



# REPUBLIC OF BULGARIA MINISTRY OF TRANSPORT

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## FINAL REPORT

ON

investigation of very serious marine casualty, occurred on 27.09.2008 in Black Sea, in contiguous area of territorial sea of Republic of Bulgaria, with motor vessel „Tolstoy”



**APPROVED:**

**TO**

**MR. PETER MUTAFCHIEV**

**MINISTER OF TRANSPORT**

# **FINAL REPORT**

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The aim of this investigation is to ascertain circumstances, causes and consequences, at which the maritime casualty has originated and progressed and it is not to determine blame or responsibility.

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### Note:

The occurrence is described in local time (Universal Coordinated Time +3 hours)

### **3. List of abbreviations**

<b>DPRK</b>	Democratic People's Republic of Korea
<b>AIS</b>	Automated Identification System It is applied for all vessels above 300 GT. Each vessel with an AIS installed should emit in VHF range (161.975MHz and 162.025MHz) data burst about its location, heading, speed and some important static data - ship's name, IMO and MMSI number, size, draught, etc.
<b>VTMIS</b>	Vessel Traffic Management and Information System
<b>VT Explorer</b>	A system for collection, processing and presentation of information on navigation, received by ship's AIS transponders.
<b>BSSRAR</b>	Bulgarian Sea Search and Rescue Area of Responsibility. The boundaries of BSSRAR are defined by an act of Maritime Executive Agency.
<b>NF</b>	Naval Forces
<b>MAEA</b>	Marine Administration Executive Agency
<b>MI</b>	Ministry of Interior
<b>MD</b>	Ministry of Defense
<b>MT</b>	Ministry of Transport
<b>MRCC</b>	Maritime Rescue Coordination Centre
<b>BPMD</b>	Border Police Main Directorate
<b>NFODO</b>	On-duty operational officer of Naval Forces
<b>M/V</b>	Motor Vessel
<b>GMDSS</b>	Global Maritime Distress and Safety System
<b>MMSI</b>	Maritime Mobile Service Identity Identification number of GMDSS radio equipment
$\varphi$	geographic latitude
$\lambda$	geographic longitude
<b>N</b>	North
<b>E</b>	East
<b>S</b>	South
<b>W</b>	West
<b>EPIRB</b>	Emergency Position Indicating Radio Beacon Emergency radio beacon EPIRB type, standard equipment of vessels. The beacon is activated in critical situations. It sends a distress signal to the satellite system <u>Cospas-Sarsat</u> . This system determines the coordinates of the point of distress and transmit it to an earth-based station.
<b>EQUASIS</b>	Information system, created in cooperation between European Agency and French Marine Administration, which combines the accessible data for a ship from public and private sources.
<b>COSPAS-SARSAT</b>	International satellite system for search and rescue

<b>NAVTEX</b>	Narrow-band direct-printing telegraph equipment for receiving of meteorological or navigational information.
<b>JULIETTE AREA</b>	Meteorological warnings for JULIETTE are in the frame of NAVTEX international service and are emitted by Varna Radio - LZW at a frequency of 518 KHz immediately after their receiving and after that at 01:30, 05:30, 09:30, 13:30, 17:30 and 21:30 UTC. Servicing areas from 1 to 3 are to the west of 32 meridian, and JULIETTE area is here included. Servicing area JULIETTE is an element of GMDSS international program. According the international conventions, the sector should ensure the activities of Maritime Search and Rescue Coordination Centre during search and rescue operations
<b>UTC</b>	Coordinated universal time
<b>PARIS MOU</b>	Europe and North Atlantic region Port State Control. A Memorandum, concluded in Paris in 1982. It started a campaign against visits of inconsistent with the standards ships in the ports of states, signed the Memorandum. It has entered into force on 01.07.1982.
<b>ISM Code</b>	International Safety Management Code International code for management of ship safety operation and prevention of pollution.

Bellow sited definitions are used in the enclosure according the International Convention on Sea Search and Rescue -1979.

- 1) **Search.** Operation usually coordinated by Search and Rescue Coordination Centre or Searcy and Rescue Sub-Centre, using the personnel and means available for location of people in distress.
- 2) **Rescue.** Operation for finding of people in distress, rendering first medical aid or other care and taking them to a safe place.
- 3) **Search and Rescue.** Conducting in case of distress of observation, communication, coordination and operations for search and rescue, including ensuring of medical consultations, first medical aid or evacuation by using of public and private resources, including aircraft, ships and other vessels and installations.
- 4) **Search and Rescue Region.** An area of defined dimensions, related with a rescue coordination centre, within which search and rescue services are provided.
- 5) **Rescue Coordination Centre.** A unit responsible for promoting efficient organization of search and rescue services and for coordinating the conduct of search and rescue operations within a search and rescue region.

- 6) **Rescue Coordination Sub-Centre.** A unit subordinated to a rescue coordination centre established to complement the latter according the special regulations of the responsible bodies.
- 7) **Search and Rescue Means.** All mobile resources, including the search and rescue units assigned, used for conducting of search and rescue operations.
- 8) **Search and Rescue Unit.** A unit completed by trained personnel and equipped for prompt conducting of search and rescue operations.
- 9) **Emergency Phase.** A generic term meaning, as the case may be, uncertainty phase, alert phase or distress phase.
- 10) **Uncertainty Phase.** A situation wherein uncertainty exists as to the safety of a person, ship or other vessel.
- 11) **Alert Phase.** A situation wherein apprehension exists as to the safety of a person, ship or other vessel.
- 12) **Distress Phase.** A situation wherein there is a reasonable certainty that a person, vessel or other vessel is threatened by grave and imminent danger and requires immediate assistance.

#### **4. Factual Information**

On 27.09.2008, at 04:05 h, an EPIRB distress signal has been received at Varna MRCC from Moscow MRCC from a point with probable coordinates at about 14 nautical miles to the East from Emine Cape.

