



Panama Maritime Authority
Directorate General of Merchant Marine
Marine Accident investigation Department

REPORT: M/V “CARNIVAL GLORY”

IMO: NO. IMO 9198367

R-022-2020-DIAM

Casualty Date: DECEMBER 20th, 2019



**MARINE INVESTIGATION
REPORT
COLLISION BETWEEN
MV “CARNIVAL GLORY”
&
MV “CARNIVAL LEGEND”
At COZUMEL, MEXICO**

December 20, 2019

In accordance to Resolution No. 106-135-DGMM of September 9th, 2013 from the Merchant Marine General Directorate of the Panama Maritime Authority, on its second article stipulates; “Similarly investigations are not designed to exert actions criminal, civil or administrative, at which they will be subject only to the purposes stated in the Code for the Investigation of Marine Casualties and Incidents adopted by the International Maritime Organization (IMO)



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Abbreviations:

AB	Able Bodied Seamen
ACSO	Assistant Chief Security Officer
AIS	Automatic Identification System
ARPA	Automatic Radar Plotting Aid
BNWAS	Bridge Navigation Watch Alarm System
BRM	Bridge resource Management
COC	Certificate of Competency
COLREG	Collision Regulations
CPA	Closest point of approach
CCL	Carnival Cruise Line (Company)
CSMART	Center of simulator maritime training
DGMM	General Directorate of Merchant Marine (Panama)
ECDIS	Electronic Chart Display & Information System
ECR	Engine Control room
ENC	Electronic navigational chart
ETA	Estimated Time of Arrival
FR	Flag representative
GMDSS	Global Maritime Distress and Safety & System
GMT/LT/ hr	Greenwich Mean Time/Local Time/Hour
GPS	Global Positioning System
GRT	Gross Registered Tonnage
HP	Horse Power
IAG	Incident Analysis Group (from CCL).
IAPP	International air pollution prevention
IOPP	International oil pollution prevention
ISM	International Safety Management (Code)
IMO	International Maritime Organization
IAG	Incident Analysis Group (CCL)
ME	Main Engine
MV	Motor Vessel
Kn / Kts / nm / Mt /Mts	Knots / Nautical Miles / Metric Ton / Meters
KW	Kilowatts
LOA / LBP	Length overall / Length between perpendiculars
LR class	Lloyd 's Register Classification society
MSC	Maritime Safety Committee
MMSI	Maritime Mobile Service Identity
MPX	Master/Pilot Exchange
MW	megawatt

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N	North
NM	Nautical Miles
NRT	Net Registered Tonnage
OOW / OS	Officer on watch / Ordinary Seaman
OD	Operation Director (Staff Captain)
RFA / RPM	Ring Full Away / Revolutions Per Minute
RPM	Revolution Per Minute
RHS	Running Hours
ROT	Rate one turn
SOLAS	Safety of Live at Sea convention
SO	Security Officer (on duty)
STBD	Starboard Side
TCPA	Time interval for closest point of approach
PACE	Probing, Alert, Challenge, and Emergency
PRO	Plan, Reason, Outcome (techniques)
VHF / MF / HF & UHF	Very High Frequency / Medium / High Frequency & ultra-high frequency.
VTS	Vessel traffic services
W	West
UTC	Coordinated Universal Time
ZD	Zone Description



Objective:

The objective of this marine casualty investigation is to prevent similar casualties in the future. Investigations identify the circumstances of the casualty under inquiry and establish the causes and contributing factors, by gathering and analyzing information and drawing conclusions. Ideally, it is not the purpose of such investigations to determine liability, or apportion blame. However, the investigating authority should not refrain from fully reporting the causes because fault or liability may be inferred from the findings. In this case, determining this investigation is much more interesting since a collision of 2 vessels of the same Classification and from the same Company.

About the Final Report:

This report has been elaborated to meet all the requirements and guidelines established by the marine casualty investigation code MSC.255(84) and the Panama National Legislation, in order to describe and analyze, as clear as possible the casualty under investigation, to establish its causes and lead to the proper recommendations to improve safety and save human lives.

It is configured as follows:

- General description of the vessels
- Description of the casualty Investigation
- Particulars of Voyage and environmental conditions
- Summary of the events during the casualty, collision maneuver and geographical location
- Analysis (sequence of events, main causes, underlying factors, human error)
- Conclusions
- Recommendations

Executive Summary:

During the arrival berthing maneuvering in Puerta Maya, Cozumel, Mexico at 07:45¹ LT, while the Carnival Glory was in the berthing maneuvering process approaching to starboard side next to (Pier #02) and MV Carnival Glory collided with Carnival Legend.

Due different factors during berthing maneuvering have contributed to the collision, as environmental factors (wind, current), limited prediction during approaching pier#3 & int.dolphin #2 during the communication between the station 2 and conning and the shifting of the ROT and pivot point forward during the stern thruster propulsion upon approaching crashed into the bow of Carnival Legend². At the moment of collision, the safety officer, acting as navigator with “the conn”, began the turn to port but when the staff captain, acting as operations director, reported the turn was not clearing pier 3, the captain took over “the conn”, completing the berthing maneuvering but resulting with collision between the two vessels afore mentioned.

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During the investigation has been considerate that bridge team have been trained based on CSMART port study for Cozumel, however the berthing planning philosophy that a plan must have was not fully used completely by the bridge team and did not use the PACE tools as there was not an effective challenge when the vessel was drifting towards pier # 2.

At 08:49, the vessel was safely alongside at pier 2, starboard side alongside. As result of the collision, six (6) guests³ reported minor injuries; the aft of MV Carnival Glory sustained structural damage to the starboard quarter affecting deck 4 and 3 of Platinum Dining Room. The MV Carnival Legend received minor damage to the bow and the pier did not sustain any damage.

Due the collision, no pollution was reported, No person seriously injured and no deaths.

Sources of Information & Evidence:

The main information collected by vessel VDR:

1. VOYAGE DATA RECORDER (VDR)
Maker: Wartsila SAM Electronics GmbH
Model: VDR 4350
Data Processing Unit S/N: 532
Protective Capsule (FRM) S/N: 360-18268-02-0400
IMO: IMO Res.A.861 (120) & IMO Res. MSC. 163 (78)
Classification society: Lloyd's Register, cert No.: HAM 175064/1
2. All others information's were collected during the visit onboard the vessel, crew interviews, copies of relevant documents including log books, navigational charts, statutory certificates, survey reports, manuals and procedures were submitted by the vessel. The data collection was facilitated by Carnival Cruise Line (CCL) Nautical Department Director and the vessel staff.

All times in this report are in local time unless otherwise stated.

²“Carnival Legend” always remain in the same position at Pier No. 1 starboard side of pier 2 Lat:20° 29.2' N Long: 086° 58.9' W

³ One guest reported to the medical center after the incident; five other guests reported to the medical center throughout the day.

1. General descriptions of the vessels:



Figure 1: “Carnival Legend”



Figure 1.1: “Carnival Glory”

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1.1 Vessel Particulars:

Vessel	Carnival Glory	Carnival Legend
Flag	PANAMA	MALTA
Management	CCL	CCL
Type	Passenger	Passenger
Year built	1999	2000
IMO number	9198367	9224726
Call Sign	3 F P S 9	9HA3667
Classification society	LR class	LR class
Construction	Steel	Steel
LOA	290 Mts	290 Mts
Beam/width	35.5 Mts	32.2 Mts
Draft	8.3 Mts	8.2 Mts
GTR	110,480	85,942
Engine power	6 diesel electric oil engines driving 4 generators each 11,200kW 6,600V a.c. 2 generators each 8,400kW 6,600V a.c. connected to 2 electric motors of (20,000kW) driving 2 FP propellers at 140 rpm Total Power: Mcr 63,360kW (86,146hp)Max. Speed: 22.00kts, Service Speed: 19.60kts	Total power :62,370 kW (combined) Propulsion:Diesel-electric; two ABB Azipod units (17.6 MW each
Building Yard	Fincantieri Shipyard. Italy	Meyer Turku Oy. (ex - Aker Yards Oy)
Thrusters	3 Thwart. CP thruster (f) 1,720kW(2,339bhp) , 3 Thwart. CP thruster (a) 1,720kW(2,339bhp)	ABB Azipod units (17.6 MW each
Speed	22.3 Knots	22 knots (41 km/h; 25 mph)

1.2 Carnival Glory / Ship Licenses and Certificates (Class & Statutory):

ITEM	ISSUED		EXPIRY DATE
Navigation Statutory Certificate	20/06/2017		20/06/2022
Continues Synopsis Record	02/11/2016		
Safety Management Certificate	13/07/2012		08/05/2017
Bunker Convention	20/02/2020		20/02/2021
Document of Compliance	01/09/2017		24/09/2022
International Load Line Certificate	19/05/2018		26/06/2023
International Ship Security Certificate	13/07/2018		07/06/2023
Minimum Safe Manning Certificate	02/06/2010		
International Oil Pollution Prevention Certificate	22/09/2019		27/05/2022
Passenger Ship Safety Certificate	26/01/2020		26/06/2020
International Air Pollution Prevention Certificate	29/12/2019		26/06/2023
Certificate of Class	19/05/2018		26/06/2023
International Sewage Pollution Prevention Certificate	19/05/2018		26/06/2023
Radio Station Statutory License	26/06/2017		20/06/2022
International Anti Fouling System	13/02/2010		30/12/2020
International Tonnage Certificate	25/04/2017		
PAL	20/02/2020		20/02/2021
Maritime Labor Convention 2006 Certificate	20/06/2013		19/06/2018

2. Description of casualty Investigation:

On December 22, 2019, a Flag representative boarded Carnival Glory in New Orleans (NOLA). The FR interviewed ten (10) crew members who are as follows: The Master, staff captain, safety Officer, 1st Officer, 2nd officer, 3rd officer, Chief engineer, bosun / at the station no. 1, Bosun / at the station no. 2 and a Doctor) who were directly involved, and each provided his account of the incident. The flag representative obtained voyage data recorder (VDR) download limited due encrypted system, however we held a VDR meeting into the CCL premises (at Miami) with the full cooperation from the company. Further, videos, photographs and copies of relevant documents including log books, navigational charts, statutory certificates, survey reports, manuals and procedures were submitted by the vessel.

The data collection was facilitated by Carnival Cruise Line (CCL) Nautical Department Director and the vessel staff. The interviews were conducted in the presence of two company representative. During the vessel's visit, a U.S. Coast Guard team, LR class and (IAG) representatives boarded the vessel to interview the captain, relevant crew members, and collect various documents.

Actions taken by ship Owners Company:

The company stated the plan, in order to complete the temporary repairs at NOLA, adding the pillars on deck 4 and deck 3 partially damage (Figure 2, 3, 3.1 & 3.2), steel plates, repairs minors damage and continue with permanent repairs in Grand Bahamas shipyard or another shipyard, perhaps for a week, and provide the all proper permanent rectification and repairs to the upcoming weeks.



