REPUBLIC OF CYPRUS

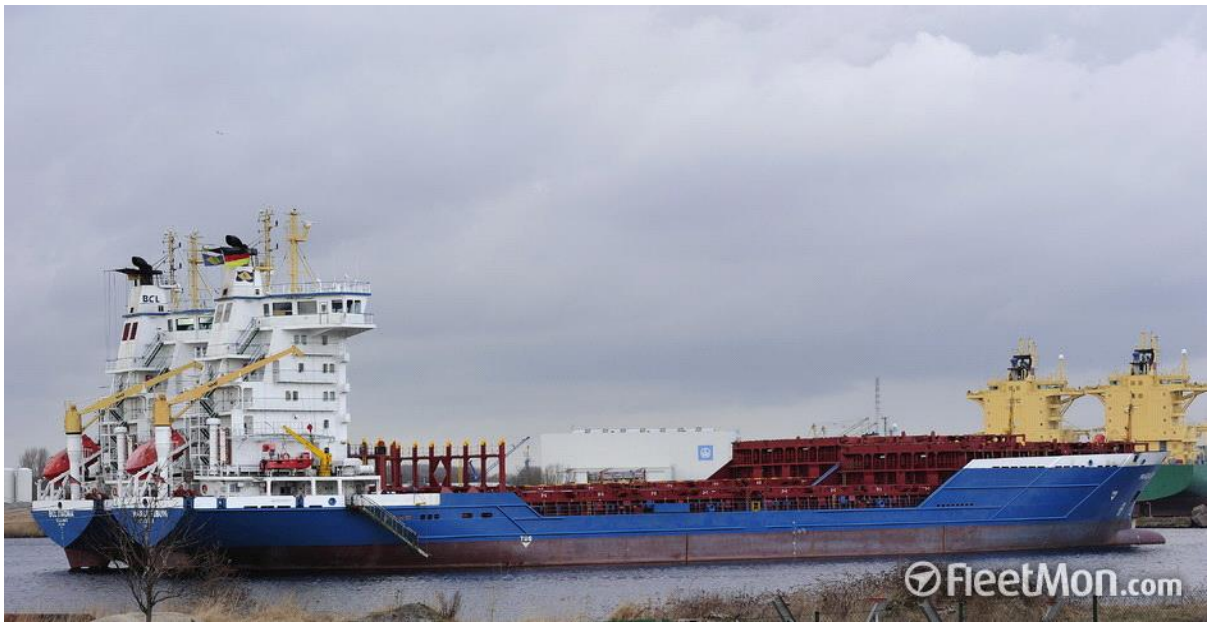
MARINE ACCIDENT AND INCIDENT

INVESTIGATION COMMITTEE

[Investigation Report No: 182A/2015]

Serious Marine Casualty

Collision in dense fog between "Dinah Borchard" and "Eurocargo Patrasso" at Venice Coast-Adriatic Sea, on the 8th of December 2015



MAIC
Marine Accident and Incident Investigation Committee
Cyprus

Foreword

The sole objective of the safety investigation under the Marine Accidents and Incidents Investigation Law N. 94 (I)/2012, in investigating an accident, is to determine its causes and circumstances, with the aim of improving the safety of life at sea and the avoidance of accidents in the future.

It is not the purpose to apportion blame or liability.

Under Section 17-(2) of the Law N. 94 (I)/2012 a person is required to provide witness to investigators truthfully. If the contents of this statement were subsequently submitted as evidence in court proceedings, then this would contradict the principle that a person cannot be required to give evidence against themselves.

Therefore, the Marine Accidents and Incidents Investigation Committee, makes this report available to interested parties, on the strict understanding that, it will not be used in any court proceedings anywhere in the world.

This investigation was carried out in cooperation with the "Malta Marine Safety Investigation Unit".

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List of Acronyms and Abbreviations

AB	Able Seaman
AIS	Automatic Identification System
ARPA	Automatic Radar Plotting Aid
C/E	Chief Engineer
C/O	Chief Officer
COLREGS	The Int/nal Regulations for Preventing Collisions at Sea 1972
DBT	Double Bottom Tank
DMS	Department of Merchant Shipping
DO	Diesel Oil
DWT	Deadweight Tonnage
DOT	Diesel Oil Tank
ECDIS	Electronic Chart Display and Information System
ETA	Estimated Time of Arrival
ETD	Estimated Time of Departure
FO	Fuel Oil
FOT	Fuel Oil Tank
FPT	Fore Peak Tank
GPS	Global Positioning System
GT	Gross Tonnage
HFO	Heavy Fuel Oil
IMO	International Maritime Organization
Lat.	Latitude
Long.	Longitude
LT	Local Time

m	Meter
MC	Management Company
MT	Metric Ton
NT	Net Tonnage
OOW	Officer of the Watch
OS	Ordinary Seaman
PSN	Position
Ro-Ro	Roll-On / Roll-Off
RPM	Revolutions per Minute
SAR	Search And Rescue
2/O	Second Officer
S.B.E.	Stand By Engine
SOLAS	Safety of Life At Sea Convention
STCW95	International Convention on Standards of Training, Certification and Watch keeping for Seafarers 1978, as amended
S-VDR	Simplified Voyage Data Recorder
TEU	Twenty-foot Equivalent Unit
TSS	Traffic Separation Scheme
VDR	Voyage Data Recorder
VHF	Very High Frequency
VTS	Vessel Traffic Services
UTC	Universal Time Coordinated
ZT	Zone Time

Summary of the Marine Casualty

On the 8th of December 2015, the Cyprus-registered Container vessel "Dinah Borchard" collided with the Malta-registered RO-RO [Roll-On / Roll-Off] vessel "Eurocargo Patrasso" close to Venice coast.