After execution of initial actions and respective operational procedures for identification of distress signal the hypothesis for casualty of m/v „Tolstoy” in a point with coordinates:  $\varphi = 42^{\circ}44' N$ ,  $\lambda = 028^{\circ}12'E$  was accepted as reliable.

An operation for search and rescue has been conducted from 10.15 h to 17.30 h on 01.10.2008. Ships and a helicopter of NF, Border Police and MAEA has participated in the operation.

2 crew members of m/v „Tolstoy” have been rescued by Mirage yacht, navigating under Belgian flag.

The rest 8 crew members have been declared missing as a result of foundering of m/v „Tolstoy”.

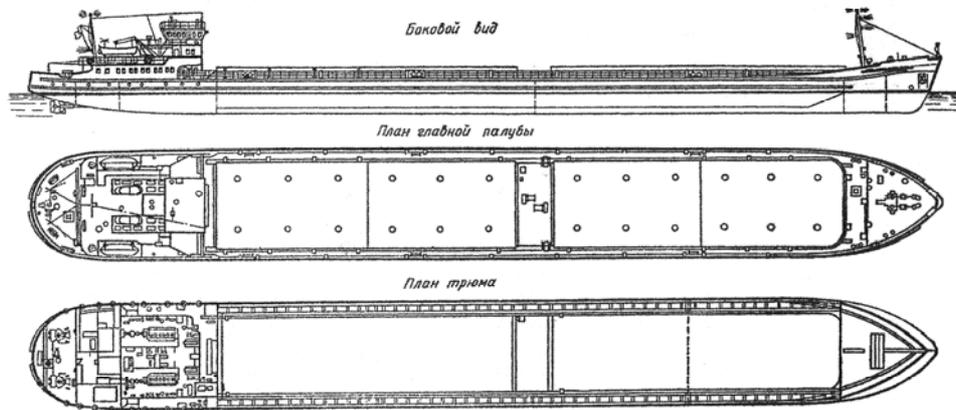
## 5. M/v „Tolstoy” Technical Data



In accordance with Certificate of Registry, issued by Marine Administration of DPRK on 30.03.2007 and valid till 01.04.2009:

- Name: „Tolstoy”;
- Ship identification: IMO No 8942917;
- Call sign: HMXW6, MM/VI 4456050;
- Nationality: DPRK;
- Registration: DPRK on 30.03.2007;
- Port of registry: Wonsan, DPRK;
- Gross tonnage: 3994;
- Net tonnage: 1198;
- Deadweight: 5180;
- Length(LOA)- 138.5 m;
- Mould breadth: 16.5 m;
- Mould depth: 5.5 m;
- Maximum draught in accordance with International Load line Certificate, issued by Marine Administration of DPRK: 3.48 m;
- Type - general cargo ship;
- Built: in 1971 at Santierul Navale - Oltenita, Romania;
- Cargo holds: two
- Main engine - 2 diesel engines, Russ 6CHRPN36/45 type, total power 1324 kwt, two propellers.

ОБЩЕЕ РАСПОЛОЖЕНИЕ  
GENERAL ARRANGEMENT



According Continuous Synopsis Record, issued by Marine Administration of DPRK on 02.01.2007:

- ship owner: Pegasus Shipping SA, Republic of Seychelles;
- operator: Regina Shipping, IMO ID number 5409624, address Sichnevogo bld., 3 Povstannya St, Kiev, Ukraine.

**6. Information about m/v "Tolstoy" voyage:**

According Declaration of the Captain on Departure No 1690 issued on 18.09.2008, signed by the m/v „Tolstoy” captain and a representative of port supervision of Rostov on Don Port, cargo berth No 63 of 09.09.2008:

On 22.09.2008 m/v „Tolstoy” has departed from Rostov on Don Port with a crew of ten (10) capable persons.

Voyage destination: Nemrut, Turkey.

Cargo 2568 metric tonnes metal scrap

Draught: forward =1.83 m, aft =2.83 m, midship=2.35m

Fuel and lubricant quantity declared at sailing:

73.8 tonnes of diesel fuel and 756 liters of diesel oil;

Potable water declared at sailing: 35 tonnes.

Ship documents and certificates as to the moment of sailing in accordance with Declaration of the Captain on Departure No 1690 issued on 18.09.2008:

Cargo Ship Safety Construction Certificate, issued on 14.06.2007 issued by Marine Administration of DPRK: valid till 01.04.2009.

Certificate of Registry, issued by Marine Administration of DPRK on 30.03.2007, valid till 01.04.2009.

Cargo Ship Safety Equipment Certificate, issued on 14.06.2007, valid till 01.04.2009.

Cargo Ship Safety Radio Certificate, issued on 14.06.2007 by Marine Administration of DPRK, valid till 01.04.2009.

International Load Line Certificate, issued by Marine Administration of DPRK on 14.06.2007, valid till 01.04.2009.



### **7. Information about crew:**

- Master, certificate of competence No 203011355;
- Chief Officer, certificate of competence No 00113/2004/09;
- Chief Engineer, certificate of competence No 01692/2007/07;
- Second Officer, certificate of competence No 01692/2007/07;
- Second Engineer, certificate of competence No 00257/2008/06;
- Third Engineer, certificate of competence No 00650/2006/01;
- Seaman;
- Seaman;
- Seaman;
- Cook.

### **8. Information about marine casualty**

The casualty is classified according Art.4, Para.1, item 1 of Regulation No 23 of MT as: very serious marine casualty –total loss of the ship, loss of life.

Date and time of marine casualty: 27.09.2008, at 03.39 h.

Coordinates and location of marine casualty:

Black Sea,  $\varphi = 42^{\circ}44.4'N$ ,  $\lambda = 028^{\circ}11.5'E$ , at about 14 nautical miles to the east from Emine Cape in contiguous area of territorial sea of Republic of Bulgaria.

