "*With the help of hauling lines passed from the vessel to the dock or vice versa from all four winches, mooring and braking lines should be passed to the vessel's bow through mooring pipes and then after initial tightening, the ends of these ropes should be laid on bow bitts.*" Finally, clause 4.4 of the Instruction, entitled "Starting up and Towing a Vessel" states that "*After the vessel has been moored with towing ropes and the bow tugboat has left the dock, the vessel is brought into the dock by means of winches. Starting of a vessel should begin at a speed of 1 m/min passing gradually to higher speeds, up to the speed of up to 10 m/min (...) During docking the stern of the vessel should be held by means of tugboats in the plane of symmetry of the dock.*"

in the south-westerly direction, as instructed by the pilot. *Green Egersund* was navigating at the course over ground (COG) 297° at the speed of 0.4 kn<sup>9</sup>.

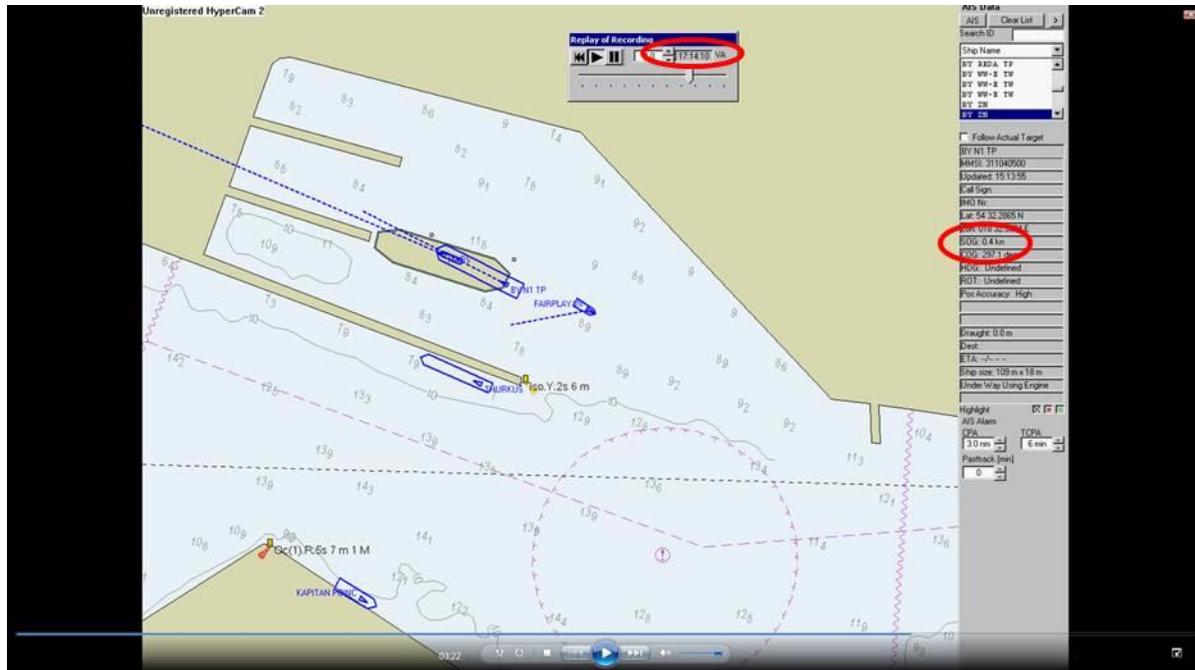
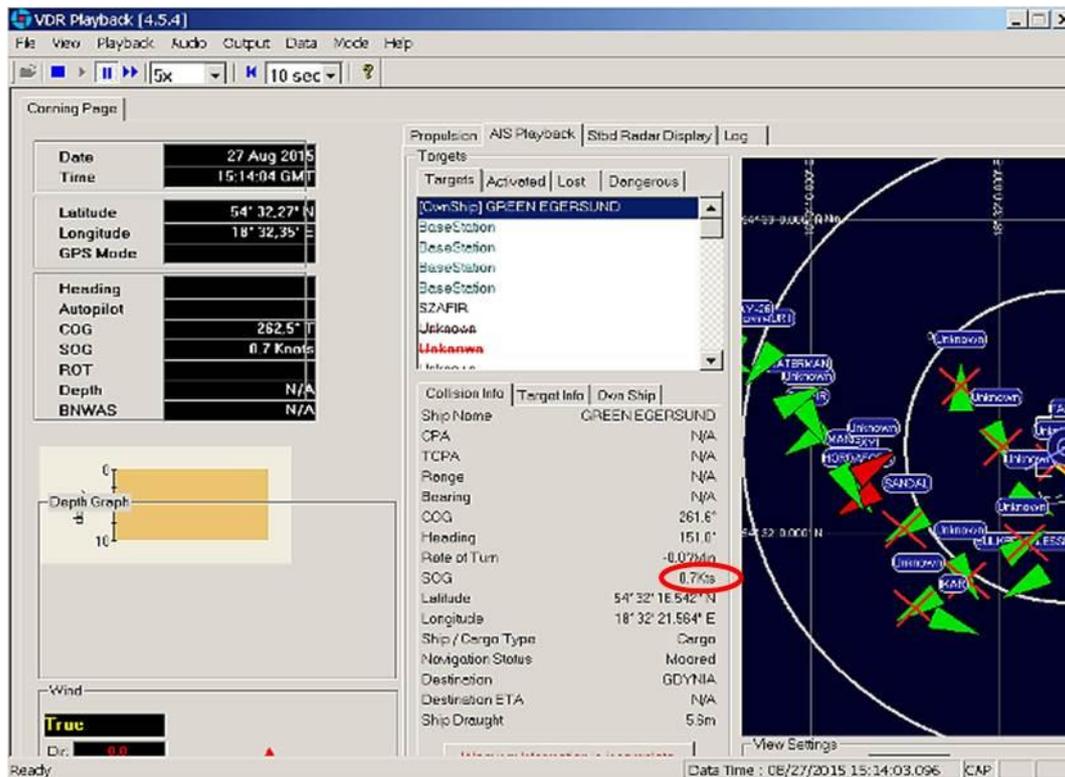