In conducting its investigation, the Marine Accident Investigation Committee (MAIC) interviewed the crew who was on the Navigation Bridge of the "Dinah Borchard" at the time of the accident, reviewed documents and photographs and S-VDR recordings taken from the "Dinah Borchard", and statements and documents from the "Eurocargo Patrasso" provided by Malta Marine Safety Investigation Unit.

Accident Description

Around 15:00 hours LT, both vessels departed from the port of Venice. Shortly after their departure, the visibility deteriorated due to fog. At about 15:30 hours both vessels as soon as cleared Malamocco strait, dropped outward pilot.

"Eurocargo Patrasso" was proceeding with minimum-Dead-Slow-Ahead / manoeuvring speed. Fog signals for vessel underway were sounded. Two seamen were posted for look-out at the forecastle. The Navigation Bridge was manned with the Master, the Officer of the Watch and a Helmsman.

"Dinah Borchard" was proceeding with manoeuvring speed at 12,5 Knots. Two seamen were posted for look-out at the forecastle. Anchors were stand-by for emergency. No fog signals for vessel underway were sounded. The Navigation Bridge was manned by the Master, the Officer of the Watch and a Helmsman.

The "Dinah Borchard" was following the "Eurocargo Patrasso". The bridge team on each ship was not aware of the other ship's presence. When the actual situation was acknowledged on both ships, it was too late to maneuver to avoid the collision.

At 15:36′30″ hours LT, the "Dinah Borchard" hit by her port bow the starboard quarter of the "Eurocargo Patrasso" on course 121° and speed 12.5 knots. The angle of impact was 20-25°.

On the "Eurocargo Patrasso" the crew felt the initial impact and subsequently two to three impacts like a prolonged contact. After the collision, the two vessels came in parallel, touching each other and proceeding together for approximately 2 minutes.

At 16:15 LT, both vessels were ordered by Venice Harbour Master, to proceed to "MSC Anchorage" for investigation. The distance from the collision's position to the anchorage was about 7 nautical miles (NM). The distance from their berths in the port to the collision's position was about 11 NM. Both vessels sustained structural damages. No crew members were injured and no pollution was reported.

Conclusions

Immediate cause

The stbd turn of both vessels, (without notifying each other, due to the fact that they didn't recognize each other), until immediately before the collision.

Contributing Cause(s):

1. Poor Visibility due to fog was a factor in the accident.
2. Inadequate look-out as required by ColRegs Rule 5 - Look-Out including use of all available means by both vessels, was a factor in the accident.
3. Violation of Colregs Rule 19 - Restricted Visibility - No fog signals as required by the "Dinah Borchard" was a factor in the accident.
4. Violation of ColRegs Rule 6 - Safe speed, by the "Dinah Borchard" was a factor in the accident.
5. Inadequate skill of Radar Operators on both vessels, was a factor in the accident.
6. Inadequate BRM, on the "Dinah Borchard" was a factor in the accident.

Safety issue(s)

1. Pilots left from both vessels as soon as cleared the Malamocco strait and not at the charted pilot boarding position.
2. No instructions and follow-up was provided by the Venice Port Control.
3. There was no documentary evidence that it is considered appropriate by the Flag Administration (Department of Merchant Shipping- DMS) of the"Dinah Borchard" to have a second 9 GHz Radar, instead of 3 GHz Radar.
4. It has not been stated that Look-outs at the stem, were equipped with binoculars.

Recommendations

Five safety recommendations have been issued.

2.Factual Information

2.1DINAH BORCHARD

Photo of the DINAH BORCHARD

2.1.1 Ship Particulars

Name of ship:	DINAH BORCHARD
IMO number:	9318929
Call sign:	5BHY4
MMSI number:	212960000
FlagState:	Cyprus
Type of ship:	Container
Gross tonnage:	6,701
Length overall:	132.60 m
Breadth overall:	19.20 m
Classification society:	Germanischer Lloyd
Registered shipowner:	Celito Shipping Company LTD
Ship's company:	Marlow Ship Management Deutschland GmbH & Company KG
Year of build:	2004
Deadweight:	8,238
Hull material:	Steel
Hull construction:	Single Hull

Propulsion type:	Caterpillar Motoren Rostock GmbH, 1500 kW @ 50 Hz @ 400 V
Type of bunkers:	HFO & MDO
Number of crew on ship's certificate:	11

2.1.2 Voyage Particulars

Port of departure:	Venice, Italy
Port of call:	Limassol, Cyprus
Type of voyage:	International
Cargo information:	Containers
Manning:	11
Number of passengers:	None

2.2 EUROCARGO PATRASSO

Photo of the EUROCARGO PATRASSO

2.2.1 Ship Particulars

Name of ship:	EUROCARGO PATRASSO
IMO number:	9131527
Call sign:	9HA3275
MMSI number:	229368000
Flag State:	Malta
Type of ship:	Roll-On / Roll-Off
Gross tonnage:	26,536
Length overall:	185 m
Breadth overall:	25.34 m
Classification society:	Registro Italiano Navale (RINA)
Registered shipowner:	Malta Motorways of the seas LTD
Ship's company:	Grimaldi Cia. di Nav. S.p.A. Grivani
Year of build:	1997
Deadweight:	11,600
Hull material:	Steel
Hull construction:	Single Hull

Propulsion type:	2xMAN B&W CPP
Type of bunkers:	HFO & MDO
Number of crew on ship's certificate:	25

2.2.2 Voyage Particulars

Port of departure:	Venice, Italy
Port of call:	Limassol, Cyprus
Type of voyage:	International
Cargo information:	Containers
Manning:	25
Number of passengers:	No