Hydro-meteorological conditions in the area of marine casualty:

wind from NNE with a speed of 17.2-20.7 m/s, heavy sea with waves up to 4.0 m of height, air temperature +11°C, visibility from 3 to 5 miles, limited by rain, sea water temperature + 18°C.

## **9. Consequences:**

M/v „Tolstoy” foundered as result of serious structural failure, led to fracture of vessel's hull, without sufficient time for activation of collective rescue means and organized abandonment of the vessel.

Reported missing: 8 crew members.

Rescued: 2 crew members by the crew of Mirage yacht, navigating under Belgian flag.

## **10 .Description of Marine Casualty**

On 22.09.2008 m/v „Tolstoy” sailed from Rostov on Don Port, Russia, with a cargo of metal products (scrap), with destination port of discharge Nemrut Bey, Turkey.

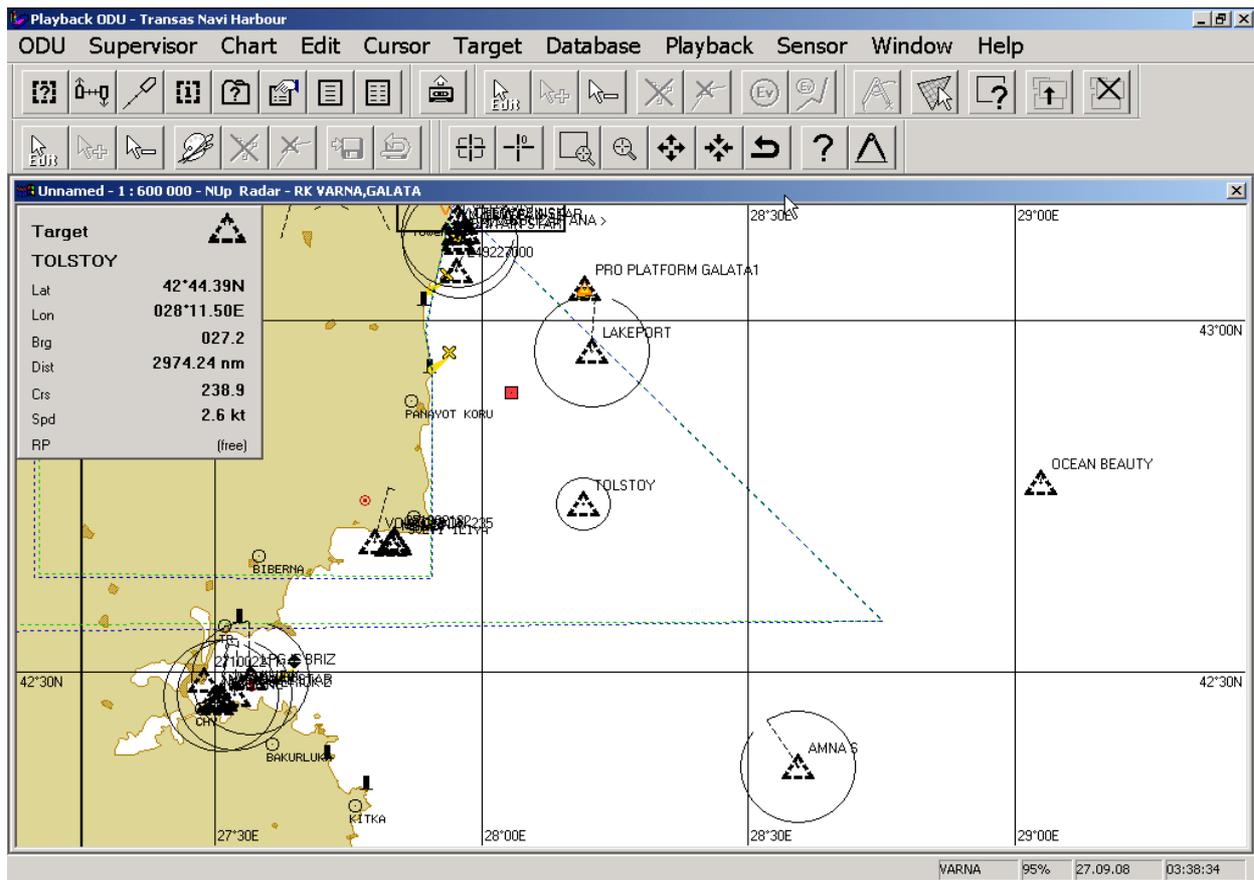
On 24.09.2008 at 09.00 h, according the data of VTMIS, the vessel went out from Kerch channel with course 260° and speed about 6 knots. On 26.09.2008 at 17.43 h the vessel was at a point with coordinates:  $\varphi = 43^{\circ}05'50.2N$ ;  $\lambda = 029^{\circ}14'26.2E$ , course =248°, speed of about 4.5 knots, and hydro-meteorological conditions of sea region: wind from NNE, force of wind 8 (17.2÷20.7 m/s), heavy sea 5 (about 4 m height of waves). Till 03.16 h on 27.09.2008 the vessel has steered on course 245° with a speed of about 4.5 knots in direction to Emine Cape, with deviation from the course in the range from 15° to 25° to the left-hand and right-hand side under wind influence from NNE with force of 8 (17.2÷20.7 m/s), heavy sea 5 (sea waves height of about 4 m). At 03.18 h the vessel has changed abruptly her course from 210° to 171°, and lost a speed down to 3.5 knots. At 03.22 h the vessel has been established at a course 217° with a speed of about 4.2 knots. Till 03.38 h on 27.09.2008 the vessel has kept course 238° and speed of about 2.6 knots. At 03.39 h „Tolstoy” m/v disappeared from Varna VTS observation in a point with coordinates:  $\varphi = 42^{\circ}44'39.2N$ ,  $\lambda = 028^{\circ}11'29.5E$ .