Figure 2: Affected area of Carnival Glory (deck 4 and deck 3 partially damaged)

Furthermore, the participation of the Class, Company, Shipyard, Advisors, PSC, Flag State and the vessel staff, in order to ensure the complete safety and to be in compliance with international regulation that was verified on board and the substantial measures/action taken corresponding to the ITC, safety construction, Damage, stability and ISM, ISPS MLC.



PSC (USCG) Statement as per visit on site⁴:

The Condition of the ship and its equipment shall be maintained to conform with the provisions of the present regulations to ensure that the ship in all respect will remain fit to proceed to sea without danger to the ship or persons on board. After Allision, vessel suffered significant damage to aft decks 3, 4 Dining room.

LR Class Statement as per visit on site⁵:

1. It was stated by Master that on 20 December 2019, and during berthing operations to above Cruise Terminal to Pier 2, the Vessel allied with another vessel which was berthed at Pier 1, causing a contact damage to her aft stbd side area iwo Deck No.3 and 4. Temporary repairs held to the affected areas while in Cozumel, Mexico to the satisfaction of the LR attending Surveyor.
2. Upon Vessel's arrival to New Orleans Passenger Terminal, a meeting was held with Owners representatives along with Flag, Shipbuilders representatives and USCG Officers to discuss scope of work to be held while in New Orleans, LA (US).
3. Temporary repair plan submitted/provided by Owners representatives thoroughly discussed and necessary repair steps discussed/agreed.
4. Affected structural members at Deck No.3 & 4 assessed and additional structural reinforcements held as found necessary which included fitted of steel plates at side shell area to provide proper weather tightness and on completion all found "satisfactory".
5. It was further stated that Repair Shipyards' Representatives will be visiting the Vessel at her next port of calling and once final quotation/estimation provided it could be concluded that final repairs would be commenced within four weeks.
6. Fire integrity verified this time and appropriate actions taken by Senior Officers considered in order. Passengers Cabins below affected area (Deck No.2) also internally examined and no deformation verified this time." "Based on the verification of temporary repairs it is considered that vessel's seaworthy is not affected until permanent repairs held scheduled within 30 days.

Panama Flag Statement as per visit on site⁶:

According to all the forecasts made by the ship owner company, the Panama Maritime authority Have No objection that the Vessel continue with its regular operation, as long the Class and PSC allow to the vessel proceed to the sea without Danger on the ship or persons on board in accordance with the activity number of the PSC.



Figure 3: Affected area of Carnival Glory (deck 4 and deck 3 partially damaged)

⁴ The PSC statement is based in accordance with the PSC report at NOLA.

⁵ The Class statement is based in accordance with the class statement issued at NOLA.

⁶ The Flag statement is based in accordance with the Flag statement issued at NOLA.



Figure 3.1 Temporary Repairs



Figure 3.2: Affected area of Carnival Legend (suffer minor's structural damage on the bow (portside)).

2.1 Crew experiences of the key personnel:

The Master, a man of 46 years old, Croatian, who held a valid flag endorsement license, STCW II/2 COC issued by the Croatian Maritime Authority, have a more than 19 years of experience in sailing navigation. He had been with CCL since 2000, and was promoted to captain in 2016. He joined the Carnival Glory in May 2017. He had previously docked the vessel at pier 2 in Cozumel. The captain attended BRM 1, BRM 2 and Ship-Handling 1 course but he did not attend Ship-Handling 2 (company courses). He was in Almere in March 2019 for the Continuous Development course.

The staff captain, man of 40 year old, Italian, who held a valid flag endorsement license, STCW II/2 Certificate of Competency issued by the Italian Maritime Authority, have more than 15 years of experience in sailing navigation. He had been with CCL since 2005, and was promoted to staff captain in 2016. He had previously docked a vessel at pier 2 in Cozumel. The staff captain attended BRM 1, BRM 2, Ship-Handling 1.

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Safety Officer, man of 34 year old, Italian, who held a valid flag endorsement license, STCW II/2 Certificate of Competency issued by the Italian Maritime Authority. He had been with CCL since 2007; he was promoted to safety officer in 2017. He joined the Carnival Glory on December 13, 2019. It was his third contract on board the vessel. The safety officer attended BRM 1, BRM2, Ship-Handling 1, and Ship-Handling 2 courses (company courses). He was in Almere in March 2019 for the Continuous Development course.

The 1st officer junior attended courses in CSMART in February 2016.

The local pilot on board the Carnival Glory was one of the most experienced in Cozumel. He had worked as a pilot in Cozumel for over 20 years. One of the limitation was that no pilot testimony or statement was not available.

The local pilots measured the strength of the current at the bathymetric of 20, 50, and 100 meters via a practical assessment when they were on the pilot boat.

2.2 Fatigue:

As per MLC 2006 rest hours records for the bridge team members involved in the maneuver, fatigue was not a factor in the incident.

2.3 Manning:

The manning of the deck department was appropriate. The deck officers held a valid IMO Standard of Training and Certification for Watch-keepers (STCW) certificate as well as a flag state (Panama) endorsement.

Furthermore, CCL, in accordance with the requirement of company EMR 1104, “Drug and Alcohol Testing After Marine Incident”, required deck crew members on duty at the time of the accident to provide samples for toxicological analysis. The Master, staff captain, safety officer, and training officer, second officer on watch, third officer on watch, cadet, two helmsmen, and the local pilot provided samples. All samples tested negative for the presence of alcohol and illegal drugs.

2.4 Engine Power Management:

The arrival maneuver was set with four diesel generators (DG), three “big” (11 MW) and one “small” DG (8 MW). During the maneuver, the engines’ power load sharing appeared ideal. The thrusters’ power output (total of 6 x 10.2 MW) seemed appropriate.

3. Voyage Particulars and environmental conditions:

The Environmental Conditions at the time of the marine casualty in accordance with the VDR information, vessel and company information can be taken as follows with a good visual and quite clear, the current with some incidence but the effect of the wind if it has a trigger that could



influence the moment of the collision. The wind effect had a greater impact with a wind relative angle between 45 to 135 degrees on vessel's side. Carnival Glory wind and thrusters load graphic showed that 30 knots abeam wind generated a theoretical wind force of 121 tons. When used, the total thrusters' power generated a theoretical force of 152 tons.

The bridge team discussed the weather forecast. The report from WRI⁷ forecasted a wind speed at 13 knots with gusts up to 21 knots from north-northwest, forecasted a wind speed of 12 knots with gusts up to 19 knots from north for the arrival maneuver.

The current was expected with a north setting, moderate to strong.

The predominant wind is from the easterly sectors, the wind from northwest account only for 5% of the time. During the month of January, the average wind speed is 12 knots. The predominant current between November and March is northeasterly while between April and October the direction occasionally changes to southwesterly between the depth contour of 200 meters and the contour of 50 meters.

During the arrival maneuver, the VDR recorded a wind speed between 12 and 25 knots with gusts up to 29 knots, the direction was predominantly from north-northwest.

The VDR recorded a current with a north-northeasterly set with a speed between 0.5 to 2 knots. The current meter readers⁸ fitted on the pillars of Puerta Maya piers 2 and 3 recorded a speed between 0.2 and 0.5 knots.

The port agent reported the wind from the northwest at 25-26 knots with gusts up to 30 knots, current to the north between 1.5 to 2 knots.

⁷ WRI is the weather provider for all the Operating Lines.

⁸ Data obtained from www.windfinder.com

WindFinder is another web based weather forecast commonly used by the mariners.

3.1 Similar cases that have occurred previously:

MV Oosterdam on May 4, 2019, MV Oosterdam was swinging the stern into place at the pier and hit the stern of the MV Nieuw Amsterdam during the mooring operation in Vancouver, Canada. As a result of the collision, the sterns of both vessels were damaged; no injuries or fatalities were reported. The root cause of the incident was improper planning and a failure to practice all the elements of BRM. The failure to conduct an effective arrival briefing and develop a comprehensive berthing maneuver resulted in a setting where none of the bridge team shared the same mental model. The breakdown in thinking aloud further augmented the situation, which in turn led to poor situational awareness.



MV Carnival Victory On the morning of October 25, 2017, Carnival Victory / was attempting to dock, portside alongside, at the Puerta Maya pier N.2 in Cozumel (Mexico), when it allided with the dolphin fenders. The allision caused minor damages on the pier dolphin fenders.

The ship suffered minor hull plate deformation and minor internal damages to structures and pipes adjacent to the point of contact. There were no injuries, hull breaches, or pollution as a consequence of the allision. CCL nautical department investigated this event. The investigation determined that the root cause of the incident was “a failure of the bridge team to properly assess the insufficient holding power to handle the fluctuating relative wind direction, strength, and current conditions near the piers.” As part of the action plan, CCL sent a nautical learning event to the fleet inclusive of lessons learned. The Carnival Glory’s bridge team was not fully aware of the lessons learned from the Carnival Victory allision. The nautical learning event was uploaded in the CCL web portal, nautical operations.

3.2 Ship handling during Voyage planning /MAR/ instructed by the company procedures:

“Ship-Handling” the objective of the company procedure MAR-1309 is to ensure proper ship handling and the development of competence for the staff captain and bridge watch-keeping officers. Each officer records the maneuvers into the Ship-Handling log. “Ship Handling” stated that, when circumstances permit, the Captain must provide opportunities for the Staff Captain to gain experience in ship handling. In particular, this is to take place during entering and leaving ports as well as mooring and anchoring operations. As part of their ongoing development, and when the Captain determines that an Officer is sufficiently experienced and capable, bridge watch-keeping officers should be given the opportunity to handle and maneuver the ship when entering or leaving an anchorage or port under the direct supervision of the Captain. The Ship-Handling Log showed that the safety officer completed 20 maneuvers (arrival/departure) during his previous contract on board the Carnival Glory. He previously docked the Carnival Glory six times in Cozumel; however, it was his first time berthing the vessel at pier 2, starboard side alongside. Since he returned to the vessel, this was his first berthing maneuver.

“Bridge Resource Management” At the time of the event, CCL was operating under the regulations of MAR-1201, “Bridge Resource Management.” The procedure highlights the importance and need for a pre-arrival briefing, which should be used to develop and share a mental model of the operation. Open and continuous communication between bridge team members/pilots improves situational awareness. The captain and the rest of the bridge team on duty at the time of the event, except the cadet, completed Bridge Resource Management (BRM) 1 and BRM2 courses at CSMART (Almere, Netherlands).