Figure 3: Position of vessels at the moment when the vessel hit the side wall of the dock; source: materials of the Maritime Office in Gdynia, application SAAB „Adveto - Aecdis 2000 400 v3.49”

The speed of *Green Egersund* at the entrance to the dock was 0.7 kn (Photograph 20). The Commission has recognized that such speed was safe and appropriate to pass heaving lines and take over the towlines provided that the vessel was moving in the axis of symmetry of the dock.

<sup>9</sup> It should be noted that the vessel's silhouette shown in Figure 3 does not reflect its actual position. The vessel was moving stern to, not the bow in. The lack of actual heading (HDG) and thus the correct position of the envelope of the vessel is due to the lack of data from the vessel's VDR on its course. In addition, the Commission has noted that the figure is missing the silhouette and AIS data of the third tugboat taking part in towing the vessel. The AIS device of the *Fairplay IV* was switched off or out of order.



Photograph 20: The parameters of “Green Egersund” when its stern went into the dock from the S-VDR device

The vessel's crew gave the hauling lines from the stern to both side walls of the dock but failed to mount the towline taken from the north side wall on the mooring post as the stern of the vessel started to move fast to the south being pushed by *Fairplay IV*.

After receiving the heaving line, the dock crew from the south side wall had not been able to deliver the towline to the vessel because as they saw the stern of the vessel approaching them with great speed in fear of their safety they escaped from the manoeuvring position.

Moreover, the Commission has considered that the master of *Green Egersund* could have questioned the pilot's plan to enter the dock without stopping at the line connecting extreme forward dock points of side walls and taking towlines or passing them to the side walls that would have stabilized its lateral motion.

The docking instruction did not prohibit from stopping the vessel before entering the dock. The master might have suggested to the pilot that it would have been safer to stop and take mooring lines from the dock or pass them to the side walls in order to stabilize the vessel in the axis of symmetry and then enter the dock while keeping the side movement of the hull at the stern under control.



