



Bundesstelle für Seeunfalluntersuchung
Federal Bureau of Maritime Casualty Investigation
Bundesoberbehörde im Geschäftsbereich des Bundesministeriums
für Verkehr, Bau- und Wohnungswesen

18 July 2003

Summary
Investigation Report No. 19/03

Serious Marine Casualty:

Collision

Container M/V "VILLE D'ORION"
and
M/V "TOP GLORY"

on 23 January 2003 near Hawaii

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1 Summary of the marine casualty

In the early morning of 23 January 2003 at about 04:45 LMT/15:45 UTC the container vessel "VILLE D'ORION" (IMO-No.: 9125619) sailing under German flag, bound for Los Angeles, USA, collided with the bulk carrier "TOP GLORY" (IMO-N°.: 8307820) sailing under Chinese flag, proceeding from an unknown port of departure, in the open sea at position 26° 52,1'N 160° 46,4'W, about 265 sm NNW from the Hawaiian Island Kauai.

There were no personal injuries. Nor did the collision lead to any water intake, damaged tanks or environmental pollution.

The container M/V "VILLE D'ORION" sustained damage to the port side between frames 71 and 85 (Bay 21-35) in the collision. After Germanischer Lloyd, the insurer and the authorities were informed, the vessel was redirected to Honolulu, Hawaii as port of distress to have the damage ascertained and the necessary scope of repair fixed. The vessel's expert estimated the costs of repair at \$ 1.5 million.

According to the information supplied by USCG and the vague statements by the Chinese Marine Department in Hong Kong, the bulk carrier "TOP GLORY" was damaged on her starboard bow. No information was available about the amount of the repair costs. According to the information supplied by the United States Coast Guard (USCG) and the Marine Accident Investigation Section, Hong Kong (MAIS), the vessel continued her voyage to Japan without any interruption.

2 Scene of the incident

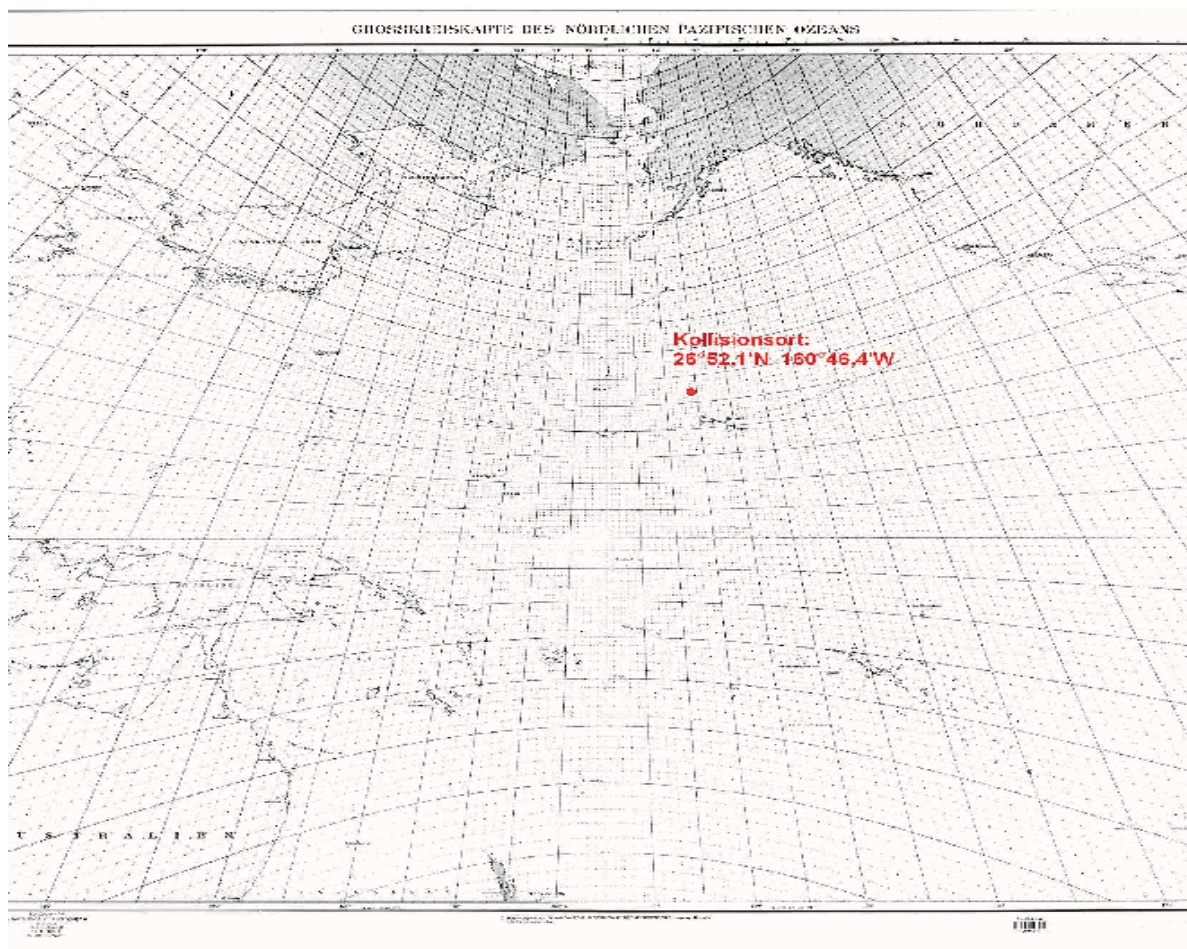
Nature of incident: Serious marine casualty