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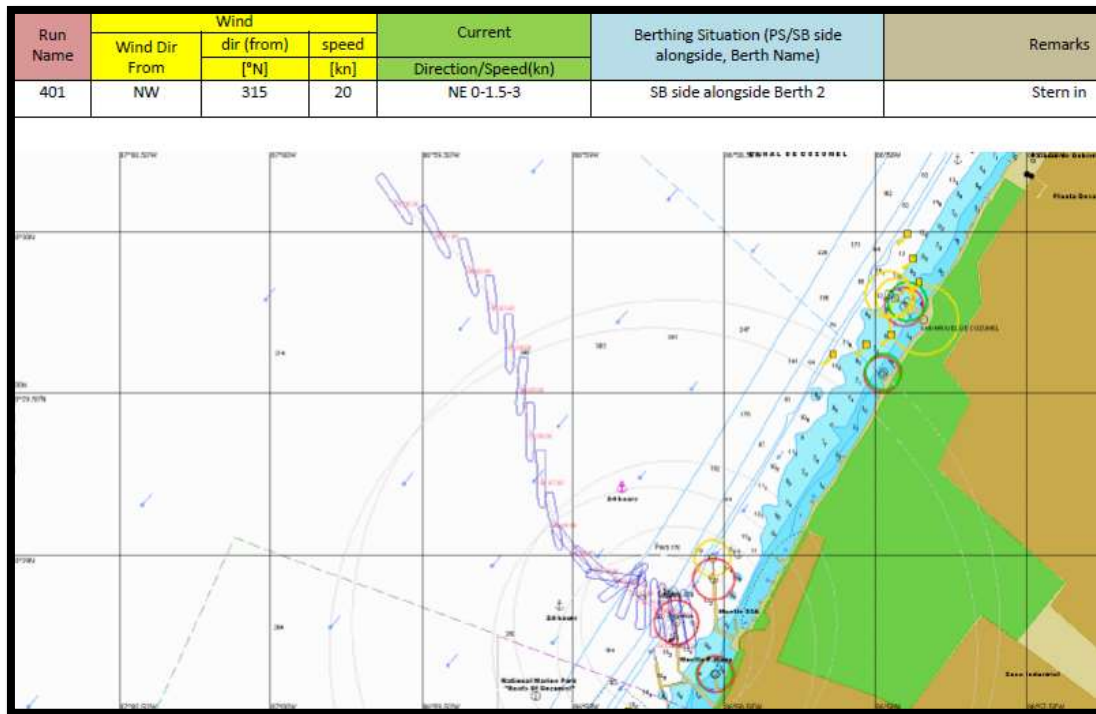


Figure 4: The simulation on CSMART (Stern) The nautical team’s final comments included “not recommended going stern in at pier 2 under those conditions.”

On July 2017, CSMART conducted a port study of Cozumel, by using an XL class ship model and a Dream class ship model. The study identified that the arrival maneuver performed with current to the northeast (NE) and the wind from northwest (NW) was very challenging. The XL class ship model (azipod propelled) was used for the simulation at pier 2 starboard side alongside, with an operational envelope of NE current up to 3 knots and wind from NW with a speed of 20 knots. The risk assessment final score showed a “4” or major risk.

The nautical team’s final comments included “not recommended going stern in at pier 2 under those conditions.”

“Voyage Planning” The objective of the company procedure MAR-1301, is to establish a clear process for all vessels to develop and execute a safe and professional plan for every voyage. The procedure states “during the appraisal process, the Voyage Planning Officer must review the list of port studies in the Marine Information Network (MIN). Where a port study is available, this must be reviewed as part of the voyage appraisal and planning process, and the captain informed so as to be able to use during briefings.”

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Voyage Passage Planning was developed by the 1st officer junior¹⁰ and signed and approved by master as required by MAR-1301, “Voyage Planning”. Although the plan had the ship berthing at pier 2 starboard side alongside at Puerta Maya, the track on the ECDIS was marked as a bow in, port side alongside. The blind pilotage¹¹ was prepared for an approaching speed between 3 and 4 knots, current moderate to north and northwesterly wind about 20 knots. The vessel was scheduled to turn to port once abeam of the international pier. The commit point was set at 0.7 nautical miles from pier #3.

The blind pilotage did not have specifics for the critical elements such as turning circle (radius) and the required Rate of Turn (ROT), swept path, transversal speed or minimum distance from pier 3, reserve areas and no-go areas and planned corridor. The berthing plan had a maneuver with the bow in, portside alongside, in the eventuality the current was heading south.

⁹The CSMART risk assessment scale ranges from 1 “insignificant” to 5 “catastrophic”. CCL Center of simulation maritime training (CSMART) at Almere, Netherlands.

¹⁰Voyage planning officer.

¹¹Blind pilotage also known as navigation of a vessel in restricted waters using as a primary method: radar/ECDIS and AIS data.

4.Summary of the events of this marine casualty:

The sequence of events is based on the docking maneuver that culminated in the collision between the MV Carnival Glory and the MV Carnival Legend.

**During the berthing maneuvering operation on December 20th 2019
At Puerto maya, Cozumel Mexico (figure 5 , 5.1, 5.2 and 5.3)**

**Lat: 20° 28.9 N
Long: 086° 58.6 W
Course :357.2° (T)
Speed: 2.8 knts
ENC: MX509225**

Wind 340°/20 kts gusting to 25 kts. & current NNE with a speed between 0.5 to 2 knots and increasing.



Figure 5: Accident location. (Background source: Google Maps)



Figure 5.1: Accident location. (Background source: Google Maps)

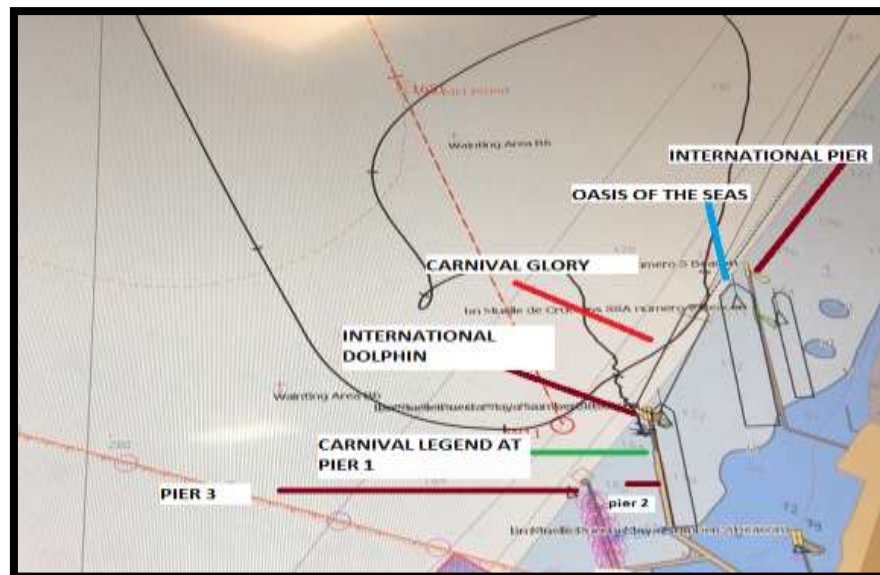
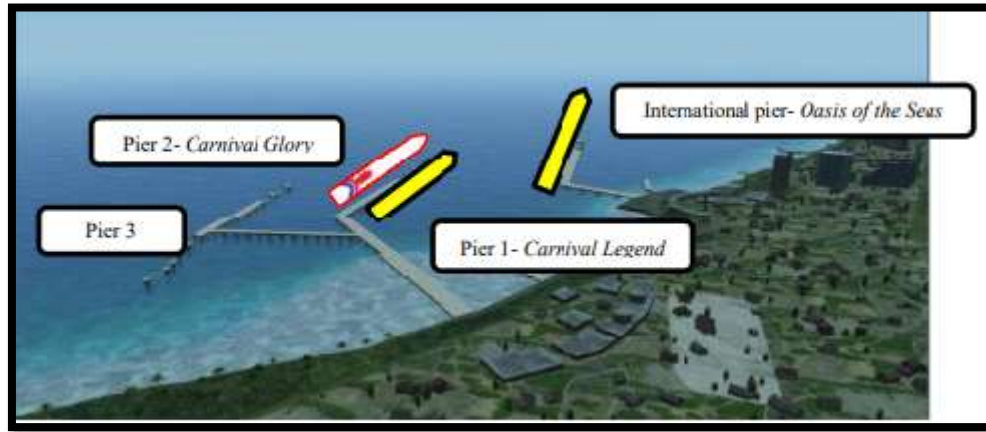


Figure 5.2: Time of the IMPACT (collision): 07:46:10 LT with Carnival Legend ,VDR Transcript, ENC : MX509225



PUERTO MAYA, COZUMEL piers configuration (figure 5.3)

“Pre-Arrival Briefing” On December 19, about 16:30, the captain conducted an arrival briefing through conversation, and through the Electronic Chart Display and Information System (ECDIS) screen following the arrival briefing check-list and the blind pilotage slides. The captain assigned the operational functions to the bridge team. He decided to assume the mentor role and let the safety officer take “the conn”, assigning the staff captain the role of operations director (OD). The berthing plan was discussed. The maneuver had the vessel turn sharp to port at the reference point 1 (figure 5.2), and set 0.3 cables west of the planned track, sail 300 meters north of pier 3, align the stern with reference point 2 (figure 5.4), and move backwards to pier 2. The clearance from pier 3 was set at 70 meters. The minimum depth was five meters by pier 2. The briefing specified the speed during the turn to port, the use of rudders and main engines; however, there was no clear indicator on when to use the bow/stern thrusters. It also specified the position for the transfer of controls from the main console to the starboard bridge wing (figure 5.5)



Figure 5.4: Reference points 1 and 2



Figure 5.5: starboard bridge wing, RADAR: SA 164632051 WARTSILA COMPASS SAFE DISTANCE Sam electronic S: AZ3073G240. ECDIS Chart: MX509225, MAIN AND STBS SIDE, CONN FULL BRIDGE: MULTIPILOT PLATINUM \ RADAR SYTEM WITH AUTOMATIC RADAR PLOTTING AID MEETS THE REQUERIMENTS IMO A.694 (17) AND A.278 (VII) S:IEC 62388,IEC 60945 , IEC 62288 .

4.1 Crew configuration during maneuvering:

Captain: Mentor (M)

Staff Captain: Operation Director (OD), also Opns director

Safety Officer: Navigator (NAV)

1st Off. Junior– Co-Navigator (CoNav)

Training Officer – Mooring Station Aft (station No.2)

3rd Officer – Mooring Station Fwd. (station No.1)

Mexican pilot - Advisor

On December 20, at 06:50, the captain held a pre-operational brief with the bridge team and briefed the Engine Control Room (ECR). The bridge team consisted of the captain as mentor, the staff captain as OD, the safety officer as the navigator with “the conn”, the 1st officer junior as the co-navigator, the helmsman, the lookout, and the local Mexican pilot as advisor. The 3rd officer, as administrator, was dispatched to the forward mooring station (station 1) while the cadet officer assisted the co-navigator with the administration. The training officer was in charge of the aft mooring station (station 2).

The navigator briefed the captain about the berthing maneuver. The captain reminded the navigator to turn sharply to port once the vessel was on the reference point. They did not discuss the specifics of the ROT, the wheel over point, the wheel over line, or transversal speed. The navigator suggested anticipating the turn to port to have more clearance from pier 3; the bridge



team did not comment on it. The captain discussed with the bridge team that the local pilot should board on the port side.