The Commission has also noted errors made by the vessel's management in the documents prepared by the vessel prior to docking. “*Captain Statement on docking of the vessel*”<sup>10</sup> of 27 August 2015, which the master handed over to the vessel's repair manager, contained vessel's particulars and information on the state of filling in the ballast and fuel tanks<sup>11</sup>. According to data provided by the master of the vessel in the statement, the filling state of the heavy fuel service tank No. 15 at starboard was 1.9 m<sup>3</sup> and the heavy fuel catch tank No. 14 at starboard - 12.8 m<sup>3</sup>. The actual filling of the tanks was different. The catch tank was empty and in the service tank there was 15.4 m<sup>3</sup> of heavy fuel<sup>12</sup>, which accounted for 75% of the tank filling<sup>13</sup>.

The Commission also pointed out that two tugboats of the three ones engaged in the docking of *Green Egersund*, were trapped in a fuel spill that had leaked from the damaged vessel and once their services were accomplished they left the vessel and went to other parts of the port without cleaning their sides.

#### 4.2. Organizational Factors

Among the organizational factors that indirectly contributed to the accident the Commission has included the imprecise docking procedures described in the “Docking Instructions” for the floating dock 8000T. A very laconic content of clause 2.12 of the “Instructions” (as amended in March 1999), which has been limited mainly to sharing responsibility for towing operations in front of the dock and in the dock, indicates that the master of the vessel is responsible “for towing operations in front of the dock.”

The instruction leaves the master and, in practice, the master and the pilot, the decision how to approach the dock (namely the front of the dock, i.e. the line connecting extreme forward dock points), and at the same time the representatives of the Naval Shipyard in

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<sup>10</sup> *Captain Statement on docking/undocking of the vessel* – a statement form was given to the master by the Shipyard's representative to be filled in.

<sup>11</sup> The statement included a note in which the master confirmed that he had become aware of the requirement that a docking vessel had the least possible amount of fuel in the tanks.

<sup>12</sup> Data on the basis of measurements by Havyard Design and Engineering Poland on 11 September 2015.

<sup>13</sup> If in reality fuel had been distributed as given in the statement, then despite the damage to the plating, fuel from the tank No 15 would not have escaped overboard because its level would have been lower than the level of the hole caused by tearing of the hull. It can also be assumed that even if tank No. 14 had been damaged (at the same level), then due to the shape and position of that tank, the size of the fuel spill from the vessel would have been considerably smaller than that of tank No. 15.



practice require the vessel to enter the dock and take lines from winches, which are located a dozen meters or so from the edge of the dock.

The dock master's responsibility for the towing operation begins according to the "Instructions" "just as the towlines are taken over by the dock's crew"<sup>14</sup>, which usually takes place when the vessel is at least a dozen or so meters deep in the dock.

It results from the above that no one is responsible for the movement of the vessel entering the dock from the time the vessel passes the "line connecting the extreme forward dock points" until the towlines are passed to the vessel and fixed on vessel's poles.

The "Instructions" do not provide for the vessel to be stopped in front of the dock, to receive lines from the dock or to pass lines from the vessel to the side walls of the dock, thereby setting the vessel in its axis by means of capstans in the dock before further docking.

#### **4.3. Influence of External Factors, Including the Marine-related Ones on the Accident**

The "Docking Instructions" for the shipyard's floating dock 8000T amended in March 1999, states in clause 2.10, entitled "Weather Conditions", that docking operation is possible with wind force of up to 4° B.

During towing and docking operation of *Green Egersund* on 27 August 2015, the weather was good. It is confirmed by the materials from hearings of witnesses of the accident carried out by the Commission as well as the weather data from the area of the Port of Gdynia provided by the Institute of Meteorology and Water Management - Gdynia Maritime Division of the National Research Institute, recorded on the day of the accident (Photograph 21).

By analyzing the weather conditions during *Green Egersund's* docking manoeuvres, the Commission has considered the possibility of a sudden change of wind direction to the opposite (north), which could cause an unexpected drift of the hull to the southern side wall.