## **11. Participation of Coastal Authorities and Emergency Actions**

On 27.09.2008 at 04:05 h, an EPIRB distress signal has been received at Varna MRCC from Moscow MRCC from EPIRB emergency buoy from a point with probable coordinates at about 15 nautical miles to the east from Emine Cape.

At 05.02 h on 27.09.2008 from COSPAS-SARSAT MRCC Rome at Varna MRCC a message was received, confirming the validity of the distress signal, received at 04.05 h from EPIRB vessel emergency buoy. COSPAS/SARSAT ALERT 406 MHZ-MM/VI 4456050 (0-M/V „TOLSTOY”-C.S HNXW6-FLAG NORTH KOREA.

After execution of initial actions and respective operational procedures for identification of distress signal, the hypothesis for casualty of m/v „Tolstoy” in a point with coordinates:  $\varphi = 42^{\circ}44,39N$ ,  $\lambda = 028^{\circ}11,5E$ , to the east from Emine Cape was accepted as reliable.



### Actions Undertaken

- **Orientation** – from 04.06 h till 05.28 h on 27.09.2008
- **Uncertainty, Alert, Distress** till 11.25 h on 27.09.2008)
- **Initial actions** from 04.35 h till 07.45 h on 27.09.2008.
- **Planning** from 08.45 h till 09.20 h on 27.09.2008.
- **Search and rescue** from 10.15 h on 27.09 till 17.30 h till 01.10.2008.
- **Cessation in sea** - at 18.30 h on 29.09.2008;
- **Cessation on land:** at 17.30 h on 01.10.2008.

### Planning details:

- **Main object** of search: persons in water with or without individual rescue equipment.
- **Secondary objects:** life rafts or life boats.
- **Main hypothesis:** hull failure, very quick stability loss, foundering of the vessel without sufficient time for activation of collective rescue means and organized abandonment of the vessel.
- **Criterion for effectiveness:** accumulated probability for discovering of searched objects.

### Notified:

#### Date 27.09.2008

- at **04.35 h** by telephone: Varna Radio in order to start communication search;

- at **04.57** h an E-mail messages was sent to Varna Radio in order to emit a May Day signal
- at **05.30** h by telephone: Director of Search and Rescue Directorate of MAEA;
- at **05.35** h by telephone: On-duty officer at Border Coordination Centre - Bourgas. The traffic in the region at the time of occurrence has been discussed. A request for survey of an area at about 14 miles to the east from Emine Cape by technical means was sent;
- at **06.56** h by telephone: On-duty operational officer of Naval Forces; A request for assistance at conducting of radar analysis of the traffic in the area to the east of Emine Cape during the occurrence was made;
- at **06.57** h an e-mail message was sent to the Maritime Search and Rescue Coordination Centers of Black Sea states with information about the signal received from vessel emergency buoy EPIRB with a request for submitting of additional information about the vessel, her owner, operator, agent, etc.;
- at **07.50** h: - by telephone: Executive Director of MAEA;
- at **07.50** h: by telephone on-duty officer at MT;
- at **08.08** h: by fax to on-duty operational officer of Naval Forces. Assistance and sending of ships and a helicopter was asked for participation of emergency rescue actions, related with the marine casualty.

### **Underwater Inspection**



An underwater inspection was undertaken on 03.11.2008 in order to identify the vessel and video recording. IMO number and name of object, written on the stern and on both side of superstructure, were visible and filmed.



The vessel's stern lies on even keel at a depth of 76 m in north-south direction. It was established visually that the vessel was fractured into two parts in the area of stern cargo hold, close to the vertical partition wall between the cargo holds, at a distance of about 60 m from the stern.



The navigation bridge is heavily bended down in the middle. Starboard side wing door of the bridge is opened and the port side wing one is closed.



From the video inspection no presence of crew members was established in this compartment.

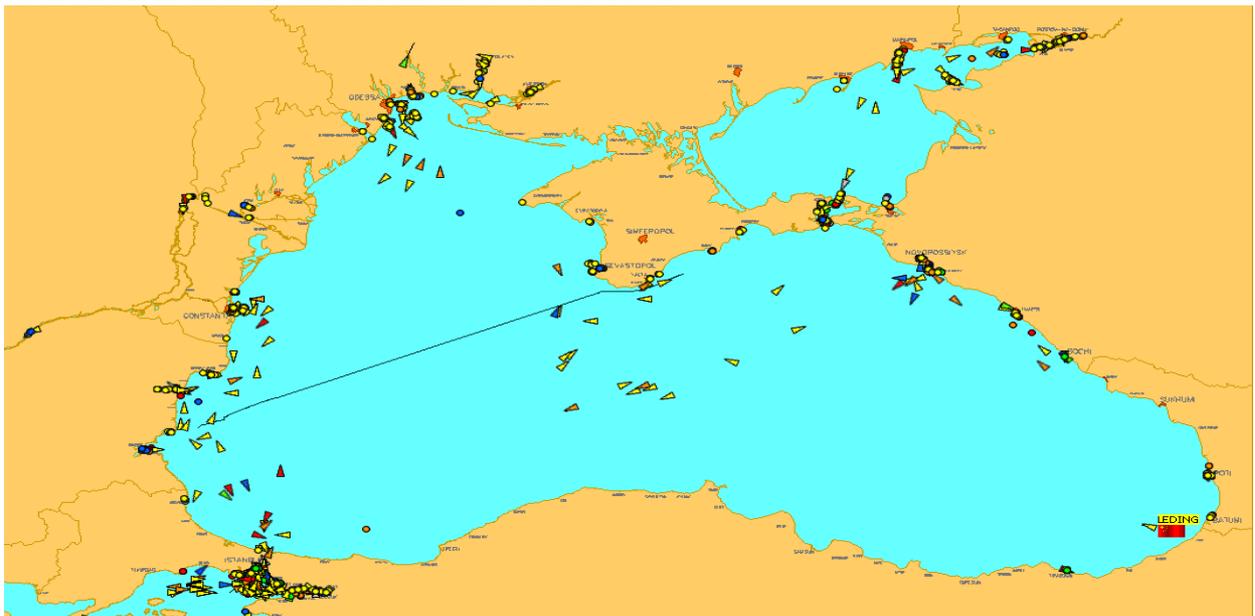


## 12. Marine Casualty Reconstruction

M/v „Tolstoy” sailed from Rostov on Don Port, Russia, on 22.09.2008.