2.3 Marine Casualty or Incident Information

Type of marine casualty/incident:	Serious Marine Casualty- Collision between vessels
Date/Time:	08 December 2015/15:37 LT
Location:	At the fairway exit end from Venice/Italy, Adriatic Sea
Position (Latitude/Longitude):	Lat. 45° 19.3'N / Long. 012° 22.7'E
External and Internal Environment:	SmoothSeaState, Light Breeze Wind WSW 3 knots, Daylight, Fog, Visibility Poor
Ship operation and Voyage segment:	Normal service – In passage – Displacement mode
Human Factors:	Yes/Human Error/Negligence
Consequences:	Damages to the shell plating of both vessels

2.4 Shore authority involvement and emergency response

Venice Harbour Master instructed both vessels on VHF to proceed to "MSC Anchorage" in distance 7 NM for investigation. No assistance was required.

3. Narrative

Sequence of Events

1. The afternoon of the 08th December 2015, the Venice Harbour Master allowed the departure of merchant vessels from Venice port, after a delay of approximately 6 hours, due to dense fog prevailed in the region. The visibility was about 1 nautical mile (NM) but deteriorated after about half an hour, to about 50-200 metres (m).

2. "Eurocargo Patrasso" - On 08 December 2015 **at 14:18 hrs** (UTC+2), the "Eurocargo Patrasso" departed from the Port of Venice (Fucina Terminal No1).
Destination Ravenna-Italy.
Outward Pilot on board.
The Bridge team consisted of the Pilot, the Master the Officer of the watch (OOW) and the Helmsman.
Vessel was proceeding with minimum-Dead-Slow-Ahead / manoeuvring speed.
Fog signals for vessel underway were sounded.
Two Ordinary Seamen (OS) were posted for look-out at the forecastle.

3."Dinah Borchard" - On 08 December 2015 at **14:24 hrs** vessel departed from the port of Venice.
Destination Limassol-Cyprus.
Outward Pilot on board.
The Bridge team consisted of the Pilot, the Master the OOW and the Helmsman.
Vessel was proceeding with manoeuvring speed at 12,5 Knots.
No Fog signals for vessel underway were sounded.
An AB and an OS were posted for look-out at the forecastle.
Anchors stand-by for emergency.

4. "Dinah Borchard" - At about 15:28 LT, the Helmsman was ordered by the OOW, to escort the Pilot to the pilot ladder. The OOW took the wheel. The Helmsman after the Pilot's disembarkation remained on Deck to secure the pilot ladder.

5. "Dinah Borchard" - At about 15:30 LT Pilot disembarked from the "Dinah Borchard". Pilot disembarked on the clearance of the Malamocco Breakwater. The OOW continued fixing vessel's position.

6. "Eurocargo Patrasso" - At 15:27 hrs LT passed Porto di Malamocco Breakwater. At about 15:30 LT Pilot disembarked. The OOW escorted the Pilot from the Bridge to the Deck stbd side. After disembarkation of the Pilot, the OOW returned on the Navigation Bridge. At the same time the Chief Officer (C/O), went on the Bridge. He

was asked by the Master to confirm when own vessel pass the last red buoy of the Fairway.

7. "Dinah Borchard" - At 15:31, the Master took the wheel from the OOW. On the bridge was only the Master and the OOW. The AB and OS were at the forward station, and the Helmsman was still on the Deck securing the pilot ladder. The course of the vessel was 107° and the distance from the "Eurocargo Patrasso" 0.75NM. At 15:32 the distance was 0.65NM. At 15:33 the distance was 0.50NM.

8. "Dinah Borchard" - At 15:34 LT, the course of the vessel was 107° and the distance from the Eurocargo Patrasso was 0.40NM. The Harbour Master called on VHF and asked to go to Ch.11. Then he asked the Master information about Pilot's boarding time, cargo, destination and ETA. The conversation lasted until 15:35′50″. During the conversation, the Master was turning to stbd, the course changed from 107° to 120°. He stated that the reason for turning to stbd was to avoid the echoes in the Radar's screen.

9. "Eurocargo Patrasso" - At abt 15:35 LT, (distance between the two vessels was 0.30NM), the C/O confirmed that own vessel passed the last red buoy of the Fairway. After passed the last red buoy of the Fairway, vessel altered course to stbd (136°) in order to proceed in the Traffic Separation Scheme (TSS).

11. "Dinah Borchard" - At 15:36 15 ″LT, the vessel was heading 121°. The AB forward, saw a "silhouette" of a ship at a short distance approaching the port bow of own vessel. He immediately reported this to the Navigation Bridge via VHF on channel 72. Instantly, the Master put the Main Engine (propeller pitch) to "Full Astern" and the bow thruster full to starboard. The helm was on manual mode and the position of the rudder was "amidships".

12. "Eurocargo Patrasso" - At about 15:36 LT the OOW as soon as he returned on the Navigation Bridge, reported that he sighted a vessel on the Radar approaching on collision course towards own vessel's stbd quarter. No fog signals were heard from the other vessel.

13. "Eurocargo Patrasso" - At about 15:36 LT The C/O spotted on the Radar that a ship was approaching own ship, with much higher speed on a collision course from the stbd quarter. He went on the stbd wing to see astern in order to see the other ship and if danger of collision existed. Due to the restricted visibility, he couldn't see the other ship, but after a few seconds he felt the impact. He saw the other ship, only after the collision.