The Commission has examined the printout from the program recording strength and direction of wind which can be seen on the monitor of the dispatcher of the Pilot Station in Gdynia presented by the pilot piloting *Green Egersund* into the dock.

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<sup>14</sup> The Commission has noted that the expression is not fully correct because the towlines are passed from the dock to the vessel not the other way round.

Kierunek oraz średnia prędkość wiatru (m/s) w ręczno portu, w Gdyni\*  
Okres: 27 - 30 sierpnia 2015 r.

Data/godzina (UTC)	Kierunek	Prędkość									
2015-08-26 22:00	SSW	3,4	2015-08-27 03:00	S	5,3	2015-08-27 08:00	SSE	7,7	2015-08-27 13:00	S	8,4
2015-08-26 22:10	SSW	3,9	2015-08-27 03:10	SSE	5,3	2015-08-27 08:10	S	7,7	2015-08-27 13:10	S	7,9
2015-08-26 22:20	SSW	4,1	2015-08-27 03:20	SSE	5,2	2015-08-27 08:20	SSE	8,3	2015-08-27 13:20	S	8,9
2015-08-26 22:30	SSW	4,2	2015-08-27 03:30	S	4,1	2015-08-27 08:30	S	8,2	2015-08-27 13:30	S	9,7
2015-08-26 22:40	SSW	4,5	2015-08-27 03:40	S	3,7	2015-08-27 08:40	SSE	8,6	2015-08-27 13:40	S	7,2
2015-08-26 22:50	SSW	3,2	2015-08-27 03:50	S	3,9	2015-08-27 08:50	SSE	8,6	2015-08-27 13:50	SSW	5,1
2015-08-26 23:00	SW	2,3	2015-08-27 04:00	S	3,5	2015-08-27 09:00	SSE	9,1	2015-08-27 14:00	SSW	6,4
2015-08-26 23:10	SW	2,8	2015-08-27 04:10	S	3,5	2015-08-27 09:10	S	8,5	2015-08-27 14:10	SSW	6,9
2015-08-26 23:20	SW	2,0	2015-08-27 04:20	SSW	3,8	2015-08-27 09:20	S	8	2015-08-27 14:20	SSW	5,1
2015-08-26 23:30	SW	2,9	2015-08-27 04:30	S	3,7	2015-08-27 09:30	S	7,9	2015-08-27 14:30	SSW	6
2015-08-26 23:40	SW	2,8	2015-08-27 04:40	S	4,2	2015-08-27 09:40	S	8,4	2015-08-27 14:40	S	6,3
2015-08-26 23:50	SW	3,1	2015-08-27 04:50	S	4,2	2015-08-27 09:50	S	9,6	2015-08-27 14:50	SSW	5,2
2015-08-27 00:00	S	4,6	2015-08-27 05:00	SSW	4,8	2015-08-27 10:00	S	9,8	2015-08-27 15:00	SSW	4,1
2015-08-27 00:10	SSW	3,5	2015-08-27 05:10	S	5	2015-08-27 10:10	SSW	8,4	2015-08-27 15:10	SW	3,1
2015-08-27 00:20	SSW	3,2	2015-08-27 05:20	S	4,7	2015-08-27 10:20	S	9,4	2015-08-27 15:20	SW	2,9
2015-08-27 00:30	SW	2,3	2015-08-27 05:30	S	5,4	2015-08-27 10:30	S	8,9	2015-08-27 15:30	SSW	2,7
2015-08-27 00:40	SSW	3,6	2015-08-27 05:40	S	6	2015-08-27 10:40	S	10,5	2015-08-27 15:40	S	2,8
2015-08-27 00:50	SSW	2,9	2015-08-27 05:50	S	5,9	2015-08-27 10:50	SSW	9,6	2015-08-27 15:50	SSE	1,6
2015-08-27 01:00	S	3,1	2015-08-27 06:00	SSE	6,1	2015-08-27 11:00	S	9,6	2015-08-27 16:00	NNE	8,3
2015-08-27 01:10	SSW	3,1	2015-08-27 06:10	SSE	5,8	2015-08-27 11:10	S	8,4	2015-08-27 16:10	NNE	7,5
2015-08-27 01:20	SSW	3,1	2015-08-27 06:20	SSE	5,8	2015-08-27 11:20	S	8,7	2015-08-27 16:20	NE	6,6
2015-08-27 01:30	S	3	2015-08-27 06:30	SSE	6	2015-08-27 11:30	S	8,9	2015-08-27 16:30	ENE	4,6
2015-08-27 01:40	S	3	2015-08-27 06:40	S	5,5	2015-08-27 11:40	S	8,4	2015-08-27 16:40	NNE	4,7
2015-08-27 01:50	SSE	3,1	2015-08-27 06:50	SSE	6,1	2015-08-27 11:50	S	8,4	2015-08-27 16:50	NE	4,5
2015-08-27 02:00	S	3	2015-08-27 07:00	SSE	6,9	2015-08-27 12:00	S	9,6	2015-08-27 17:00	NW	3,5
2015-08-27 02:10	S	3,3	2015-08-27 07:10	SSE	8	2015-08-27 12:10	S	8,8	2015-08-27 17:10	NNW	3,5
2015-08-27 02:20	SSE	4	2015-08-27 07:20	SSE	8	2015-08-27 12:20	S	7,7	2015-08-27 17:20	SSW	3,9
2015-08-27 02:30	SSE	4,4	2015-08-27 07:30	SSE	7,8	2015-08-27 12:30	S	8	2015-08-27 17:30	NNE	4,8
2015-08-27 02:40	SSE	4,3	2015-08-27 07:40	SSE	7,5	2015-08-27 12:40	S	8,3	2015-08-27 17:40	NE	4,3
2015-08-27 02:50	SSE	5,1	2015-08-27 07:50	SSE	7,7	2015-08-27 12:50	S	8	2015-08-27 17:50	SE	3,5