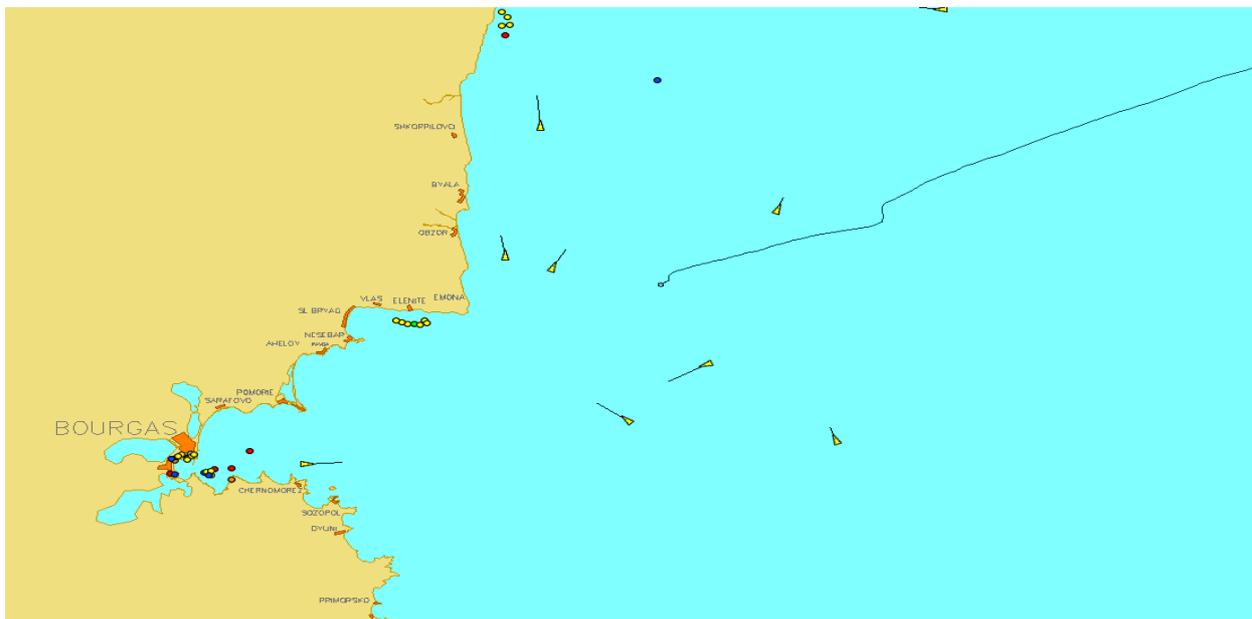
According the witness evidences of crew members survived, vessel's life-boats, 2 items, were out of fitness and usable condition and gyrocompass was inoperative. After crossing of beam of Yalta harbor, Ukraine, as a result of worsen weather conditions part of ventilation heads of the ballast tanks has received constructive damages. The crew made attempts to conduct repair and welding activities, but because of presence of sea sprays on the deck and rain their intention remained without result.



At about 17.00 h on 26.09.2008 green seas flooded vessel's poop deck and weather deck. The sea water rushed repeatedly into the saloon, galley and utility rooms. At about 01.00 h on 27.09.2008 as a result of water inrush in steering gear compartment and engine room the vessel lost steering and power.

After restoration of vessel's engine the course steering was controlled by emergency method. The crew was engaged with pumping out and drying out of flooded by sea water internal vessel's rooms.

At about 03.35 h on 27.09.2008 the vessel came again in critical situation, lost control and changed her course by about 120°. Till this moment a seaman was on duty in the steering room. For getting control over the situation, the emergency control in steering room was taken by duty officer. The Master tried to steer the course to Emine Cape, but the vessel was flooded and shaken by sea waves induced vibrations.



After several powerful vibrations the hull girder collapsed transversely in the area of fore-part of stern cargo hold, close to the bulkhead.



Two crew members, who were on the bridge during the incident, were able to abandon the sinking vessel. One of them was in life jacket. Helping mutually, they were able to reach an activated life raft by swimming.

During the emergency the usual in such case distress signals haven't been emitted by a radio station or by shooting of pyrotechnic.

### **13. Analysis of Causes and Circumstances, Led to the Marine Casualty**

During the investigation of the occurrence with the m/v „Tolstoy” the following was established:

The vessel was built in 1971 in Santierul Navale in Oltenita, Romania, as a vessel for river-sea navigation, Volgo-Don type, Project 1565- Class „O” according Russian River Vessel Register.

The vessels for river-sea navigation are designed with limited draft in order to navigate in rivers and coastal sea water space. They have limited height over the waterline to the highest point of the mast in order to be able to pass under bridges. In order to increase their payload, they are designed with wide and long hull.

The limited draught, combined with enlarged length and width is a factor with negative influence on strength characteristics of vessel construction during the operation of this type of vessels in sea navigation conditions.

According „Design of a river-sea ship by optimization” Struct Multidisc Optim 22, 240–247 Springer-Verlag 2001, authors C. Cinquini, P. Venini, R. Nascimbene and A. Tiano, the shipbuilding practice has impose the following limitations regarding the length, height and width of vessels for river-sea navigation:

- length between 80 and 90 meters;
- width between 11 and 13 meters;
- draught from 3 to 5 meters.

M/v „Tolstoy” is with the following data:

- length - 138.5 m;
- width - 16.5 m;
- draught – 3.48 m.