Date: 23 January 2003

Location North Pacific Ocean

Position 26° 52,1' N 160° 46,4' W

Figure 1, Scene of collision



3 Vessel particulars and photos

3.1 Container M/V "VILLE D'ORION"

Name of vessel:	Container M/V "VILLE D'ORION"
Operator:	NSB Niederelbe Schifffahrtsgesellschaft mbH & Co. KG, 21614 Buxtehude
Port of Registry:	Hamburg
Nationality/Flag:	Federal Republic of Germany
IMO-No.:	9125619
Call letters:	DABL
Type of vessel:	Container vessel
Crew:	21 persons
Classification:	Germanischer Lloyd
Class:	+ 100 A + MC AUT
Year built:	1997
Building yard:	Daewoo Yard/Korea
Length over all:	259.35 m
Width:	32.20 m
Max. draft:	16.34 m
GRT:	40,465
Deadweight:	49,212 t
Main engine:	Sulzer/8RTA84C
Engine rating:	32,400 kW
Speed:	22.7 kn

Figure 2, General view Container M/V "VILLE D'ORION"



3.2 Vessel particulars of M/V "TOP GLORY"

It was not possible to obtain a photo of M/V "TOP GLORY".

Name of vessel:	M/V "TOP GLORY"
Operator:	Top Glory Shipping Company Ltd./Hong Kong/China
Port of Registry:	Hong Kong
Nationality/Flag:	China
IMO-No.:	8307820
Call letters:	VRXK5
Type of vessel:	Bulk freighter
Crew:	Not advised
Classification:	American Bureau of Shipping (ABS)
Class:	Not advised
Year built:	1984
Building yard	Japan
Length over all:	182.75 m
Width:	30.01 m
Max. draft:	11.18 m
GRT:	23,186
Deadweight:	Not advised
Main engine:	Sulzer 2SA6CY
Engine rating:	6,951 kW
Speed:	16.2 kn

4 Voyage/Course of accident

4.1 Chronology of the accident and summary of the statements by the command and staff on duty of the Container M/V "VILLE D'ORION"

On 23 January 2003 at 04.00 h LT, M/V "VILLE D'ORION" was on the way to Los Angeles, California, USA, with a true course of 90° and a speed of 20 kn.

The bridge watch on board "VILLE D'ORION" was manned at 04.00 LT with the 1st Officer on Duty (Chief Mate – OOD) and the deckhand who was on watch from 00:00 to 04:00 as lookout.

According to the information supplied by the ship's crew and the entries in the logbook the visibility at the time of the occurrence was about 0.5 sm. According to the information supplied by the OOD and his lookout deckhand, the mast on the foreship was not always visible because the rain showers were so heavy. On this day sunrise at the stated position was at 06:32 h LT (17:32 h UTC).

The lookout stated that he had the watch from 00:00 to 04:00 h and 12:00 to 16:00 h daily and he had not carried out any work in the preceding 96 hours other than the eight hours on watch duty.

Because of the poor, reduced visibility he had been instructed to stand lookout until daybreak, in other words one hour longer.

The OOD stated that he normally held the watch daily from 04:00 to 8:00 h and 16:00 to 20:00 h and that in the preceding 96 hours prior to the collision he had not carried out any other work. Normally he worked one hour longer after his watch and distributed the necessary ongoing work for the deck crew to the boatswain.

His navigation lamps were switched on (top lamps, side lamps and stern lamp). No sound signals had been given. According to the statement by the crew on watch no sound signal had been heard prior to the collision either.

At about 04:45 h the OOD of Container M/V "VILLE D'ORION" felt a stamping movement on the port side. He stated later that he immediately ran to the port bridge wing but did not notice any other vessel in the poor visibility.

During the period from 04:45 to 04:52 h, the OOD stated later, he had tried about three to four times to state the name of his vessel and his position on VHF Channel 16 and asked whether there was anyone there who had met him or collided with him. He did not receive any answer.