14. "Dinah Borchard" - At 15:36 30′′ LT, the port bow of "Dinah Borchard" hit the stbd quarter of the "Eurocargo Patrasso", on course 121° and speed about 12.5 knots. The angle of impact was 20-25°.
(At the same time, the 2nd Deck Officer pressed the VDR button, three times. The CO, who was in his cabin preparing for his watch, heard a loud strike and looked to the window, discerning the Ro-Ro vessel along their port side. He immediately rushed on the Bridge. The Chief Engineer (CE) and the 2nd Engineer (2/E) were in the Engine Control Room (ECR) and an Oiler was working in the Main Engine Room).

15. "Eurocargo Patrasso" - crew felt the initial impact and two or three impacts like a prolonged contact.

16. "Dinah Borchard" and "Eurocargo Patrasso" - After the collision, both vessels came in a parallel arrangement, touching each other and proceeding together for approximately 2 minutes.

17. "Dinah Borchard" - Emergency response started by the crew. The AB and the OS left the forward station and proceeded to a safe place. The C/O arrived on the bridge and saw the Master and the 2nd Deck Officer performing emergency manoeuvring.

18. "Eurocargo Patrasso" - two OSs at the Forecastle reported later that there were no Look-outs at the forecastle of the "Dinah Borchard". They shot photos and a video clip.

19. "Dinah Borchard" - At 15:39 LT, the Master contacted the Master of "Eurocargo Patrasso", confirming that there were not any injuries and everybody aboard was safe.

20. "Eurocargo Patrasso" - Master noticed that the "Dinah Borchard" stayed for some minutes alongside his ship, "as was not able to move away". Therefore he ordered 10 degrees to port in order to make the stern free from the other ship and immediately to stbd to complete the manoeuvre.

21. "Eurocargo Patrasso" - the C/O was ordered by the Master to go to the aft mooring station stbd side to assess the situation. Then, he ordered the Bosun to make ballast soundings and to locate damages on the ship.

22. "Dinah Borchard" - At 15:40 LT, the Chief Officer (C/O) went to the Poop Deck in order to assemble the crew. Subsequently, inspected for any material or mechanical damage, took soundings and checked for any oil leakages and traces around the ship.

23. "Dinah Borchard" - At 16:00 LT, Main Engine stopped for drifting in position Lat. 45° 18.6'N and Long. 012° 23.2 'E. Continued checking for damage.

24. "Dinah Borchard" - Upon completion of the damage assessment, the C/O reported to the Master that ship's port bow and forecastle deck suffered damage of shell plating such as holes, cracks, dents and scratches. No any pollution occurred, no injuries, no damage to the cargo.

25. "Dinah Borchard" - and "Eurocargo Patrasso"At 16:15 LT, both vessels were ordered by Venice Harbour Master, to proceed to "MSC Anchorage" for investigation. Distance from collision's position to anchorage abt 7 NM. Distance from berth to collision's position 10,7NM.

26. "Eurocargo Patrasso" - Sounding of Fuel-Oil and Ballast Tanks. It was confirmed that there were no any leakages overboard.

27. "Dinah Borchard" - At 17:08 LT, dropped anchor at "MSC Anchorage".

28. "Eurocargo Patrasso" - At 17:10 LT, dropped anchor at "MSC Anchorage"

29. "Dinah Borchard" - On 9/12/2015, ship's class carried out "Hull damage survey-Collision survey", resulting in imposing a condition of class with due date 14/12/2015 i.e. before sailing from Venice.

30. "Eurocargo Patrasso" - On 9/12/2015, ship's class carried out "Hull Occasional survey". Class confirmed, subject to survey at completion of a single voyage from Venice port anchorage area to the port of Venice. Class recommendation was issued, that damages to be repaired at Venice port (at completion of a single voyage from Venice port anchorage area to the port of Venice).

31. "Dinah Borchard" - damages:
Bow area at main deck level damaged from frame #178 to 157.
The following areas found damaged:
Bulwark in the aforementioned area length appr.15m.
a) Shell plating deformed i.w.o. rope store, bosun store, paint store at connection to main deck with one crack at frame 162, and two small ones frames 174-175 and 171-172. b) Navigation light port side forward of accommodation bent.
c) Scratches and indents on port side aft.
"Eurocargo Patrasso" - damages: Damaged stbd side shell plates above main deck between frames 54 and 90, and between 3rd and 6th longitudinal (counting from the top of upper deck) and relevant structures.

4. Analysis

(The purpose of the analysis is to determine the contributory causes and circumstances of the accident as a basis for making recommendations to prevent similar accidents occurring in the future).

The following analysis draws on interviews from the crew who was on the bridge of the "Dinah Borchard" at the time of the casualty, documents and photographs and S-VDR recordings taken from the "Dinah Borchard", and statements and documents from the "Eurocargo Patrasso" provided by "Malta Marine Safety Investigation Unit".

4.1. The Ships

"Eurocargo Patrasso":
Additional Class Notation AUT-UMS MON-SHAFT,

LOA=185m, LBP=170m, Breadth=25.2m

2 Engines MAN B&W, Controllable pitch propeller, Max. Speed 22knots, 2 Bow-

Thrusters variable pitch.

Primary means for navigation: Paper charts

"Dinah Borchard":
Class Notation +100 A5 E Container ship SOLAS-II-2, Reg.19 NAV-OC

LOA=132.60m, LBP=123.40, Breadth=19.45

Speed 17 knots, Bow -Thruster 410KW

Primary means for navigation: ECDIS with Paper charts as back-up arrangements.

Both vessels had valid certificates and the maintenance records indicated that they were maintained in accordance with existing regulations and approved procedures.

There was no evidence of any defect or malfunction that could have contributed to the accident.