According information of „Equasis”, the previous and last known registration of owners and operators are as follows:

- From 01.01.1998 the owner is Sunline Shipping. Ship operator Gloria shipping Co;
- From 30.09.2002 the owner is Pegasus Shipping. Ship operator Getsar;
- From 07.06.2004 owner Pegasus Shipping and ship operator Regina Shipping.

According information of „Equasis”, the previous and last known registration of change of flag are as follows:

- From 12.05.2000 till 23.01.2001- Ukraine;
- from 23.01.2001 till 28.01.2002 - Cambodia;
- From 28.01.2002 till 26.08.2003 – Tonga;
- From 12.05.2000 till 23.01.2001- Mongolia;
- From 01.04.2004 - DPRK.

According information of „Equasis”, the previous and last known classification societies, servicing the vessel, are as follows:

- since building till year 2000 - Russian River Vessel Register;
- since 01.01.2004: Korea Classification Society (DPRK)

No available information for the period from year 2000 till 01.01.2004 was established.

According the rules of Russian River Vessel Register, under control of which m/v „Tolstoy” was navigating till year 2000, the operation of vessels Project 1565-O should be conducted according the classification requirements, applicable for river-sea navigation vessels.

Classification of river-sea vessels is accomplished in accordance of classification of inland water ways, including navigable rivers and sea areas of their mouths. They are classified by Russian River Vessel Register by classes depending on allowable wind and wave regimes, which ensure safe navigation in heavy hydro-meteorological conditions.

The class of ship is determined by the system of conditional symbols, which are given during its classification as a vessel. It describes her design peculiarities and operational conditions in accordance with the international and local safety rules.

According the data base of Russian River Vessel Register, m/v „Tolstoy” is a vessel built in the shipyard of Santierul Navale Oltenita, Romania, launched in 1971 under the name Volgo-Don 5028. It is River-Sea Type, Project 1565, class O, what means that a vessel of this class might be operated in river-sea water spaces with a height of wave up to 2.0 m.

According the TRANS/SC.3/2003/3 19 June 2003 Economic Commission for Europe, Inland Transport, Working Party on Inland Water Transport, (Forty-seventh session, 7-9 October 2003, agenda item 7 (a)), an exchange of information regarding the measures aimed to development of inland water transport, submitted by the Government of Russian Federation, additional limitations exist for safe navigation in accordance with instructions for navigation in Black Sea and Sea of Azov as follows:

- for Sea of Azov water space: distance of 20 miles from the coast;
- for Black Sea water space: from Odessa to the Danube rive mouth: 5 miles from shore and seasonal limitation for the months from March till October;
- from Odessa to Port of Skadovsk: 5 miles from shore and seasonal limitation for the months from March till November;

M/v „Tolstoy” is a vessel restrictedly suitable for sea passages.

In accordance with the vessel certificates issued on 30.03.2007 by Marine Administration of DPRK, m/v „Tolstoy” is with limited area of navigation: Red Sea, Black Sea, Mediterranean Sea and water space around Europe.

Till 03.39 h on 27.09.2008, according data available, m/v „Tolstoy” has moved on course =245°-248° with a speed of about 4.5 knots in Emine Cape direction yawing between 15° and 25° to the left and right under the influence of strong tail wind from NNE with force of 8 (17.2-20.7 m/s) and heavy sea 5 (sea waves height of about 4 m).

Sea climatic information is a basic type of servicing of navigation and activities, related with rational usage of sea resources. The knowledge about the regime characteristics of wind-induced waves in Black Sea is of vital importance for the safety of navigation. The waves cause rolling of the vessel and it might from its part serious consequences for the vessel, cargo and crew. It is a reason for origin of additional dynamic stresses, cracking, buckling and inertial forces and moments on the hull-girder.

WEATHER AND SEA BULLETIN ON 26/09 AT 1830 UTC:

PART ONE: GALE AND SEA WARNING.

PART TWO: SYNOPSIS OF WEATHER CONDITIONS ON 26/09 AT 1500 UTC: A LOW WITH A CENTRE 1006 HPA OVER SOUTHEAST TURKEY A RIDGE FROM NORTHWEST OVER BALKAN PENINSULA PERSISTING.

PART THREE: FORECAST FOR 24 HRS: AREAS 1 TO 3: WIND NORTH-NORTHEAST 6-7 GUSTS 8 FOR AREA 1 4-5 GUSTS 6-7 SEA 4-5 FOR AREA 1 3-4 VISIBILITY 2-5 MLS CLOUDY RAIN TEMP MIN 9-14 MAX 12-17 SEA WATER 17-20 DGS/C.

PART FOUR: STATION REPORTS ON 26/09 AT 1800 UTC:

SHABLA WIND NNW 7 SEA 5 VIS 5 MLS CLOUDS 10 PRESS 1017 TEMP 12=

KALIAKRA WIND N 6 SEA 5 VIS 2 MLS CLOUDS 10 PRESS 1018 TEMP 11=

VARNA WIND N 7 SEA 3 VIS 2 MLS CLOUDS 10 PRESS 1017 TEMP 11=

EMINE WIND NNE 8 SEA 5 VIS 5 MLS CLOUDS 10 PRESS 1017 TEMP 11=

BOURGAS WIND NNW 7 SEA 4 VIS 10 MLS CLOUDS 10 PRESS 1018 TEMP 12=

AHTOPOL WIND N 5 SEA 4 VIS 5 MLS CLOUDS 10 PRESS 1016 TEMP 14=

METEO VARNA

WEATHER AND SEA BULLETIN ON 27/09 AT 0630 UTC=

PART ONE: **GALE AND SEA WARNING=**

PART TWO: SYNOPSIS OF WEATHER CONDITIONS ON 27/09 AT 0300 UTC: A LOW WITH A CENTRE 1006 HPA OVER SOUTHEAST TURKEY MOVING SLOWLY TO EAST A RIDGE FROM NORTHWEST OVER BALKAN PENINSULA SLOWLY EXPANDING TO SOUTHEAST=