4.2 Sequential events, times, descriptive figures¹²:

At 06:50:00 various discussions (in Italian) between OD and NAV regarding how to take the turn and what will be the final heading for approach. The OD indicates to end the track 3 cables to the west from the point between the piers #2 and International.

At 06:52:00 established communication with Mooring Station # 2- Loud and clear.

At 06:52:28 The OD read the weather information; stating the wind will shift to N and NE in the day.

At 06:53:00 The NAV Brief the Co-Nav on the traffic, speed of approach and various discussion on the Pilot Pick up considering the wind direction. The team seems not to be in agreement which side the Pilot is going to board. The Captain stated to come to Stbd and pick up the pilot on Port Side.

At 06:54:00 The NAV suggested to alter the course to port a little earlier in order to do not end up close to the pier. The Focus went back to the Pilot Pick up side and OD and NAV were not in agreement.

At 06:55:00 Discussion between the team on the approach. Talking on the “reference Point”¹³, Distances and speed. It was requested by the NAV to provide distances from pier #3 and then as we turn distances from pier #2). The speed after the ship will start the turn. Once the turn is completed he requested to be notified of the speed astern.

At 06:56:00 Comments not pertinent to the maneuver.

At 06:58:00 established communication with Mooring Station # 1- Loud and clear.

At 06:59:00 The Look Out stated the pilot Boat was visible- None acknowledge.

At 07:00:00 Comments not pertinent to the maneuver.

At 07:01:00 The OD stated the sunshine is coming out and the wind is going down.

At 07:02:00 Again discussion on which side to pick up the pilot- The Captain suggests to carry out the Engine and Rudder tests. The Co-Nav stated: we are 1.5 miles from Pilot station. The Captain adds that the Pilot boat was still along the pier and not moving.

At 07:04:00 Discussion between Nav and Co-Nav about the engine / rudders tests.

At 07:04:00 The OD evaluating wind direction and current once we turn.

¹² Figure during sequence, described the situation during the maneuvering

¹³ “Reference Point” was discussed the day before during briefing, it was 3 cables to the west of the track, abeam the point between head of pier #2 and head of international pier

At 07:06:00 SBE- the stand-by engine (SBE) was given to the ECR. The bridge and the engine ECR were in red manning condition. The navigator had “the conn” and operated the control levers for both the propulsion and the thrusters.

At 07:07:30 The ship contacted the Pilot boat. The pilot requested STBD side boarding.

At 07:08:00 The OD mentions that we need to be W of the track.

At 07:08:30 Thrusters ready and tested.

At 07:09:00 Discussion about the Pilot pick up.

At 07:11:30 Engines and rudders test carried out.

At 07:12:35 The ship is heading off the track to provide good lee to the Pilot Boat .The OD suggested to come more to STBD and then when the pilot boat approach to go hard to port in order to give a good lee. The Navigator agreed.

At 07:15:00 the navigator consults with the Captain on the wind direction when the vessel completes the turn – The Captain said it is going to be from North.

At 07:16:00 The Nav talking about his next intention, to find himself west of the track. Co-Nav acknowledges

At 07:17:00 Hard To port Rudder- SOG 5.6 kts – Pilot boat approaching – Pilot requests to come more to port.

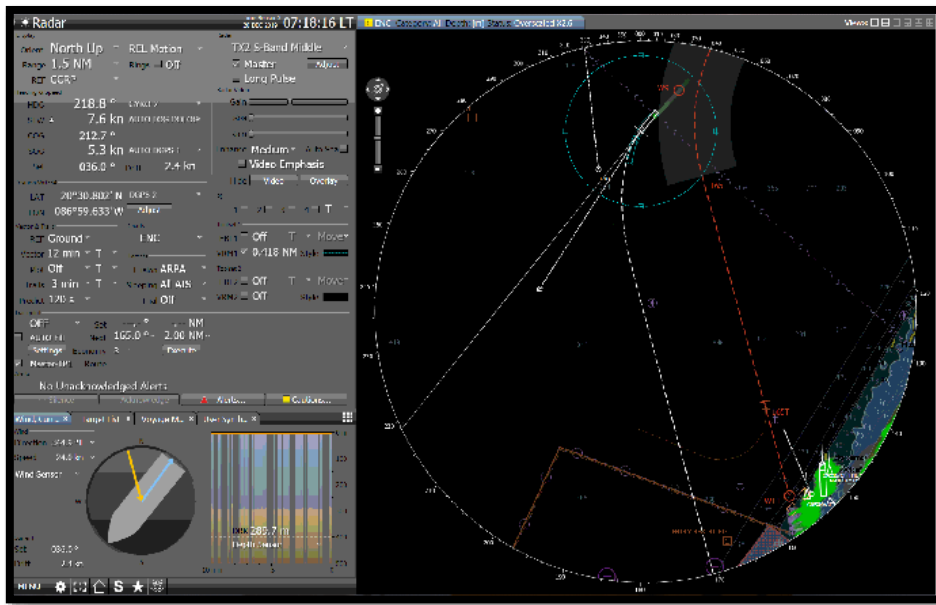


Figure during sequence - Figure 6.

At 07:20:00, The local pilot requested to board the Carnival Glory on starboard side.

At 07:20:30 Pilot on board – local pilot was on the bridge. The captain briefly discussed the berthing plan with the local pilot. Then the staff captain carried out with the local pilot following the check-list. However, they did not discuss navigational parameters such as the wheel over point, the wheel over line, the intended ROT, turning circle and transversal speeds at critical stages, and specific weather limits to abort the maneuver.

The local pilot reported that the weather conditions by the pier were: current moderate to the north and the wind from north-northwest, speed about 25 knots. The local pilot requested, via radio, that the pilot boat to follow the maneuver of the Carnival Glory.

There were no tug boats readily available in the port of Cozumel.

At 07:20:45 The Co-Nav mentioned the wind is going to be on Port Side- None acknowledge

At 07:21:30 The NAV stated: we need to come more to port, we are 3 cables off the track and we are in good position.

At 07:22:00 The Co-nav repeat the intention to keep 3 cables off the track, heading toward the Pier#3 and will inform on the drifting angle and distance from the Pier cable by cable.

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At 07:22:30 The OD stated the planned heading between the Pier is 153 degrees

At 07:23:00 The Navigator stated turning 3 cables to the west when between outermost dolphin of pier #2 and outermost dolphin of the International pier.

At 07:23:00 The OD admits : my mistake.

At 07:23:00 The NAV stated : reducing the speed in approach the drift is going to increase to port. The Captain intervene and said: let's see what will happen with the wind and current as we approach. (Reaction to Nav's concern while adjusting the heading, to see what is going to prevail).

At 07:23:30 The Captain asked: where is the Pilot boat. The answer was it is behind us. The captain said they will never get to the pier before us. He was concerned to have the boat by the pier indicating the current speed and direction.

At 07:23:38 Pilot arrived on the bridge. The Captain welcomes him in and detail the Bridge Team Positions and duty for the maneuver. He also expresses the intended maneuver to turn the ship to port and back up to the Pier # 2.

At 07:23:50 The OD talking with Pilot of topics not pertinent to the maneuver (pilot sharing past experience on previous ship maneuver at a different Pier).

At 07:24:00 The OD stated to the Pilot: we are 1.6 miles from the pier 2 we will be staying a bit west of the track and when we will be in between the two piers (international and Pier # 3) we will turn to port with speed 3 kts ahead. By the time we turn, we will move to the STBD wing , set the engine astern. The Pilot acknowledges. The OD completed the Pilot Exchange information and asked the pilot if he needed further requirements and asked if he was familiar with the ship. The pilot asked if Engines and thrusters were working properly. The OD mentioned about the wind and asked about the current. The OD completed the exchange of information stating that the Navigator will maintain the conning up the pier side. Wind speed and direction discussed 25 kts NNW.

At 07:27:00 Arrival Checklist Completed.

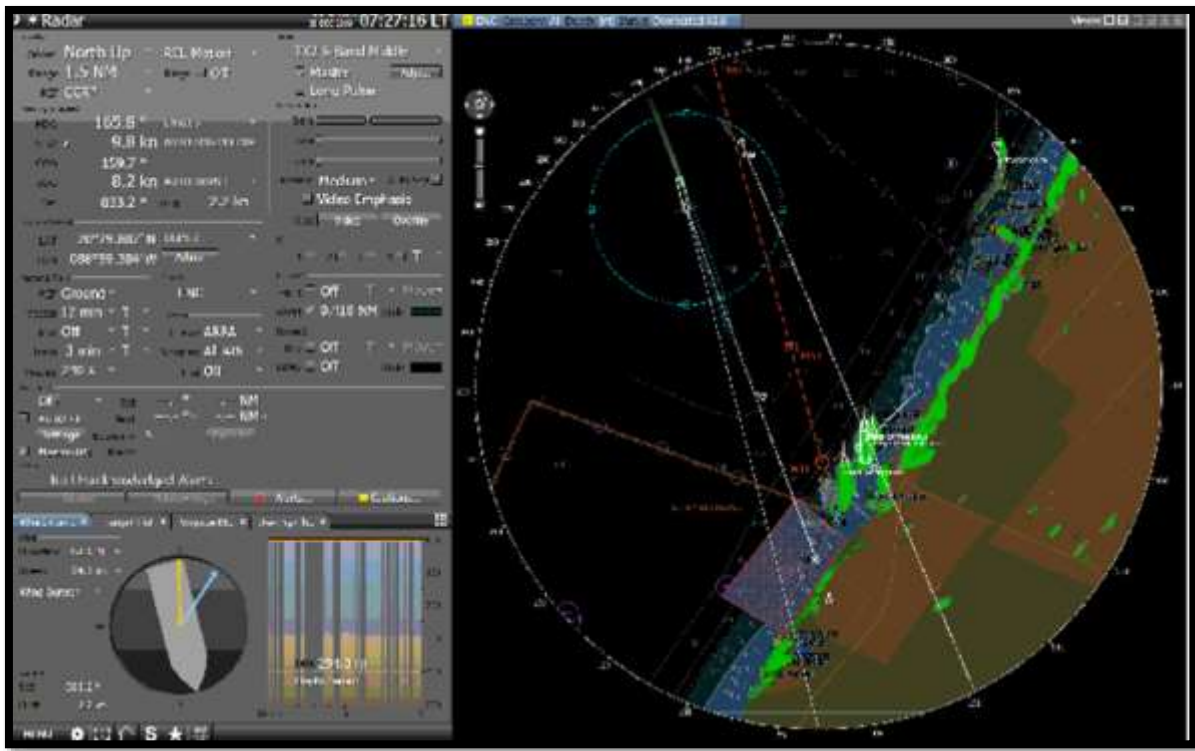


Figure during sequence¹² - Figure 6.1

At 07:27:15 Cross communications not pertinent to the maneuver. Captain informs the Pilot we cancelled G. Cayman and we anticipated the arrival in Cozumel.

At 07:28:00 Captain asked about the current. Pilot confirmed Moderate to North.

At 07:28:16 The Nav. Ordered course 270° (?)¹⁴, and repeated 270° (?).