4.2. The Crews

Training and Certification Both vessels were manned with crew licensed, qualified and medically fit in accordance with the requirements of the International Convention on Standards of Training Certification and Watchkeeping (STCW) Convention as amended.

A lack of training and certification was not a contributory factor to the accident.

Manning level

At the time of the incident, both vessels were manned in accordance with theirs Minimum Safe Manning Document (MSMD). The "Dinah Borchard" had a crew of 11, and the "Eurocargo Patrasso had a crew of 25.

A lack of manpower was not a contributory factor to the accident.

Alcohol Impairment

No alcohol tests had been carried out after the incident. Nevertheless, there was no evidence to suggest that alcohol or drugs were taken by any of the crew members involved in the accident**.**

Alcohol impairment was not considered a contributory factor to the accident.

Fatigue

Prior and on the day of the accident, the recorded hours of Work/Rest of both ships, were in accordance with the MLC, 2006 and STCW 78 as amended.

Fatigue was not considered a contributory factor to the accident.

4.3 The Environment

The Port of Venice and the Malamocco Channel:
The Port of Venice is situated in the Venice lagoon and can be accessed year-round, 24/7/365 including at night, and in all weather conditions. The port offers 30 km of quayside where ships can berth.

The Port of Venice is constituted of two port areas, Marghera and Maritima.

There are two separate access points for the two port areas, (Marghera and Maritima), the Malamocco port mouth and the Lido port mouth.

The Malamocco port mouth, serves Marghera for cargo ships (commercial/industrial traffic), while the Lido port mouth serves Maritima for passenger ships (cruise ships, ferries, fast ships and yachts).

Cargo ships reach the commercial/industrial port facilities in the Marghera cargo port via the Malamocco port mouth which is 14 m deep and then through the Malamocco-Marghera Channel which is 11 m. deep and leads directly to the cargo terminals.

Weather conditions:

Smooth Sea State, Light Breeze Wind WSW 3 knots.
Visibility Poor due to fog. On 08 December 2015, after a delay of approximately 6 hours due to dense fog prevailed in the region, it was allowed by the Venice Harbour Master the departure of merchant vessels from Venice port.

4.4. Safety Management

Both vessels' Management Companies (MC), have a comprehensive Safety Management System (SMS) which is well documented.

The "Dinah Borchard" underwent an ISM Shipboard Audit on 21/08/2015 for the issue of an Interim (SMC) by DNV-GL, without any non-conformities /observations.
Also, an Internal Audit was carried out 0n 16-18/12/2015 with no non conformities.
The "Eurocargo Patrasso" had no any ISM/SMC non-conformities.

5. Conclusions

Pilotage

The "Dinah Borchard" departed at 14:18 and the "Eurocargo Patrasso" departed at 14:24, with Pilots on board. They departed from different piers. The "Eurocargo Patrasso" was ahead of the M/V "Dinah Borchard". Both vessels dropped outward Pilots at about 14:30 hrs LT on clearing Malamocco strait.

Pilots left from both vessels as soon as cleared the Malamocco strait and not at the charted pilot boarding position. (Safety issue)

Port Control

The visibility on departure was approximately 1 NM, but soon after in the Malamocco channel by the end of the pilotage, reduced to about 50-200m. Although visibility deteriorated dramatically, no instructions and follow-up was provided by the Venice Port Control.

The Master of the M/V "Dinah Borchard" stated that he had the impression that his vessel was the first in the convoy, therefore he did not expect any vessel ahead.

No instructions and follow-up was provided by the Venice Port Control. (Safety issue)

Visibility

On 08 December 2015, after a delay of approximately 6 hours due to dense fog prevailed in the region, it was allowed by the Venice Harbour Master the departure of merchant vessels from Venice port. At 15:00 hrs, during departure of the vessels, the visibility was about 1NM. Immediately after sailing, in the Malamocco channel, the visibility reduced to about 50m according to the crew statements of the "Dinah Borchard" and 200m according to the crew statements of the "Eurocargo Patrasso".

Poor Visibility due to fog was a factor in the accident. (Contributing factor)

Fog Signals

According to ColRegs Rule 19, fog signals are required when navigating in or near an area of restricted visibility.
No fog signals were sounded by the "Dinah Borchard".
"Eurocargo Patrasso" sounded fog signals but they were not heard by the "Dinah Borchard" neither by the crew at the forecastle, nor by the Master and the 2/O inside the Navigation Bridge.

Only at 15:36 LT, (seconds before the collision), at the same moment when the Look-out AB of the "Dinah Borchard" stationed forward saw the "silouette" of the "Eurocargo Patrasso" (he) heard the fog signals sounded (by "Eurocargo Patrasso").

Violation of Colregs Rule 19-Restricted Visibility - No fog signals sounded as required by the "Dinah Borchard" was a factor in the accident. (Contributing factor)

Look-out

According to the ColRegs Rule 5, every vessel shall at all times maintain a proper lookout by sight and hearing as well as by all available means appropriate in the prevailing circumstances and conditions so as to make a full appraisal of the situation and of the risk of collision.

Both vessels had Look-out men posted at the forecastle equipped with Walkie -Talkies. No mention has been made in their statements that they were equipped with binoculars.

A proper look-out, is both **ahead and astern**. Also, in restricted visibility, there is no overtaking vessel that is obliged to keep clear from the overtaken vessel. The Master and the OOW of the "Eurocargo Patrasso" did not mention in their statements that they noticed any ship astern with higher speed than of own ship. No alarms had been set on RADAR/ARPA to alert to the risk of the collision. Had alarms been set they would have been alerted of the very short distance of the following vessel.

Also, "Eurocargo Patrasso" turned to stbd in order to proceed to the TSS, without notifying the ship astern.