\*wg pomiarów prowadzonych na Automatycznej Stacji Meteorologicznej IMGW - PIB Gdynia

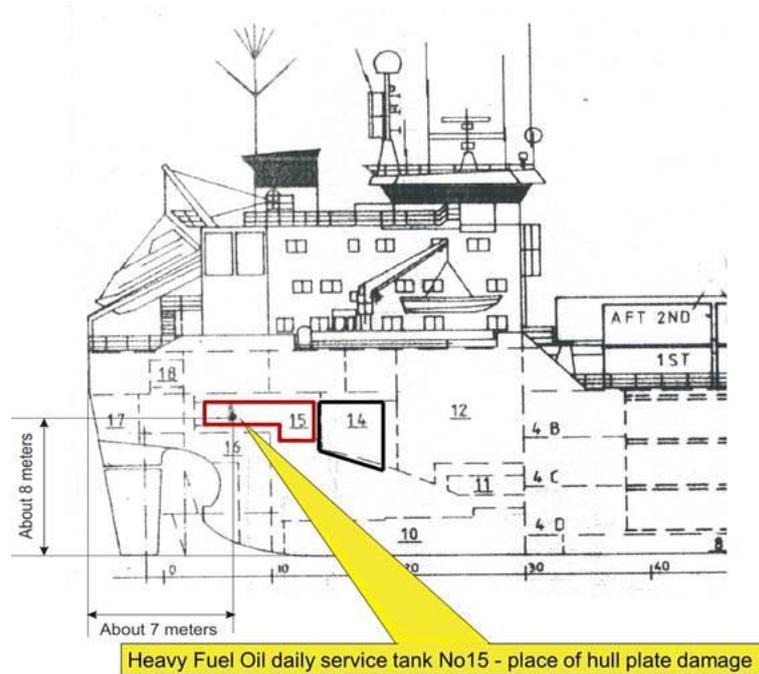
Photograph 21: Weather data from the area of the Port of Gdynia supplied by the Institute of Meteorology and Water Management - Gdynia Maritime Division of the National Research Institute – registered on the day of the accident (UTC:15:10 - 15:20; LT:17:10 -17:20)