¹⁴ Intention was to go to 170° to compensate for the current. Even if wrong order was given and repeated (270 instead of 170) it was executed as intended. Ship's heading was changed to 170°.

At 07:29:00 – 07:33:00 Master tells to Nav that we need to start turn earlier, when abeam International (instead of at the “reference point”) and that (Nav) will have to use thrusters.

At 07:33:00 Discussion between the OD and the NAV at where to start turning. The OD said abeam international Pier, when the Navigator intention was to turn at the reference point. The new Reference point is by now marked on the radar with the “Ruler” feature. Discussion when to go to the stbd wing. Nav said when clear from pier #3, OD suggested to go when clear from International (when bow clears pier #3 or International). The Captain intervenes saying you will move when you feel comfortable, these are little details, we do not have to stick to the plan. The Captain reiterates that we need to see which environmental factor will prevail: the wind or the current, and then act accordingly with the turn. He further stated, if the wind will push against the pier, we do not have many option here, and we need to turn fast and we need to go.

At 07:35:00 passing commit point.

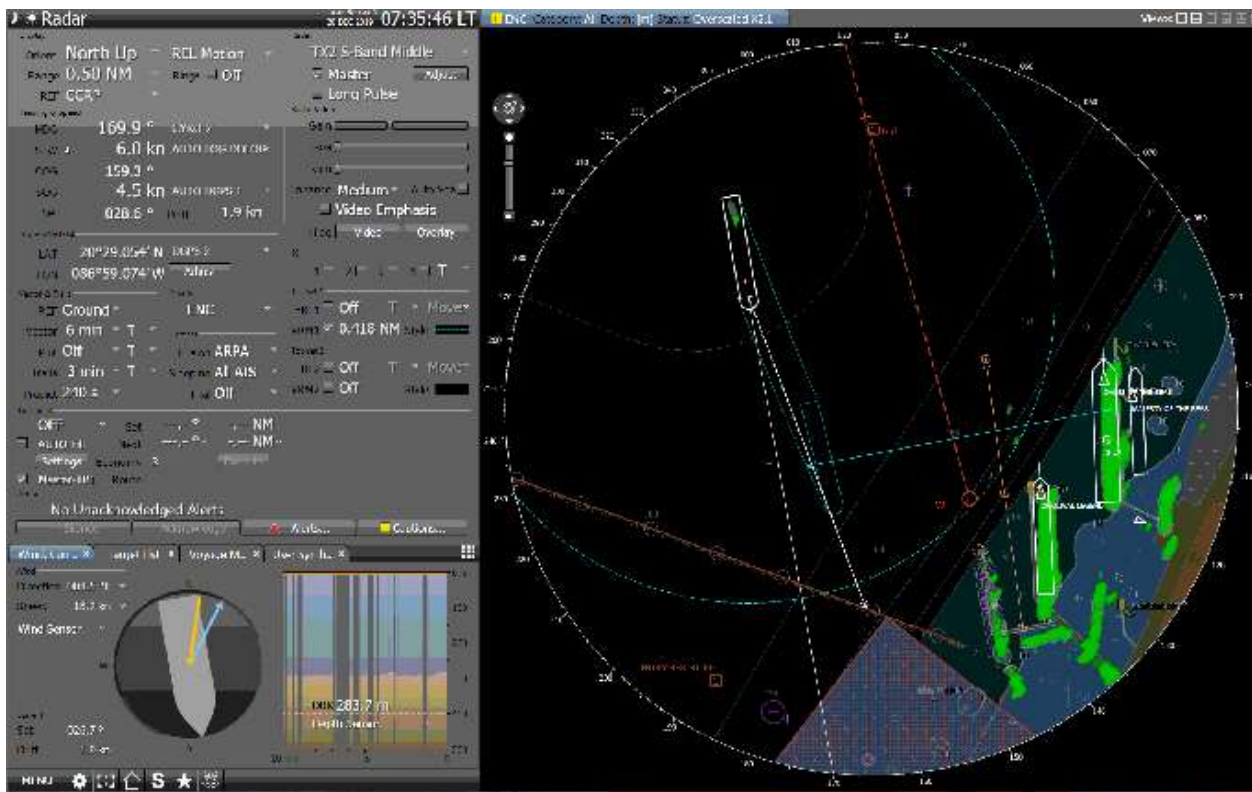


Figure during sequence - Figure 7.

At 07:37 Pilot Boat by the Pier communicated to the ship that the current is moderate to north at pier#2 and more than moderate to North at pier#3.- Captain acknowledge. Captain asks “What is this?” referring to radio interference noise. Not audible on “intercom”. (intercom: audio source on VDR).



At 07:37:45 – abeam with Bow to SSA pier (international). Captain suggests starting turn to port. Navigator acknowledges and executes. Speed 4 kts (SOG) ordered 4 ahead on two to increase the thrust on the props and improve the ROT.

At 07:38:45 The Nav. Suggest to increase the ROT, The Captain said the ROT is increasing. Nav acknowledge. Engine order levers two ahead on two. Wind 005/27kts

At 07:39 NAV: Engine order levers three ahead on two to increase ROT.

At 07:39:17 NAV ordered: Levers Port Eng three astern.

At 07:39:31 The Captain Stated too early to put port engine astern as we needed to continue the turn with good ROT / “You need to turn, we need to go ahead” – bad choice of words. Intention was to say to go ahead with the turn, to keep both engines ahead).

At 07:39:40 Captain suggest to go more ahead. Not audible. As the current was helping to drift more to north.

At 07:40:09, The OD, stated the Prediction looks good and also the ROT. The captain asked the Pilot if the turn looks good- Pilot acknowledged saying it is good.

At 07:40:45, The Navigator expressed some concerns about the prediction. Captain insisted.. we need to go ahead – (again bad choice of words. Intention was to say to go ahead with the turn, to keep both engines ahead).

At 07:40:46, Navigator ordered to stop the port engine (it was three astern). And ordered 4 ahead on the STBD Eng.

At 07:41:15, The navigator set pitch 4 ahead on the port engine.

At 07:41:20 Four ahead on Port Engine ordered.

At 07:41:30 Navigator suggested to move to the STBD wing.

At 07:41:46, The Nav. stated we are not clearing Pier #3. Also, Capt: “Current is also pushing you up”.

At 07:42:00, The helmsman said, “The Rate of Turn is decreasing.”

At 07:42:05: OD “Prediction not looking good”.

At 07:42:05, The captain said, “The current is pushing to north. The navigator replied, “We should increase it (ROT) to port.” The navigator set the bow thrusters full to port.

At 07:42:10, The OD stated the vessel’s position prediction set at 4 minutes did not look good. No one in the bridge team acknowledged.

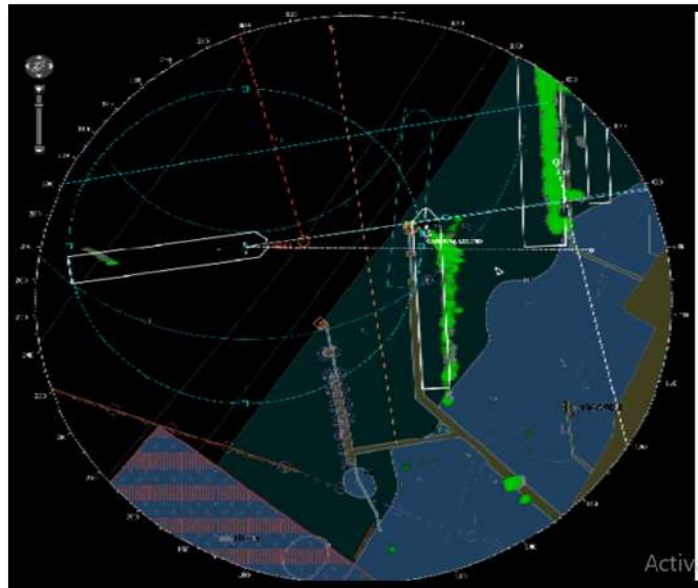


Figure during sequence - Figure 9.

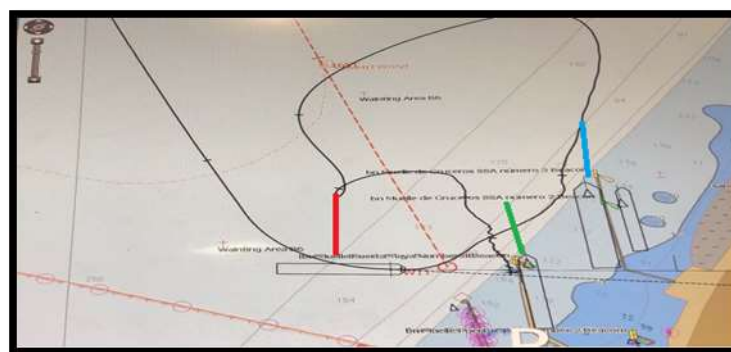


Figure during sequence - Figure 10.

At 07:42:31 Nav. ordered to move the control of the ship from the STBD wing. Pier#2 was about 240 meters on the vessel’s bow.

At 07:43:17 – The Aft Station stated that the turn does not look clear on Pier#3.

At 07:43:30 - NAV sets the Stern Thrusters full to port, The Rudders were hard to port- The STBD Eng. lever 4 ahead – Port Eng. still 4 ahead.

At 07:43:46 NAV Rudder Midship ordered

At 07:44:00 Captain asked the Mooring aft if we are clear. The Navigator answered: we are not clear.



Figure during sequence - Figure 11.

At 07:44:08 The Captain not having received confirmation from the mooring station but order to QM “Hard to STBD”.

At 07:44:10 Pilot asked the Pilot boat about the clearance. The Boat confirmed clearance for 15 meters from the pier#3. And then 20 meters clear.

At 07:44:16 The Pilot request Bow Thrusters full to Port since the bow was approaching the Pier#2. The Stern Thrusters were still full to Port.



Figure during sequence - Figure 12.

At 07:44:45 Mix of orders on the thrusters. The Captain Takes the Conn. Hard to Port Rudders

At this time the VDR data showed: rudder/full to port, starboard engine/pitch 4 ahead, port engine/pitch 4 ahead, bow thrusters/full to port, stern thruster/full to starboard, wind direction north north-west, speed 20 knots, current direction north north-east, speed 1.5 knots. The captain executed the evasive maneuver.

At 07:45:00 Aft Mooring station gave the clearance from Pier # 3 not realizing that the ship was close to Pier#2 now.

At 07:45:20, Station 2 called the bridge team and reported that the stern was well clear from pier#3. The bridge team did not acknowledge.