PART THREE: FORECAST FOR 24 HRS: **AREAS 1 TO 3:** WIND NORTH 6-7 GUSTS 8 GRADUALLY DECREASING TO 4-5 FOR **AREA 1** 4-5 GUSTS 6 GRADUALLY DECREASING TO 2-4 SEA 4-5 GRADUALLY DECREASING TO 2-3 FOR **AREA 1** 3-4 GRADUALLY DECREASING TO 2-3 VISIBILITY 5-10 MLS CLOUDY FOR **AREAS 2 AND 3** RAIN TEMP MAX 13-18 MIN 9-14 SEA WATER 16-19 DGS C=

PART FOUR: STATION REPORTS ON 27/09 AT 0600 UTC=

SHABLA WIND N 6 SEA 4 VIS 5 MLS CLOUDS 10 PRESS 1018 TEMP 14=

KALIAKRA WIND N 6 SEA 4 VIS 10 MLS CLOUDS 10 PRESS 1018 TEMP 12=

VARNA WIND N 6 SEA 3 VIS 2 MLS CLOUDS 10 PRESS 1018 TEMP 12=

EMINE WIND NNE 8 SEA 5 VIS 5 MLS CLOUDS 10 PRESS 1017 TEMP 11=

BOURGAS WIND NW 5 SEA 4 VIS 5 MLS CLOUDS 10 PRESS 1019 TEMP 11=

AHTOPOL WIND NW 4 SEA 4 VIS 1 MLS CLOUDS 10 PRESS 1015 TEMP 12=

METEO NIMH VARNA

AR

The Commission assumes with a high probability, that because of getting of the vessel in heavy hydro-meteorological conditions - wind NNE with force of 8 and waves of about 4 m), in order to shorten the distance to safe anchorage at Emine Cape, the master of m/v „Tolstoy” has used so-called ride out a storm method of navigation.

M/v „Tolstoy” conducted the passage with draught: forward = 1.83 m, stern=2.83 m. As a result of influence of hits of overtaking waves on a vessel with insufficient draft it might to cause abrupt drift of the stern, damages of steering arrangement, main engine shutdown resulting from propeller high rotation speed because of operation in air environment, inrush of water in vessel berthing, service or cargo space as a result of damages of ventilation system or other vessel system/v. Underestimation of harmful influence of resonance-pitching leads to violation of hull strength, shortening of vessel life and sometimes to casualty and even to wreck of vessel.

#### **14. Main and Contributing Factors led to the Marine Casualty**

The very serious marine casualty occurred on 27.09.2008 in Black Sea with m/v „Tolstoy” was a result of following:

##### **Main cause:**

The vessel has found herself in severe hydro-meteorological conditions, for which she is not fit regarding her construction and designed. This has created conditions led to damages, structural deformations and to overall hull-girder collapse.

##### **Contributing Factors:**

M/v „Tolstoy” was built as a river-sea type vessel with insufficient hull girder residual strength. The presence of elements of longitudinal and transverse web frame with qualitative characteristics under the normative requirements resulting of corrosion, material fatigue of vessel's hull or operational causes has contributed for increasing of the possibility for hull-girder collapse because of external factors or secondary internal influences.

These conclusion are based on the following information from „Equasis”:

On 22.03.2007 m/v „Tolstoy” during its stay in Port of Elefsis, Greece, was a subject of inspection by Port State Control. The inspection established 15 shortcomings:

- irregularities in application of Convention No 147(ILO) regarding the minimal standards in commercial navigation, 1976;
- structural damages and deformations of longitudinal and transverse sets of vessel's hull;
- irregularities regarding the operable condition of radio aids for communication in emergency situation (GMDSS MF/HF);
- irregularities regarding the validity of vessel's documentation and certificates of competence of crew members;
- comments regarding the implementation of International Convention on Load Lines - 1966.
- remarks regarding implementation of International code for management of safety operation of ships and prevention of pollution. (ISM Code),
- remarks regarding implementation of International Sewage Pollution Prevention by Ships, etc.

On 22.03.2007 m/v „Tolstoy” during its stay in Port of Milos, Greece, was a subject of inspection by Port State Control. The inspection established 27 shortcomings:

- irregularities in application of Convention No 147(ILO) regarding the minimal standards in commercial navigation, 1976;
- structural damages and deformations of longitudinal and transverse sets of vessel's hull;
- irregularities regarding the operable condition of radio aids for communication in emergency situation (GMDSS MF/HF);
- irregularities regarding the validity of vessel's documentation and certificates of competence of crew members;
- remarks regarding implementation of International code for management of safety operation of ships and prevention of pollution. (ISM) Code;

- remarks regarding implementation of International Sewage Pollution Prevention by Ships, etc.

On the base of these results the vessel was detained for 3 days.

On 06.06.2007 m/v „Tolstoy” during its stay in Port of Rostov on Don, Russia, was a subject of inspection by Port State Control. The inspection established 3 shortcomings:

- cracks on vessel's hull;
- irregularities regarding the operable condition of radio aids for communication in emergency situation (GMDSS MF/HF);
- irregularities regarding the validity of certificates of competence of crew members;

On the base of these results the vessel was detained for 1 day.

The commission has ascertained that on 26.10.2007 the Marine Administration of DPRK has sent a note to all member of Paris, Black Sea, Mediterranean and Indian Memorandum of Port State Control to inform the member states, that because of discrepancy of standards and serious omissions, resulting in multiple detentions of the vessel and related with the requirements of DPRK Ship Register, m/v „Tolstoy” has been excluded from the register.

In the same note Marine Administration of DPRK has asked assistance of the members of Paris, Black Sea, Mediterranean and Indian Memorandum of Port State Control for deprivation of ship documents of m/v „Tolstoy”.

On 06.11.2007 by a letter No 081/07 the note for excluding was sent by the Secretary of Black Sea Memorandum of Port State Control to the Marine Administrations of the States of Black Sea Region for immediate execution.