As well as keeping a look-out by sight and hearing, must also be used 'all available means' which would be appropriate at the time. A 'full appraisal of the situation' means that navigators must be fully aware of what is going on in and around their ship at all times. All available means, such as VHF, Radar, AIS, Echo Sounder etc., must also be used.

VHF

There was no any communication on the VHF between the two vessels. Although there is no explicit Colregs requirement to use the VHF for collision avoidance, there is implicit requirement to use "all available means".

AIS

The AIS is not mentioned by the Colregs because when they were drafted it did not exist, but again falls into the implicit requirement to use "all available means".

The Master of the "Dinah Borchard" stated that he knew from the AIS, that a vessel was ahead (the AIS was showing the triangle symbol, but not any more information) but he couldn't recognize any ship in the Radar screen due to several echoes ahead. The OOW stated that the AIS which is connected with the ECDIS did not show any ship ahead of

own ship. After the incident the AIS showed information indicating that the "Eurocargo Patrasso" was moored (see photo).

AIS information was not mentioned in the statements of those on the "Eurocargo Patrasso".

RADAR

It has been stated by "Dinah Borchard" Master that he could not locate in the Radar screen any targets ahead due to cluster returns around own ship. The OOW of the M/V "Dinah Borchard" stated that in the screen of the Radar which he was operating at 1,5NM scale, there were many cluster returns and that he couldn't recognize any ships ahead

The Master of the "Dinah Borchard" stated that extended clusters around the centre of the Radar screen, covered echoes of other vessels in the vicinity (see Radar photos). It is generally accepted that a competent Radar Operator will recognize a true target (as opposed to clutter returns) if it scans at the same target for at least 5-10 scans. It is assumed that, clutters in the center of the screen obscuring the vessel ahead of own vessel, most probably resulted by failure to adjust the gain and anti-clutter properly. Therefore, it is assumed that inadequate skill of Radar Operators of the "Dinah Borchard" was a factor in the accident.

No mention has been made in the statements of the Master and OOW of the "Eurocargo Patrasso" regarding the performance of their ship's Radars. Nevertheless, they did not notice the overtaking vessel from astern (i.e. the "Dinah Borchard"), until immediately before the collision.

Inadequate skill of Radar Operators* on both vessels *was a factor in the accident.

(Contributing factor)

Navigators on each ship were not aware of the other ship's presence due to inadequate look-out by both vessels. When the actual situation was acknowledged on both ships, it was too late to maneuver to avoid the collision. Therefore, it is concluded, that inadequate look-out by both vessels, was a factor in the accident.

Inadequate look-out by both vessels was a factor in the accident. (Contributing factor)

It has not been stated that Look-out men were equipped with binoculars. (Safety Issue)

Safe Speed

According to the ColRegs Rule 6, every vessel shall at all times proceed at a safe speed so that she can take proper and effective action to avoid collision and be stopped within a distance appropriate to the prevailing circumstances and conditions.

Also, the STCW 95 requires that the OOW "must not hesitate to use the helm, engines and sound signaling apparatus".

The state of visibility is one of the most important factors in determining safe speed. Speed should be reduced - to bare steerage if necessary. Slowing the vessel reduces the likelihood of a casualty because it gives more time to the navigator to assess the situation, and keeps power in reserve, if emergency manoeuvres become necessary.

The "Dinah Borchard" was proceeding with manoeuvring speed, but 12,5 knots was not safe under circumstances of 50m-200m, i.e., nearly zero visibility. The"Eurocargo Patrasso" was proceeding with much lower speed and the distance between the two vessels was decreacing. As extracted from the S-VDR of the "Dinah Borchard", at 13:20 the distance was 1.30NM, at 13:25 = 1.0NM, at 13:30 = 0.80NM, 13:35 = 0.30NM.

Violation of ColRegs Rule 6-Safe speed, by the "Dinah Borchard" was a factor in the accident. (Contributing factor)

Bridge Resources Management (BRM)

At 15:28 hrs, on the "Dinah Borchard", the Helmsman handed over the wheel to the OOW in order to escort the Pilot to the Deck. Until 15:31 the OOW was keeping the wheel. From 15:31 until 15:37 the Master was keeping the wheel. Therefore he could not monitor the Radar and also make the necessary adjustments in gain and anti-clutter. He could not monitor other available means such as AIS, Echo Sounder, ECDIS and communicate on VHF with other vessels, and the Look-out men forward. In addition he was occupied for about two minutes by the Harbour Master who was asking information on the VHF. The OS/ Wheelman escorted the Pilot and remained on the Deck to secure the pilot ladder. The OOW was occupied in plotting ship's position. There was no Look-out man on the Navigation Bridge, though there were two Look-out men, at the forecastle.

Navigating in a busy channel in zero visibility, the Master should have monitoring the Radar the most of the time, and the other available means, the OOW plotting ship's position and monitoring other available means (AIS, VHF, Echo Sounder) a dedicated quartermaster steering, and also, summon additional crew for Look-out. He did not, therefore, it is concluded that inadequate Bridge Resources Management (BRM), was a factor in the accident.

Inadequate BRM, on the "Dinah Borchard" was a factor in the accident. (Contributing factor)

Immediate cause

The stbd turn of both vessels, (without notifying each other, due to the fact that they didn't recognize each other), until immediately before the collision.

Contributing Cause(s):

1. Poor Visibility due to fog was a factor in the accident.
2. Inadequate look-out as required of ColRegs Rule 5- Look-Out including use of all available means by both vessels, was a factor in the accident.
3. Violation of Colregs Rule 19 - Restricted Visibility, no fog signals as required by the "Dinah Borchard" was a factor in the accident.
4. Violation of ColRegs Rule 6 - Safe speed, by the "Dinah Borchard" was a factor in the accident.
5. Inadequate skill of Radar Operators on both vessels, was a factor in the accident.
6. Inadequate BRM, on the "Dinah Borchard" was a factor in the accident.