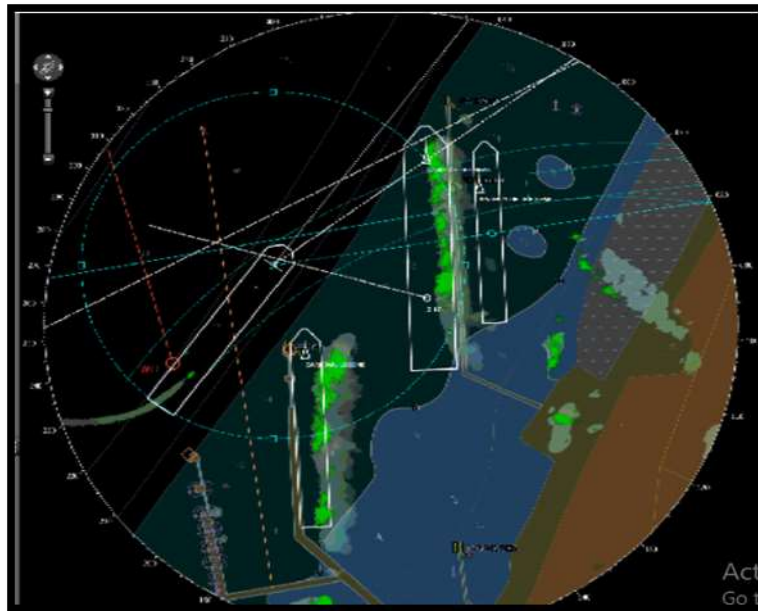


Figure during sequence - Figure 13



Figure during sequence - Figure 14.

At 07:45:25, The navigator stated, “We are not clearing station 2”. The bridge team did not acknowledge.



Figure during sequence - Figure 15

07:45:30, Captain ordered to Drop Port Anchor, one shackle on deck. Also station 1 (forward mooring station) called the bridge team and reported a lateral distance of 80 meters from the Oasis of the Seas.

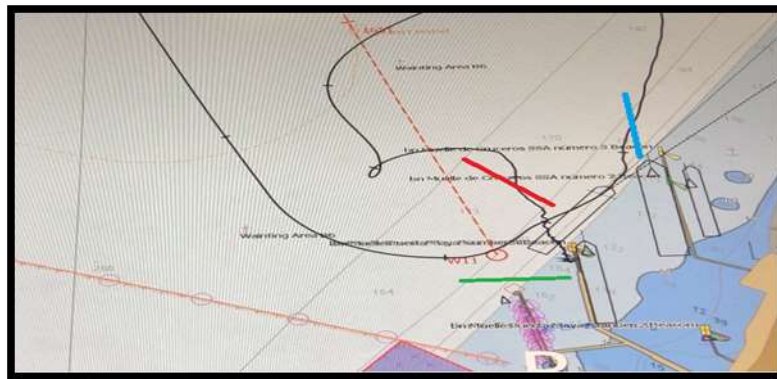


Figure during sequence - Figure 16

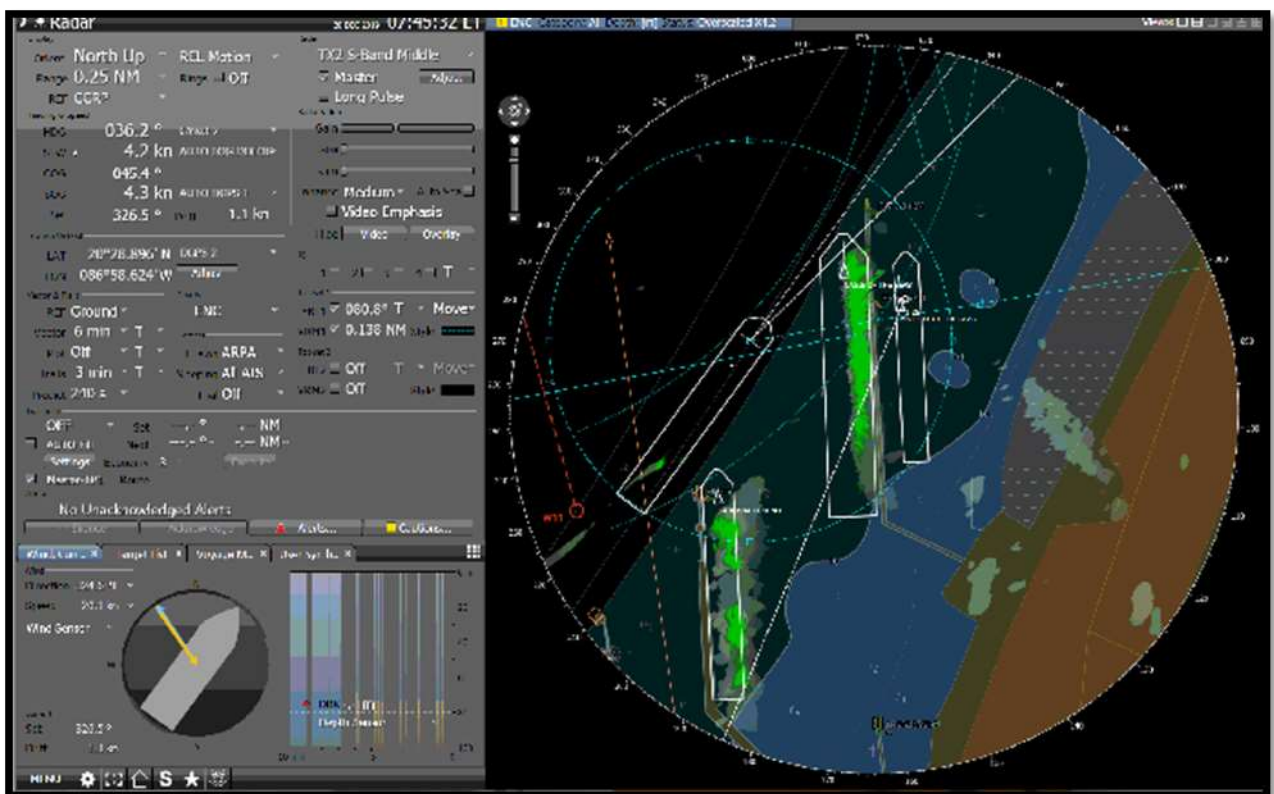


Figure during sequence - Figure 17



Figure during sequence - Figure 18



Figure during sequence - Figure 18.1

At 07:45:50 The navigator called station 2 and station 2 reported the stern was getting closer to the Carnival Legend. The bridge team did not acknowledge.

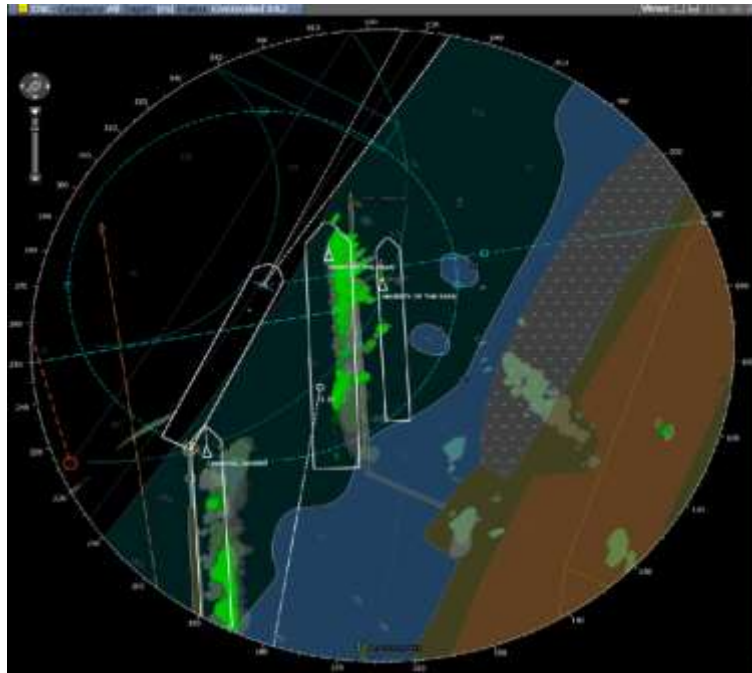


Figure during sequence - Figure 19

07:46:00 STBD quarter collided with the Carnival Legend Bow. The Bridge Team, at this point, did not realize of the impact with the Carnival Legend.



Figure during sequence - Figure 20.

07:47:00 Confusion on who was giving the orders to the wheelsman.

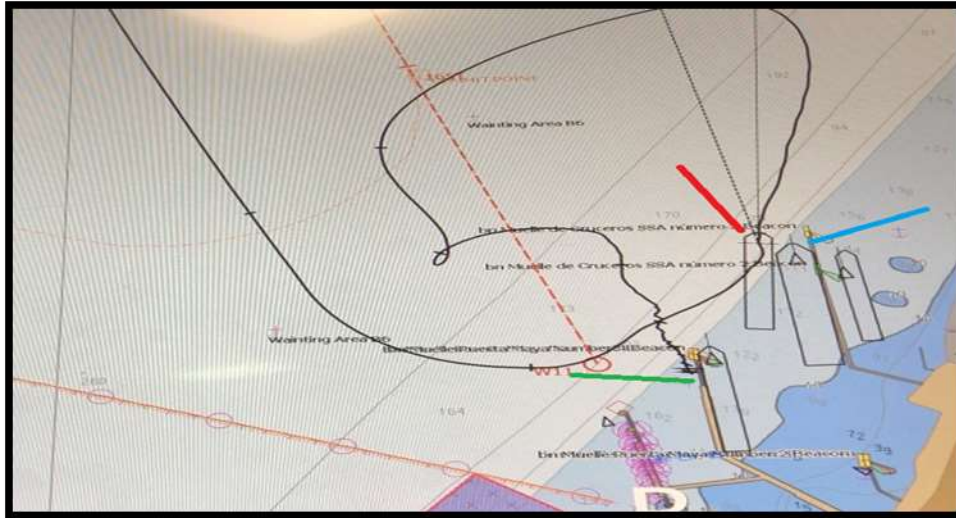


Figure during sequence - Figure 21.

07:48:00 Master ordered to heave up the anchor.

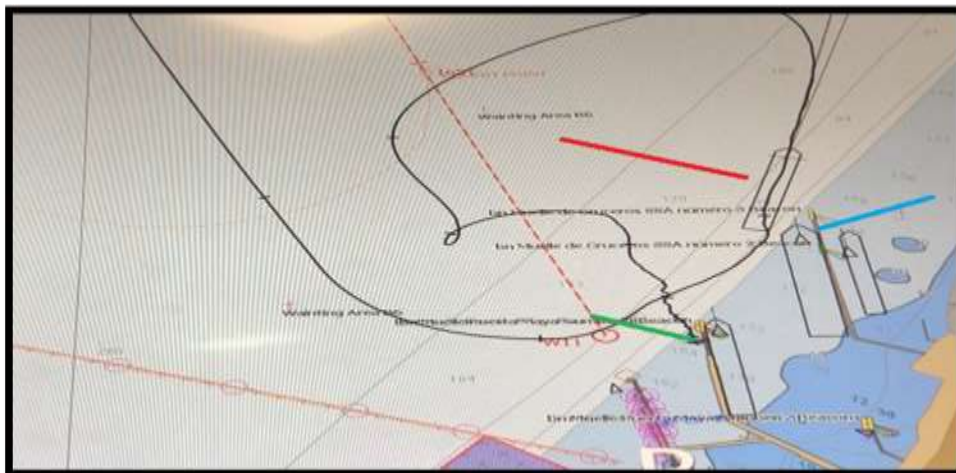


Figure during sequence - Figure 22.