According information of „Equasis”, on 19.03.2008 m/v „Tolstoy” was a subject of inspection by Port State Control during its stay in Port of Rostov on Don, Russia. The inspection established:

- structural damages and deformations of longitudinal and transverse sets of vessel's hull;
- irregularities regarding the operable condition of radio aids for communication in emergency situation (GMDSS MF/HF) and provision with navigation charts and manuals;
- remarks regarding implementation of International Sewage Pollution Prevention by Ships.

On the base of these results the vessel was detained for 9 days.

During the check of ship documents, cited above, the fact that the vessel had been excluded from North-Korean Ship Register hasn't been established.

The practical result of execution of the Note should lead to detention of the vessel at first port visited, which hasn't happen.

Till 27.09.2008 m/v „Tolstoy” appears in the data base of International Maritime Organization as a vessel navigating under DPRK flag.

The Commission has established, that notwithstanding of the announced act of Excluding of the Ship from DPRK registers, its Maritime Administration hasn't accomplished the right to inform International Maritime Organization for the change of status of m/v „Tolstoy”.

From 06.11.2007 till 27.09.2008 m/v „Tolstoy” has navigated, visited ports, conducted cargo handling in violation of the norms, rules and criteria established by International Maritime Organization and European Maritime Safety Agency.

The Commission is not authorized to clarify the genesis of this precedent.

### **15. Difficulties Encountered by the Commission during the Investigation**

The Commission doesn't dispose with a copy of original construction plan of m/v „Tolstoy”. A lot of multiple unsuccessful attempts to establish a contact with the owner of vessel or her operators for resolving the problem were made.

The Commission doesn't possess a certified copy of International Certificate for Load Lines, issued by Marine Administration of DPRK on 14.06.2007, valid till 01.04.2009. The document was submitted in an illegible form and of no favor for investigation of marine casualty. The Commission has made a number of ineffective attempts to establish a contact with Marine Administration of DPRK in order to resolve the problem.

The Commission doesn't possess an original loading plan of the ship. This plan is not submitted by the ship-owner and ship-operator, as well by the Port Administration of port of departure, Rostov on Don, Russia.

The Commission established shortcomings in implementation of the note of Marine Administration of DPRK by the members of Paris, Black Sea, Mediterranean and Indian Memorandum of Port State Control for deprivation of ship documents of m/v „Tolstoy”.

The Commission has established omissions in application of Regulation on System/v of Movement, Reporting and Management of traffic and information servicing of navigation in maritime space of Republic of Bulgaria and Bulgarian Sea Search and Rescue Area of Responsibility, published in State Gazette, No 76 of 20.09.2005, Chapter 1, Article 3, Para.1; Chapter 2, Section 3, Article 15, Para.2, item 1b & item 4.

The Commission has established that:

- Varna Maritime Rescue Coordination Centre doesn't possess a suitable premise, equipped for operation of a joint staff of experts, participants in search and rescue operations.
- The technical equipment available are not reliable, there is no software support for forecasting of assumed coordinates of people and objects in distress in the search and rescue controlled area.
- Varna Maritime Rescue Coordination Centre has limited user's access to VT Explorer software product for observation of Black Sea in real time. The perimeter observed is less the boundaries of Bulgarian Search and Rescue Area of Responsibility.
- The experts and operators at Varna Maritime Rescue Coordination Centre have no authorized full access to International Maritime Organization data base of ships with the necessary data for identification of vessels in distress condition.

The Commission has established that the aircraft, NF helicopters, have no technical ability to communicate with maritime rescue crafts during the coordinated search and rescue.

### **16. Proposals for Safety Measures Excluding Recurrence of Similar Events**

On the base of the maritime casualty with m/v „Tolstoy”, the Commission makes the following proposals for safety measures.

#### **International Maritime Organization (IMO)**

- To elaborate mandatory criteria for safety of construction and safe operation of river-sea vessels.

- To introduce a procedure for deleting of a vessel from the registers of International Maritime Organization after declaration of "Note of Deletion" by the Flag Administration concerned.

**European Maritime Safety Agency (EMSA):**

- To introduce a procedure for control of determine the fact of deprivation of vessel's documents after declaration of "Note of Deletion" by the Flag Administration concerned.

**MT, MD, MI**

- To update and coordinate the Search and Rescue Operation Plan in Bulgarian Sea Search and Rescue Area of Responsibility in the part about the coordination procedures in cases of serious maritime casualties, requiring joint actions in search and rescue operations. Due time for execution 31.12.2009.
- To take measures for providing of helicopters with communication and survival equipment with operational frequency compatible with the frequencies of maritime rescue units and Maritime Rescue Coordination Centre.

**MAEA to provide:**

- Varna Maritime Rescue Coordination Centre with the necessary for their activity up-to-date technical equipment and software for support of planning, organization, coordination and conducting of the process of maritime search and rescue in accordance with Search and Rescue Operation Plan in Bulgarian Sea Search and Rescue Area of Responsibility.
- full access to IMO data base, providing information about vessels' data.
- full access to VT Explorer software product for observation of Black Sea in real time.
- premises equipped for operation of joint staff of experts, participating in search and rescue operation.
- to organize periodical participation of experts and operators at Maritime Rescue Coordination Centre in training and refreshing courses for maritime search and rescue.

**The Commission recommends to MAEA management the following:**

- to prepare a proposal for revision of Commercial Navigation Code Part II; Register books for registration of ships, Art. 41,. and to introduce a new paragraph to oblige MAEA in case of excluding of a vessel from its register to inform the respective bodies of International Maritime Organization and European Maritime Safety Agency, as well to ensure in a define by it time the real deprivation of vessel's certificates of the excluded vessel.

The documents related with investigation of the marine casualty are filed in the archives of Investigation of Accidents in Air, Water and Railway Transport Directorate.

**MARINE ACCIDENT INVESTIGATION BOARD**