At 04:52 h the OOD of Container M/V "VILLE D'ORION" called the Master and informed him of the incident. He believed that the vessel might have rammed something. He also ascertained that the radar image was disturbed due to heavy rain.

The Master of "VILLE D'ORION" came onto the bridge at 04:54 h.

The Master of "VILLE D'ORION" saw the vessel on the radar screen at 05:04 h and ascertained that it was aft abeam on the starboard side at a distance of about 4.5 sm, was steering a course of about 140°, and moving at a speed of 9 to 9.4 kn. The Master also declared that he had attempted to establish contact with the unknown vessel via VHF Radio. However, he too had not received any reply. He stated that the Container M/V "VILLE D'ORION" had not altered its course or its speed either before or after the casualty.

At 05:30 h, the OOD of Container M/V "VILLE D'ORION" stated, he made an inspection tour of the deck and at this time was not able to ascertain any damage.

Later at 07:00 h the ship's mechanic of Container M/V "VILLE D'ORION" discovered the damage to the port side of the vessel.

The Container M/V "VILLE D'ORION" reported the collision via the DSC Marine Emergency System at 10:45 h.

The US Coast Guard (USCG) conducted a monitoring flight and contacted "VILLE D'ORION" after sight contact via VHF Radio at 12:33 h LT. The Master confirmed that he did not need any assistance and that the vessel would run into Honolulu.

During this monitoring flight the USCG also sighted M/V "TOP GLORY". The vessel was contacted via VHF Radio at 13:04 h LT and damage to the starboard bow of the vessel was ascertained. The Master of the vessel confirmed to the USCG aircraft that there had been a collision with another vessel but he had been unable to learn the name of the other partner in the collision. The Master rejected any assistance and reported that he would continue his voyage to the next port in Japan.

On 24 January 2003 at 07:24 h a USCG safety team went on board the Container M/V "VILLE D'ORION".

The Container M/V "VILLE D'ORION" was instructed at 07:40 h to anchor at least 3 sm off the coast since the anchorage grounds were closed as a result of strong wind conditions.

On 25 January 2003 the Container M/V "VILLE D'ORION" reached the anchorage "D" in Honolulu at 08:00 h.

The United States Coast Guard Marine Safety Office Honolulu – inspectors (MSO) went on board together with the surveyor for the classification society of "VILLE D'ORION" (Germanischer Lloyd), the owner's representative and the agent at 09:00 h. The surveyor of the classification society of M/V "TOP GLORY" also accompanied them.

The MSO Honolulu personnel left the vessel at 16:00 h.

On 26 January 2003 at 08:00 h the Container M/V "VILLE D'ORION" entered the port of Honolulu and went alongside at Pier 1 in order to have the emergency repairs carried out to the port shell plating.

The emergency repairs were completed on 27 January 2003. The Container M/V "VILLE D'ORION" left Honolulu in the direction of Los Angeles, California, USA. The USCG Test Report on the repairs carried out is recorded in the document MISLE Vessel Inspection Activity – No.: 1739972.

These statements were made to the BSU in writing by the Chief Mate, his deckhand on watch and the Master of the Container M/V "VILLE D'ORION".

Figure 3, Emergency repair to the Container M/V "VILLE D'ORION" at the Pier in Honolulu



Figure 4, Damage to the port side of Container M/V "VILLE D'ORION"



4.2 Statement by MAIS/Hong Kong on the course of the casualty

On 23 January 2003 at about 02:35 h LT the vessel "TOP GLORY" registered in Hong Kong collided with the port side midships of the vessel "VILLE D'ORION" registered in Germany.

In this collision the "TOP GLORY" was damaged on its starboard bow and "VILLE D'ORION" on its port side midships.

Shortly before the collision "TOP GLORY" had been steering a course of 154° and was travelling at a speed of 8 to 9 kn.

At about 01:35 h LT "TOP GLORY" had altered its course to 154° and maintained this course up to the time of the collision. Because of the poor weather and reduced visibility the vessel had not been able to maintain its normal cruising speed of 13 kn.

According to the information supplied by MAIS it had not been possible to locate the "VILLE D'ORION" on the radar sets of "TOP GLORY" because of the high sea and heavy rain showers and the fact that the radar plotter was set for sea and rain. At the time of the collision visibility had been badly reduced and it had been raining heavily. The watch crew on the bridge of "TOP GLORY" had been able to make out "VILLE D'ORION" optically at close quarters directly ahead shortly before the contact.

Directly after the collision the German vessel had been located on the ARPA radar screens of "TOP GLORY", with an easterly course and a speed of 20 kn. After the collision "VILLE D'ORION" had not altered course at all.

The bridge watch on board "TOP GLORY" had been manned by the Second Officer and his deckhand on watch for the watch 00:00 to 04:00 h. The Master had been resting in his cabin. All the navigation lights had been operating properly and the vessel had been steered by hand at the time of the collision.