07:50:00 The Master managed to clear from the other ship Docked at the SSA pier (Oasis of The Seas).

07:52:00 Aft Mooring Station reported water coming down from the deck above.

07:56:00 The OD was informed of the Damage on the STBD quarter Dining Room on deck 3 and 4 caused by the collision with the Carnival Legend Bow.

At 07:58:00, The bridge team informed the engine team of the collision.

At 07:59:00, the OD directed the safety officer to the damage area and requested all the deck officers to report to the bridge.

At 08:06:00, The captain decided to proceed with the berth. The vessel swung with the bow to starboard and moved astern toward pier 2.

At 08:49:00, The vessel was berthed at pier 2, starboard side alongside.



Figure 23: Cozumel Piers configuration

4.3 Navigational Data:

Extract of the VDR navigational data (Figure 24). The sign (–) stands for port/astern and the sign (+) stands for starboard/ahead. The time of the turning to port is highlighted in green; the time of allision is highlighted in yellow.

Time LT	HDG	COG	SOG	Transverse SOG	Rudders angle	Rate of Turn	Main engines RPM		Thrusters power %	
							Port	Stbd	Bow	Stern
0736	170	159.6	4.6	-0.8	+26	0	+11	+10	0	0
0737	169.9	159.9	4.1	-0.7	+22.5	0	+11	+10	0	0
0738	170.1	159	3.9	-0.8	-17.7	+0.2	+11	+10	0	0
0738:30	167.3	152.3	4.1	-1.1	-45.5	-11.1	+22	+22	0	0
0739	158.4	143.2	4.4	-1.2	-44.8	-21	+55	+53	0	0
0740	136.6	120.4	3.9	-0.8	-44.6	-26	-30	+38	0	0
0741	107.7	102.9	3.0	-0.3	-44.2	-23.5	-10	+38	0	0
0742	085.9	092.3	2.7	0.3	-45.4	-20.1	+55	+54	0	0
0743	064.2	063.4	2.8	0	-44.6	-24.8	+55	+54	-99.8	0
0744	037.4	039.9	3.5	0.1	-2.8	-26.9	+69	+77	-99.8	-99.8
0745	038.5	053.7	5.1	1.4	0	+9.1	+55	+49	-100.9	+99.9
0745:30	036.2	045.4	4.3	0.7	-45.5	-12.2	-7	-12	-100.9	+99.8
0746	026.3	034	3.1	0.4	-45.2	-21.8	-68	+18	-100.9	0
0747	014.8	014.1	1.7	0	-45.4	-15.3	-92	+70	-100.8	-100.9

Figure 24: VDR navigational data



5. Analysis:

Based on all the information collected, it can be determine that the root cause and the under laying factors that contribute to the collision of the MV Carnival Glory with the MV Carnival Legend, are the following.

Root Cause:

Listening and observing the VDR at the Company premises and taking the information from the log books system, interviews, the information obtained from our visit and other evidences, that during the berthing maneuvering at 07:42:05, the captain said, “The current is pushing to north, the navigator replied, “We should increase it (ROT) to port.”

The navigator set the bow thrusters full to port increasing the ROT. At 07:42:10, the OD stated the vessel’s position prediction set at 4 minutes did not look good. No one in the bridge team acknowledged it. Then 07:43:30 stern thrusters were full to port remaining a good ROT, however the Pier#3 does not was clear (not confirmed by the Aft mooring station #2), So that, At 07:44:45 during the mix of orders on the thrusters, the Captain Takes the “Conn” with rudder/hard to port, starboard engine/pitch 4 ahead, port engine/pitch 4 ahead, bow thrusters/full to port, stern thruster/full to starboard, wind direction north north-west, speed 20 knots, current direction north north-east, speed 1.5 knots.

After making the analysis, it has been considered that these mixed orders modified the ROT by changing the momentum of correct turning, pushing the vessel forward and laterally to stbd. side direction clearing the pier #3, but approaching to the No.2 International dolphin and not clearing the Bow of the Carnival Legend, then the impact (collision) at 07:46:00.

Hence, in this sense, different factors during berthing maneuvering have contributed to the collision, as environmental factors (wind, current), limited prediction during approaching pier#3 & int.dolphin #2 during the communication between the station 2 and conning and the shifting of the ROT and pivot point forward during the stern thruster propulsion. In addition, Regardless pre-arrival briefing being held, the wind/current limits to abort the maneuver were not set. The Bridge team cannot work using the Technique Plan, Reason, Outcome (PRO), technique taught by the company on this kind of scenarios. Also, the foreseen safety margins from pier 2 and pier 3 were not discussed.

Bridge team made specific actions to control the vessel’s outcome based on challenge when the vessel was approaching to pier 2. Further, the bridge team did not effectively use the Probing, Alert, Challenge, and Emergency (PACE) technique.



Therefore, having into account the aforementioned analysis, we can conclude that the **Root Cause** of this marine casualty was improper planning during mentoring at stern berthing operation at pier no.2 (Puerto Maya, Cozumel), when the vessel is facing critical situation, resulting in improper Rate of Turn (ROT) conducting in an inadequate starboard side laterally stern movement that concludes in collision with the bow of the MV CARNIVAL LEGEND.

Underlying Factors:

Software: The mentor role played by the Master allowing the safety officer to take the conn and assigning the Staff Captain as the OD. This was done in a way to comply with company policy MAR-1309 in which officers as the staff captain and the safety officer must be allowed to gain experience performing docking and undocking maneuvers as long as they are supervised by the Master, this directly influenced the occurrence of this marine casualty.

In the pre-arrival briefing meeting to define the docking maneuver, the Master and the officers did not perform a real risk analysis on the external factors that could influence the maneuver and make a plan to avoid any further risk as wind, current, distance from pier #3 and int. dolphin #2, MV Carnival Legend and others.

At the pre-arrival meeting it was not verify that there was a study from (CSMART) in which it was not recommend performing this maneuver under the environmental conditions to which the ship was subjected with a wind of approximately NW 20 knt and a current of NE 3 knt. The risk assessment final score of this study showed a 4 or major risk.

Therefore, the recommendations of the company indicated in its procedure MAR-1301 Voyage planning were not followed.

Hardware: All the navigational equipment on the bridge and in the engine room were operational, therefore the ship was in optimal conditions to carry out the maneuver, this point had no direct impact in the occurrence of this marine casualty.

Environment: The current and the wind had a direct impact on this casualty because they directly influenced the change in the ROT point, due to the fact that they were pushing the vessel forward and lateral to starboard side while it was turning to port at the ROT point. Another external factor that conditioned the maneuver was the presence of the MV Carnival Legend, MV Oasis of the sea, International pier, the pier #2 and #3.

Liveware: Although the safety officer had already performed docking maneuvers with the carnival glory ship, he had not performed a docking maneuver on pier #2. This could cause the Navigator to hesitate when making decisions regarding when to start the rotation to port according to the ROT and the designated reference point defined in the docking plan.



Liveware, Other Persons: The fact is that the captain and the OD were supervising and making remarks about the maneuver performed by the navigator. The pilot was silent for most of the time and did not comment unless was asked.

During the maneuver the communication and the command orders were confusing, it was indicated that the Navigator had control, but the OD at some point suggested decisions that went against the navigator and this caused doubts during the maneuvering. When the risk of collision was imminent, the Captain decided to intervene and carried out an evasive maneuver. Another point that had an influence was that the mooring station at some point during the maneuver did not respond when they should have. All these factors influenced the occurrence of this casualty.

A summary of the factors that affected the ship's docking maneuver is presented below:

1. The Climatic Conditions specifically the effect wind and current.
2. Communication between the Bridge and the Officers who were in the different positions. The different mooring stations there must be more than close communication and repetition on both sides of what they hear on the radio.
3. During the master/pilot exchange there was insufficient information shared with regard to the berthing plan/contingency plan/ abort plan between the bridge team and the local pilot.
4. Previous study of the Berths in Cozumel and Plan of how to carry out the maneuvers as such and if the force of the risk wind is considered, abort until it improves.
5. The bridge team assessment of the effects of the wind and current on the vessel's maneuverability was inaccurate, considering that the bridge team did not dynamically monitor the data shown on the conning display when assessing the effects of the wind/current on the vessel. The port strong breeze and the moderate current to the north experienced by the vessel at the port turn.
6. The bridge team response to the emergency was not structured and not wholly adequate to this marine casualty.



6. Conclusion:

Taking into account the information gathered by the interviews on-board, VDR records and other evidences, its can conclude as following:

1. **The mentoring to another crew member:** According to company procedures, it is established that the master can determine when to allow another member of the officers, in this case, the safety officer to carry out a docking and undocking maneuver as long as the master supervises the maneuver. In this case the safety officer was supervised by the master and the staff captain.
2. **Docking study carried out by CSMART in the port of Cozumel:** Which indicated that a stern docking maneuver at pier #2 with a wind NW 20 Knt and a current NE of 3 Knt was not recommended, this study was not taken into account by the 1st officer Jr. When making the docking plan, it was not verified by the Captain.
3. **Pre-Arrival Briefing:** Although during the meeting prior to docking the captain indicated how the maneuver would be carried out and who would take the conn, but the CSMRT study was not taken into consideration and there was no risk analysis on performing the maneuver in the way indicated by the captain.
4. **Bridge Internal Communication:** Its considered the internal communication of all Bridge Officers into this operation did not act in any way with the best communications, nor in the verification of the equipment on the support bridge to see the real situation and the bridge team response to the emergency was not structured and not wholly adequate to this accident, thus the berthing planning philosophy that a plan wasn't used completely by the bridge team.
5. **Pilot interaction in the docking maneuver:** The communication of the master with the Pilot was not the most adequate and this could incur an excess of confidence at the time of the maneuvering.
6. **Environment Condition:** They played a crucial role during the maneuvering of the ship, because the wind and current had a direct impact on the collision with the MV Carnival Legend ship. At 07:44:45 hour the wind was N-NW 20 knt and the current was N-NE 1.5 knt.
7. **The ROT Point:** The mixed orders in the bridge modified the ROT changing the momentum of correct turning, pushing the vessel forward and laterally to starboard side direction clearing the pier #3, but approaching to the No.2 International dolphin and not clearing the Bow of the Carnival Legend, triggering the collision at 07:46:00 hours.



- 8. Master take the Conn:** At 07:44:45 the master took the conn and began to perform an evasion maneuver, the master indicated hard to port rudders and drop port anchor one shackle, but this did not prevent the collision with the MV Carnival Legend, the master must have intervened in the maneuver much before and not 2 minutes before the collision.