As the Commission has determined, the wind direction and velocity sensors used to deliver data to the program used by the Pilot Station are devices installed in the Port of Gdynia in the framework of the research project “Safeport” conducted by the Gdynia Maritime Academy, Port of Gdynia Authority SA, “CTO SA” company, “Sprint Sp. z o. o.” company and Norwegian companies “Aanderaa Data Instruments A/S” and “NIVA” in 2010-2012 and they are located in another part of the port (at the Wendy Wharf). Since these devices have not been maintained and calibrated since the end of the project, the Commission has decided that the data obtained from these devices cannot be considered more reliable than the data received from Institute of Meteorology and Water Management.

#### 4.4. Scope of Oil Spill in the Port and Preventive Actions Taken

The impact of *Green Egersund*'s stern at starboard against an uncovered edge of the foundation of the mooring roll of the right side wall of the “SMW-1” dock caused a 2.2 mm x 100 mm cut in the aft part of the vessel at about 8 m from the baseline and 7 m from the stern (Figure 4).

At this place of the hull there is a heavy fuel service tank No. 15 and the cut was made about 70 cm above its bottom.



*Figure 4:* A place where the hull plating was damaged and positioning of heavy fuel tanks – starboard stern (catch tank No. 14 and service tank No. 15)

Consequently, about 9 m<sup>3</sup> of heavy fuel flowed out of the tank contaminating the shipyard's basin, a part of port basins, 13 wharfs and a part of the main detached breakwater under the management of the Port of Gdynia Authority SA. The degree of contamination of individual basins and wharves was different and it depended mainly on the wind direction during the first hours after the accident. The "SMW-1" dock itself, mainly its southern side wall, and the sides of *Green Egersund* (Photographs 22-25) were also contaminated with heavy fuel.



*Photograph 22:* View to the Basin IX from the southern head of the "SMW-1" dock



*Photograph 23:* The hull of "Green Egersund" soiled with fuel



*Photograph 24* Stairs on the right sidewall of the “SMW-1” dock soiled with fuel



*Photograph 25:* Oil film in the Basin IX between the Gościnnie Wharf and the dock

Some of the oil stains could be removed by means of dispersants (Photographs 26, 28 and 29). In cases where the fuel accumulated at the wharves in larger quantities, specialized equipment was required for collection (Photograph 27).



*Photograph 26:* Cleaning of oil spill at the Pilotowe Wharf



*Photograph 27:* Heavy fuel collected at the Fińskie Wharf by “Delfin II” catcher



*Photograph 28:* Traces of oil spill in the inner port



*Photograph 29:* Traces of oil spill in the outer port

The inspection of port basins carried out by a diver from the “Aqatech” company and photographs of thirteen wharves affected by the spill show the extent of contamination caused by spilled fuel. Photographs of four selected wharves are presented below (Photographs 30 - 33).



*Photograph 30: The Polskie Wharf*



*Photograph 31: The Norweskie Wharf*



*Photograph 32: The Stanów Zjednoczonych Wharf*



*Photograph 33: The Słowackie Wharf*

The Commission has determined during the investigation that the management of the Naval Shipyard took action after the accident to cover protruding dock fittings to limit the possibility of damage in case of contact of the hull of a vessel entering or leaving the dock.

However, the Commission has considered that the post-accident protection (rubber cover – Photograph 34) of the foundations of rolls guiding the lines on each side wall were insufficient.



Photograph 34: The cover on the foundation of the direction roll in the “SMW-1” dock

The Commission has also determined that a few days after the accident at the Port of Gdynia the operator of *Green Egersund* issued a circular<sup>15</sup> and sent it to all vessels of their fleet, describing the piercing of the hull’s plating when docking and established operator’s procedures<sup>16</sup> in the event of docking.