Safety issue(s)

1. Pilots left from both vessels as soon as cleared the Malamocco strait and not at the charted pilot boarding position.
2. No instructions and follow-up was provided by the Venice Port Control.
3. It has not been stated that Look-outs at the forecastle, were equipped with binoculars.

6. Recommendations

1. Venice Harbour Master to take the necessary measures, so as Pilots disembark at the charted pilot position. (Within 3 months)
2. Venice Harbour Master to take the necessary measures, so as the Venice Port Control reckon and provide professional advice to the vessels navigating in the navigable waters under its control. (Within 3 months)
3. Both Management Companies should adopt written policy and insert procedure in the SMM, stating that, the best way to avoid an accident in restricted visibility is not to get underway, or to seek a safe haven if conditions change while underway. But, because it is not always practical, every vessel must be well prepared for navigation in restricted visibility every time (the vessel) gets underway. Policy should emphasize that a delay to the vessel is preferable to the undesirable consequences of an accident. The policy should place the responsibility for sailing with the vessel's master. (Within 3 months)
4. Vessels conduct regular fire, abandon ship, and man overboard drills, but very few practice restricted visibility procedures. Both Management Companies should insert in the SMM a restricted visibility procedure and hold regular training. This training should include practicing taking and plotting fixes by all methods available, in case of a failure of one of the position fixing devices occurs. (Within 3 months)
5. Look-out men, in addition to means of communication with the Navigation Bridge, wearing a personal floatation device and non-slip shoes, should use binoculars.

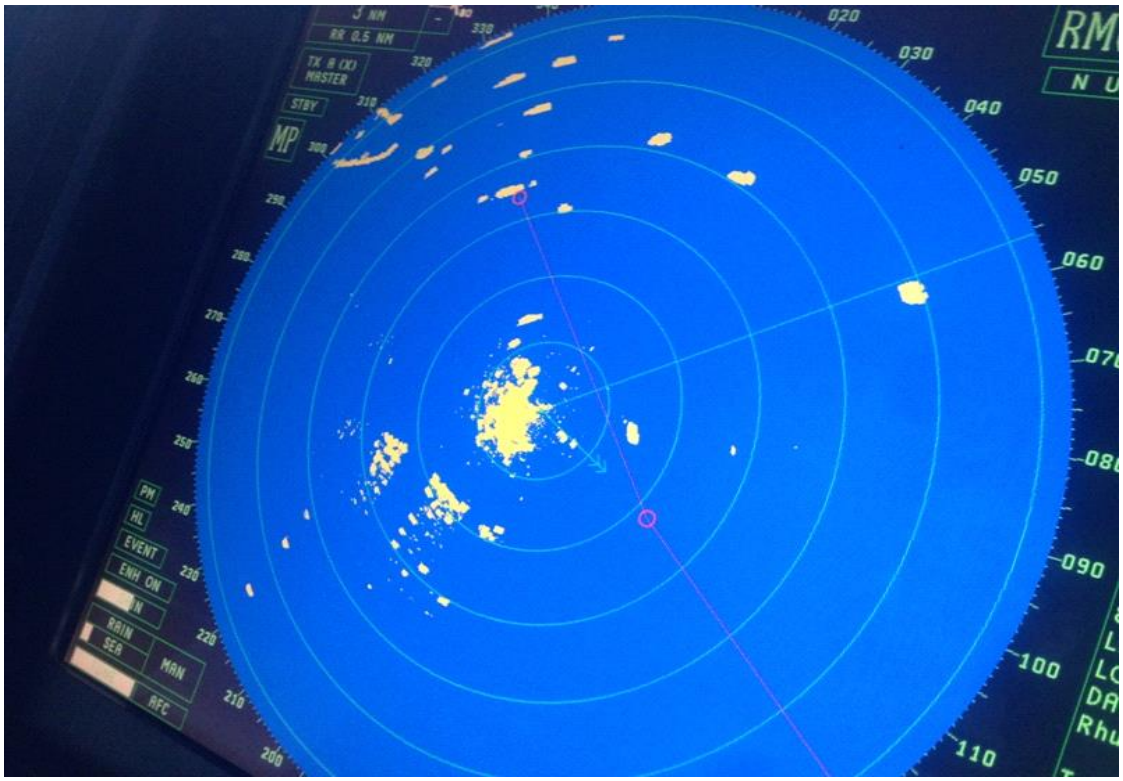

Figure 1: M/V "Dinah Borchard" Radar screen (after the collision – clutters around the vessel)