7. Recommendations:

1. When the master decides to assume the mentoring role to one of the bridge officers, it is recommended that a risk analysis be carried out in order to identify situations that imply problems when carrying out the maneuver.
2. The Bridge team must consider the berthing plan and must identify all the critical elements limits, safety margins, in terms of range of values and they must be communicated and shared during team briefings.
3. When carrying out stern docking maneuvers at pier#2 with a NW wind incidence of 20 knt and a NE current of 3 knt, the study carried out by the CSMART must be taken into account, in which it indicates that this type of maneuver for these conditions is considered high risk.
4. In high risk weather situations, the master must consider aborting the docking maneuver and return to the open sea or in such case it is recommended to use tugboats in the maneuver.
5. There must be better communication between the officers of the bridge, if the navigator had the conn, he should have executed the maneuver safely according to the instructions agreed by the captain and he should be supported by all the members included in the maneuver.
6. An appropriate communication between local pilots, the master and the bridge officers must be contemplated in order that no exist excesses of trust during the maneuvers and follow a stipulated pattern for the maneuver.
7. For stern docking maneuvers in the port of Cozumel, it is recommended to establish the port turn reference point in which there is sufficient safety distance, regarding to docks #3, #2 and the international dock, because the wind and current can displace the ship and alter the ROT point.

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8. For docking maneuvers in which the role of mentoring is being applied, it is recommended that if the maneuver does not follow the established plan and there is an imminent risk of collision, the master should take the conn with enough time to apply an evasive maneuver that eliminates the risk of a collision.
9. Once a high-risk maneuver has been identified, the bridge team, guided by the master, should make a reminder of the situations that must be taken into consideration by all stations involved in the maneuvers and must be prepared to execute the pre-established contingency plan.

8. Annexes:

Certificate No: 2057276
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Statement for possible presentation to Port State Control or Flag Administration.

Office: Miami
Date: 20 December 2019

This Certificate is issued to the Master of the following vessel:

Ship Particulars	
Name of Vessel	CARNIVAL GLORY
Port Of Registry	PANAMA
IMO/LLR No.	9198367
Gross Tonnage (TD)	110480
Call Sign	3P993

At request of the Ship Owner representative, for the purpose of reporting on the allision damage occurred on 20 December 2019 during berthing operations at Puerto Maya Cruise Terminal, Cozumel, Mexico.

Now Found:

Item	Code - Description	Date Investigation	Action Taken
01	Report on allision damage in way of aft Deck 3 and 4 starboard side and subsequent temporary repairs.	N/A	N/A

Now Done:

Item	Description
01	It was stated that on 20 December 2019, at Cozumel, Mexico, about 08:45h (L.T) during berthing operations at Puerto Maya Cruise Terminal Pier 2, the vessel allided with m/v Carnival Legend IMO 9224725 which was berthed at Pier 1, with a heading of 357.2 deg.
02	The Carnival Glory stated to have allided to the Carnival Legend in way of the aft starboard side in way of Deck 3 and 4 between frames - 4 and - 24.
03	As consequence of the allision the following damage found: 1. Deck 3 starboard side windows broken between frames -4 to -28 including frames -8, -12 and -17. 2. Deck 4 starboard side windows broken between frames -4 to -28 including frames -8, -12 and -17. 3. Deck 4 plating set in downwards between frames -4 to -28, and about 4 m inboard at its maximum point. 4. Several piping systems including scuppers, potable water, grey and black water in way of above affected areas.
04	Temporary Repairs Now done: 1. Reinforcement steel pillars have been welded in way of frames -8, -12, and -17, between decks 3 and 4, in order to compensate for the structural damage, now examined and found satisfactory. 2. Reinforcement steel pillars have been welded in way of frames -8, -12 and -17, between decks 4 and 5, in order to compensate for structural damage, now examine and considered satisfactory maritime. 3. In addition, the areas affected in Deck 3 and Deck 4 are being made weathertight by means of a combination of steel plates and plywood and method agreed maritime. Until this is completed, the Aft Dining Room (PLATINUM RESTAURANT) has been secured to restrict public access. 4. PFD 4.075 (Escape Door) is damaged and it has been secured and an alternative means of escape has been established for Deck 4 (5) of the Dining Room.

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Form: 1126/0001 (2019-10)



Statement from the classification society “LR class” page 1 of 2



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05	In addition, and underwater examination has been carried out to the underwater parts of the vessel and all found in order without visible defects.
06	Given the nature of damage, the Owners representative stated that arrangements are been made to have Shipyard representatives to visit the vessel at New Orleans on 22 December 2019, where the vessel is now bound in order to determine the damage and develop a repair plan.
07	It was stated that a formal investigation of the incident will take place in due course. However, it was stated that the high wind experienced in the area contributed to the incident.
08	Actions taken at this time deemed sufficient to allow the vessel to proceed from Cozumel, Mx to New Orleans, LA with ETA 22 December 2019
09	In view of the above a CONDITION OF CLASS due 22 December 2019 has now been raised as follows: FOR SINGLE VOYAGE FROM COZUMEL, MX TO NEW ORLEANS, LA WHERE VESSEL NOW BOUND AND ETA 22 DECEMBER 2019. ALLISION DAMAGE IN WAY OF DECK 3 AND 4, BETWEEN FRAMES -4 AND -24, TO BE SPECIALLY EXAMINED AND DEALT WITH AS NECESSARY. REPAIR PROPOSAL TO BE SUBMITTED TO LR FOR CONSIDERATION AND APPROVAL AND PERMANENT REPAIRS TO BE DONE UNDER LR SURVEY. MEANTIME STRUCTURE REINFORCED AND AFT DINING ROOM NOT IN USE AND PUBLIC ACCESS RESTRICTED.

This report is being submitted to Lloyd's Register Committee to confirm vessel's class as Passenger Ship and vessel's records updated.

A. Cacho
 Marine Office
 Lloyd's Register North America, Inc.
MEMBER

A. Cacho
 Authorized to Lloyd's Register North America, Inc.
 a member of the Lloyd's Register group

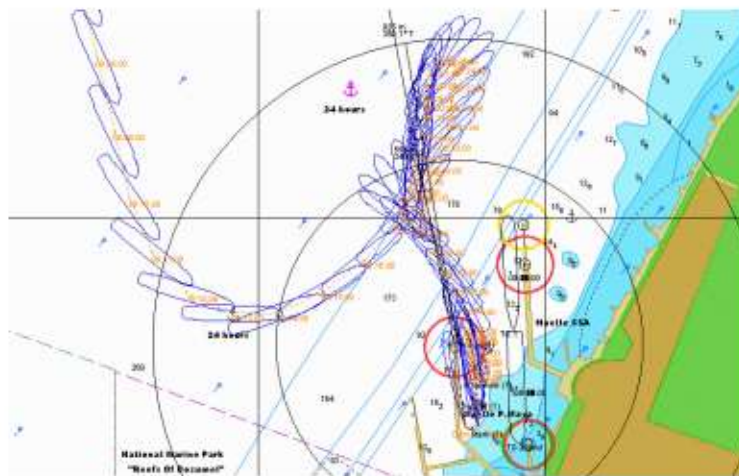
Form: F128/Local (2019 10)

Statement from the classification society “LR class” page 2 of 2



Cozumel Port Study with M/V Aida Helios (XL Class) and M/V Carnival Dream (Dream Class)


Simulation study conducted between July 10th and July 14th, 2017 at
CSMART, Almere, The Netherlands



Cozumel Port study by the company CCL



Certificate no. 3856611
Page 1 of 2



Passenger Ship Safety Certificate The Republic of Panama

The Certificate shall be accompanied by a Record of Equipment for Passenger Ship Safety (Form P) 3852100/08 issued under the provisions of the International Convention for the Safety of Life at Sea, 1974, as modified by the Protocol of 1988 relating thereto, under the authority of the Government of the Republic of Panama by Lloyd's Register Group Limited for an international voyage.

Name of ship: CARNIVAL GLORY Distinctive number or letters: 31919 Port of registry: Panama Gross tonnage: 118,480 Sea areas in which ship is certified to operate (regulation 802): A1 + A2 + A3 AIS number: 9188817 Date of last ¹⁾ :	The name of the ship: CARNIVAL GLORY Distinctive number or letters: 31919 Port of registry: Panama Gross tonnage: 118,480 Sea areas in which ship is certified to operate (regulation 802): A1 + A2 + A3 AIS number: 9188817 Date of last ¹⁾ :
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Date of building contract: **30 July 1998**
 Date on which hull was laid or ship was at similar stage of construction: **20 June 1999**
 Date of delivery: **27 June 2003**
 Date on which work for a conversion or an alteration or modification of a major character was commenced (where applicable): **Not applicable**

This is to certify:

1. That the ship has been surveyed in accordance with the requirements of regulation V7 of the Convention;
2. That the survey showed that:
 - 2.1 the ship complied with the requirements of the Convention as regards:
 - 2.1.1 the structure, main and auxiliary machinery, boilers and other pressure vessels;
 - 2.1.2 the watertight subdivision arrangements and details;
 - 2.1.3 the following subdivision load lines:
 Subdivision load lines assigned and marked on: **Freeboard**
 the ship's side amidships:
 Regulation 8-17B²⁾:
 C.1 **15/17 mm**
 C.2 **"**
 C.3 **"**
 - 2.2 the ship complied with part 6 of chapter 5-1 of the Convention - AIA;
 - 2.3 the ship complied with the requirements of the Convention as regards structural fire protection, fire safety systems and appliances and fire control plans;
 - 2.4 the life-saving appliances and the equipment of the lifeboats, liferafts and rescue boats were provided in accordance with the requirements of the Convention;
 - 2.5 the ship was provided with a fire-fighting appliance and radio installations used in life-saving appliances in accordance with the requirements of the Convention;
 - 2.6 the ship complied with the requirements of the Convention as regards radio installations;
 - 2.7 the functioning of the radio installations used in life-saving appliances complied with the requirements of the Convention;
 - 2.8 the ship complied with the requirements of the Convention as regards shipborne navigational equipment, means of entertainment for adults and children publications;
 - 2.9 the ship was provided with lights, shapes, means of making sound signals and distress signals, in accordance with the requirements of the Convention and the International Regulations for Preventing Collisions at Sea in force;
 - 2.10 in all other respects the ship complied with the relevant requirements of the Convention;
 - 2.11 the ship was subjected to an alternative design and arrangement in pursuance of regulation 8-03/17 of the Convention;
 - 2.12 a Document of approval of alternative design and arrangements for fire protection is appended to this Certificate.

3. That an Exemption Certificate has been issued:

1) An appropriate date shall be completed.
 2) For ships constructed before 1 January 2002, the applicable subdivision load lines 'C', 'C.2' and 'C.3' should be used.
 3) 'C' shall be appropriate.


 Form 173594-02/18 1/8

PSSC

Ship:	Carnival Glory IMO9198367		
Book:	Deck		
Time of entry	Name of entry		Details
September 28, 2019 09:58 -05:00	TOUCH Drill TRG-2005	Training	A6 Collision and Grounding
October 08, 2019 14:00 -05:00	TOUCH Drill TRG-2005	Training	A6 Collision and Grounding

Collision and Grounding drills carried out onboard as per the bridge log book