In the established procedures, the operator draws the attention of masters of their vessels to the necessity of keeping the vessel in the axis of symmetry of the dock while docking and using vessel’s lines or lines from the dock to secure the bow or the stern of the vessel against uncontrolled movement. Also masters are advised to set with a person responsible for docking (the dockmaster) when he or she should take charge for docking, indicating that it should be that moment when the front of the bow or stern of the vessel passes the line joining the extreme points of the dock.

<sup>15</sup> Circular letter 13-2015, issued on 8 September 2015 included in the *Shipboard Circular Letters Manual* which forms a part of the security management system (SMS).

<sup>16</sup> *GM Drydocking Operation Procedure*.



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

The use of three tugboats by *Green Egersund* for docking the “SMW-1” floating dock in Gdynia had not prevented the vessel's hull from hitting the side wall of the dock, piercing the plating and spilling oil.

The “Docking Instructions” issued by the Naval Shipyard state that the mode of docking is at the discretion of the master who is responsible for towing operations in front of the dock, the approach to the dock, the number of tugboats and the way they are used. The deployment of tugboats in the prevailing conditions when *Green Egersund* was approaching the dock was correct, according to the Commission, but the commands given to tugboats, or rather lack of some commands, made the stern of the vessel begin to move uncontrollably and the hull hit the foundation of the mooring roll at the side wall of the dock.

At the same time the “Instructions” state that it is the dockmaster who takes responsibility for towing a vessel in the dock, which is taken over as soon as the crew of the vessel takes towlines from both sidewalls of the dock and puts them on poles aboard. When the vessel is entering the dock “on the run” the towlines are given from the dock, from the second trolley (winch) from each pair of trolleys usually as soon as the stern of the vessel is a dozen metres or so away from the dock’s front.

Shipyard’s “Docking Instructions” do not prohibit from stopping the vessel before entering the dock. Docking “on the run” without stopping the vessel's movement resulted from the practice used over the years by the employees of the Naval Shipyard and pilots docking vessels.

The Commission has found out that the master of *Green Egersund* failed to tell the pilot that it would have been safer to stop and pass (or take) towlines from the side wall to stabilize the vessel in the dock's axis of symmetry before entering the dock.

The Commission has considered that the correct and most secure way of entering a vessel into the “SMW-1” dock should be in the company of two or three tugboats (depending on the propulsion capability of the vessel) assisting the vessel near the dock, where the vessel should stop before the line connecting extreme forward dock points of side walls near the dock (in case of a vessel without propulsion by means of a tugboat at the bow), mooring lines should be passed from the dock to the vessel (stern) from dock capstans through the mooring pipes which are found on each of the side walls at the edge of the dock, put them on the poles at the



stern of the vessel and resume pulling the vessel by the stern tugboat while correcting by means of capstans the position of the stern in the axis of symmetry axis of the dock.

This operation should be continued until the vessel's stern is positioned in the dock in such a way that the crew of the vessel could take from the side walls the mooring lines attached to trolley (winches) intended for pulling the vessel into the dock. After attaching these lines the crew should drop the towline of the tugboat pulling the vessel into the dock and continue to position the vessel in the dock using dock and/or vessel lines, as it is done now<sup>17</sup>.

With regard to the actions carried out by various entities immediately after the leakage of fuel overboard, the Commission has considered that the deployment of the oil spill containment boom near the “SMW-1” dock was delayed and caused the spilled fuel to flow out of the shipyard waters, polluting water and wharfs of the inner port in Gdynia. The shipyard’s Rescue Service neither had the oil boom at their disposal nor had they means and abilities to set it. The actions of the Shipyard’s Rescue Service activities were limited to neutralizing and gathering spilled fuel at the dock itself<sup>18</sup>.

Quick deployment of the oil spill containment boom by the employees of the Shipyard’s Rescue Service arriving at the site after only a few minutes would have stopped and certainly reduced the spread of oil spill and prevented significant pollution of port waters and wharfs. There was a long response time<sup>19</sup> when the dispatcher of the Naval Shipyard sent “Bonex” (the specialist company cooperating with the Shipyard) to the site, and it increased the threat to the environment in port waters in result of the spill.