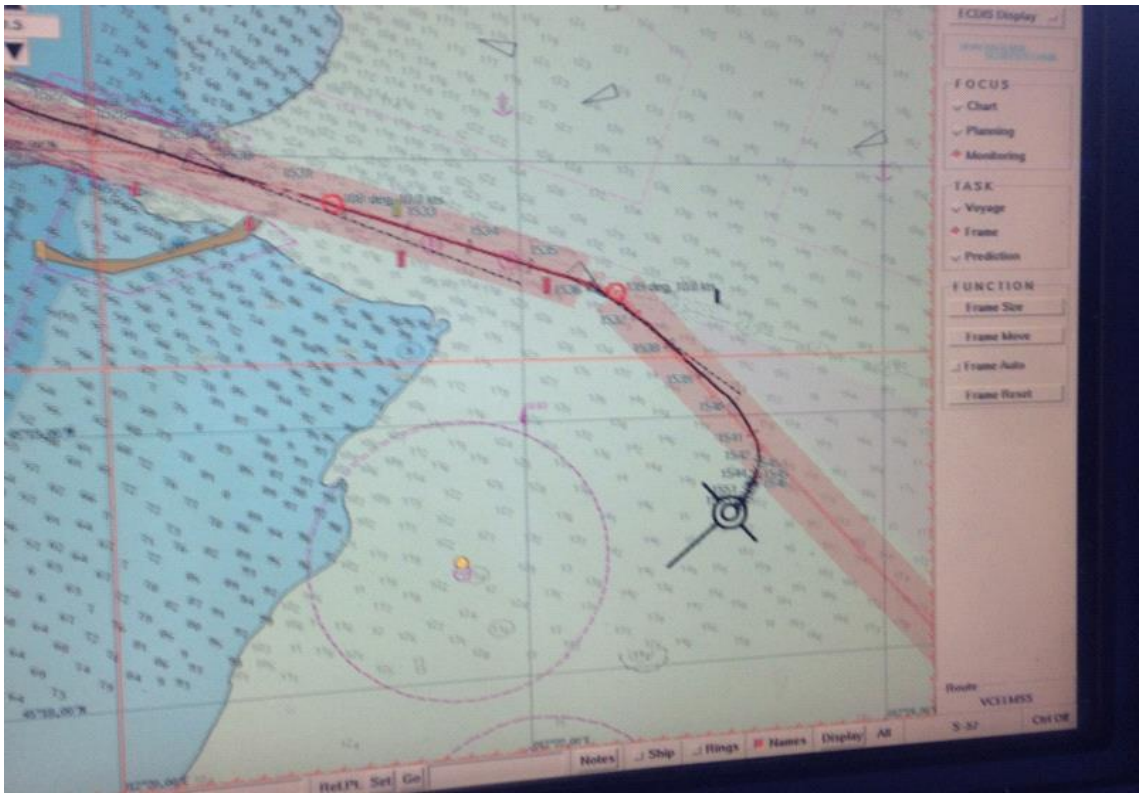

Figure 2: M/V "Dinah Borchard" ECDIS display (Pilots left from both vessels at Porto di Malamocco Breakwater. About 6-7 minutes later collided.)

Figure 3: M/V "Dinah Borchard" ECDIS display (Collision occurred between 15:36-15:37)

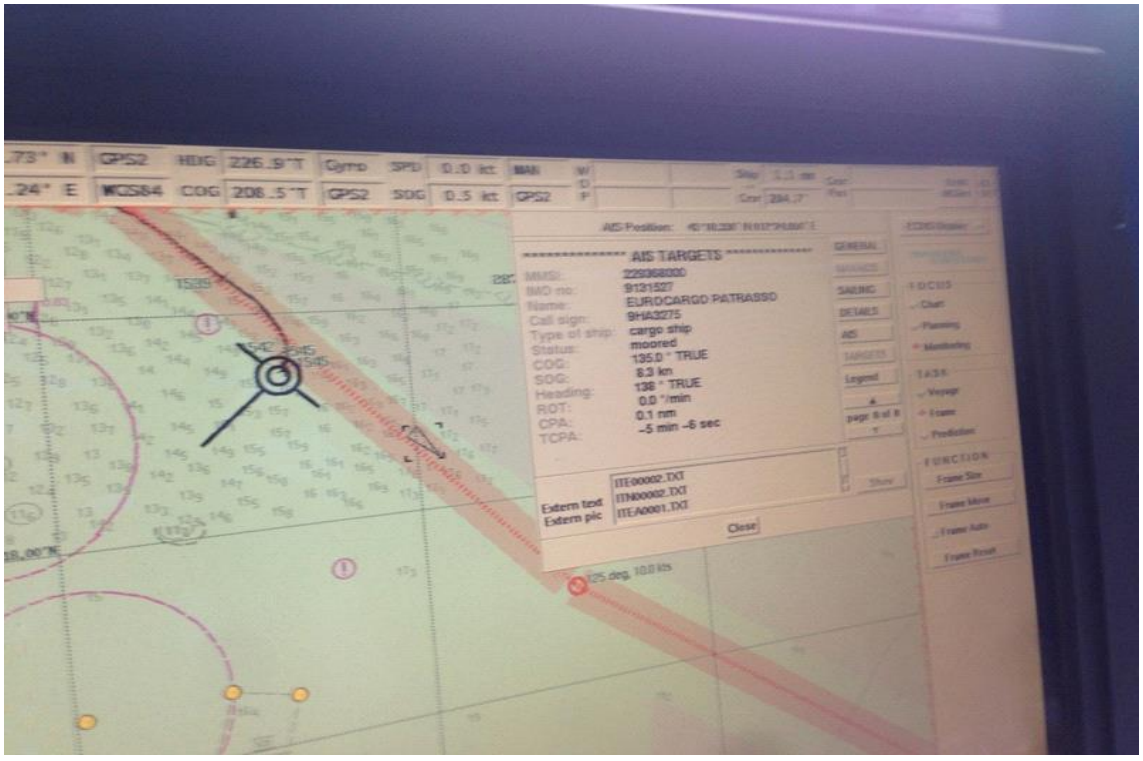

Figure 4: M/V "Dinah Borchard" ECDIS&AIS display (after collision, AIS target EUROCARGO PATRASSO moored)

Figure 5: M/V "Dinah Borchard" Port side shell plating deformed (i.w.o. rope store, bosun store, paint store at connection to main deck with one crack at frame 162, and two small ones frames 174-175 and 171-172)