At the same time, the Commission has acknowledged that efficient operations carried out just after the accident by the Inspector for the Maritime Environmental Protection of the Maritime Office in Gdynia contributed to protecting the port from even greater pollution<sup>20</sup>.

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<sup>17</sup>The Commission has also considered that the risk of damage to the ship due to uncontrolled movement of the stern traffic during docking without additional mooring lines passed before crossing by the vessels of the line of side walls could have been reduced if one unused winch was removed so that the remaining winch could reach nearly the face of the dock. This should allow for the lines to be passed to the vessel at the entrance to the dock at length of a dozen or so metres.

<sup>18</sup> According to the Instruction I-164, issued by the Naval Shipyard in 2012, in case of spill of oil-based substances the task of the Shipyard Rescue Service of spill is to supply sorbents and portable oil collection containers. The Commission has also determined that the Naval Shipyard issued a document DOK/2/2001/TM in 2001 entitled “A Simplified Oil Spill Prevention Plan for DOK-SMW-1Dock”, but it had not anticipated the tear of the hull and the leak of fuel overboard.

<sup>20</sup> After the spill of fuel from *Green Egersund*, on the initiative of the Director of the Maritime Office in Gdynia and the management of the Port of Gdynia Authority SA there started a discussion to coordinate the activities of



## 6. Safety Recommendations

The State Maritime Accident Investigation Commission has considered it necessary to give safety recommendations, which are proposals of actions that may contribute to the prevention of similar accidents in the future, to the following entities.

### 6.1. The operator of the “SMW-1” floating dock

The State Marine Accidents Investigation Commission recommends that the official receiver of the Naval Shipyard S.A. in bankruptcy liquidation in Gdynia should take the following actions:

- 1) to make changes to the “Docking Instructions for the Floating Dock 8000T””, which would specify in greater detail the way of docking the vessels in the “SMW-1” dock, taking into account the need to stop the vessel before reaching the front of the dock and to pass additional lines from the dock to stabilize the lateral movement of the stern (bow) of the vessel until the mooring lines are passed from the dock and secured;
- 2) to secure properly all protruding elements of the dock, such as the foundations of the mooring rolls on both side walls so that the vessel would not be exposed to damage:

To equip the Shipyard Rescue Service with necessary floating equipment for immediate deployment of oil spill containment booms in case of the leakage of fuel from vessels coming in or out of the floating dock or being repaired in the shipyard and to train of their personnel in the deployment of the booms unaided.

### 6.2. The operator of tugboats taking *Green Egersund* in tow

The State Marine Accidents Investigation Commission recommends that the “Fairplay Towage Polska Sp. z o.o. Sp. k.” company in Gdynia should check whether AIS devices of their tugboats used in the Port of Gdynia have been installed correctly, including in particular *Mars* and *Fairplay VII* tugboats, from which the data were transmitted irregularly and at large intervals non-compliant with ITU-R M.1371-3 protocol.

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all port facility operators and port security services, assuming the potential of common resources. Drills in this regard have also been planned but no further talks or drills were held until the announcement of this report.



In the case of *Fairplay IV* whose AIS device did not transmit data at all during docking of *Green Egersund*, the Commission recommends that the AIS device mounted on that tugboat should be repaired or replaced, or on checking the reason for the lack of AIS signal on 28 August 2015, and to determine that the device had not been switched on, to instruct the skipper to keep the device ready at all times.

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## **9. Glossary and Abbreviations**

COG – course over ground

HDG – heading

LT – local time

SW – wind direction (south-western)

S-VDR – Simplified Voyage Data Recorder

t – tonne

kn – knot (speed)

UTC – Universal Time Coordinated

## **10. Information Sources**

Notification about the accident

Ships' documents

Materials from hearing of witnesses

Materials and documents received from the ship's operator

Data from the ship's S-VDR

Materials and documents received from the Naval Shipyard

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

The team conducting the examination was composed of:

the Team Leader: Marek Szymankiewicz, the Secretary of the SMAIC,

the Team Member: Tadeusz Gontarek, the member of SMAIC.