The weather conditions had been very poor. The collision had occurred during SW winds between 9 and 10 strength, heavy showers and reduced visibility.

No sound signals had been heard on board "TOP GLORY" and none had been given. Because of the poor sea conditions it had not been possible to locate any further vessels in the radar close area.

There had been no radio contact between the two vessels via the VHF Channels.

4.3 Navigational equipment of the Container M/V "VILLE D'ORION"

The following navigational aids were available to the command of the vessel and were in use at the time of the collision: British Sea Chart No.: 4809

2 radar sets:

STN ATLAS Marine Electronics	
9600 TM / X-Band	BSH/27/ 01867/ 4 / 91 without "G.Z.A."
9600 ARPA / S-Band	BSH/27/ 01867/ 3 / 91

1 log/speedometer:

STN ATLAS Marine Electronics	
Dolog 23	BSH/27/04230/85

1 tracking system:

STN ATLAS Marine Electronics	
NACOS 25 – 2	BSH/27/31003/96

2 satellite navigation systems:

STN ATLAS Marine Electronics	
NT 200	BSH/29/8266/2/96

1 Loran C –navigation system

Koden Electronics Co.	
LRX 22P	BSH/187/03127/90

1 gyro compass set:

Cassens & Plath	
Navigat XII	BSH/40/32G/92

1 autopilot:

Cassens & Plath	
Navipilot AD II	BSH/40/40S/92

1 echo sounder system:

STN ATLAS Marine Electronics	
Echograph 481	BSH/27/26E/4/82

4.4 Weather conditions

4.4.1 Data from the logbook and according to the statements of the crew on watch duty of Container M/V "VILLE D'ORION"

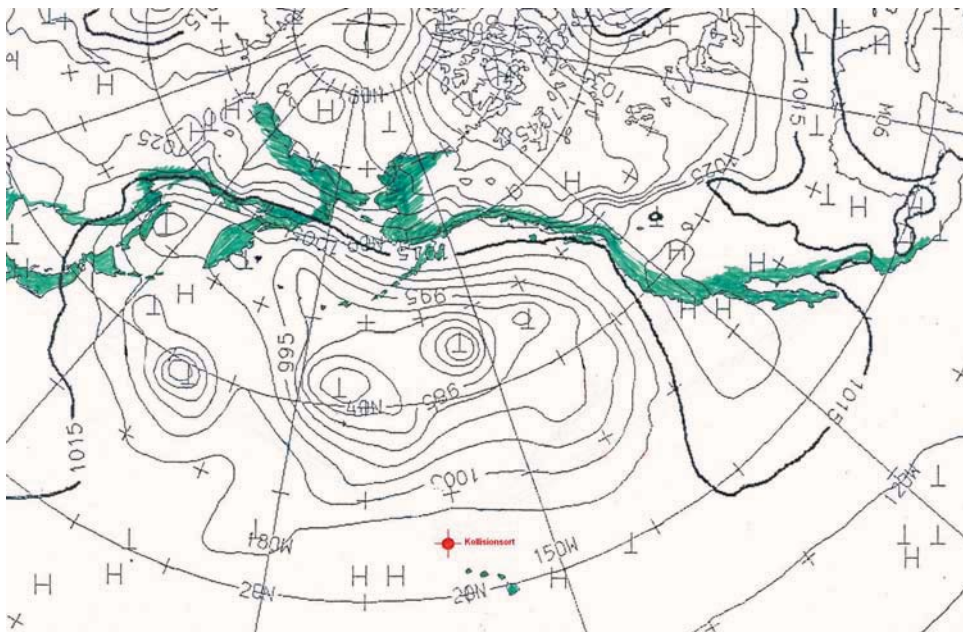
The visibility was less than 0.5 sm. At times the mast on the foreship could not be seen from the bridge due to the poor visibility caused by heavy rainfall. The wave height was ~7 m, with heavy rain showers an outdoor temperature of about 20°C was measured.

4.4.2 Expert opinion by Deutscher Wetterdienst (DWD) of April 2003

To assess the weather situation Deutscher Wetterdienst (DWD) had six-hourly ships' weather observations from the Mid-North Pacific available from international weather data exchange services. In addition DWD could access three-hourly measurement and observation values from two weather stations on Hawaii (Kauai und Honolulu). The northern hemisphere circumpolar charts for ground air pressure distribution published by the European Centre for Medium-term Forecasts (ECMF) in Reading, UK, and available to DWD for the dates 01:00 h LMT (12:00 h UTC) (Analysis) and 00:00 h UTC of the next day (forecast) were available to assess the weather situation in the greater sea area under review.

In the assessment of the sea conditions the sea plots issued by the ECMF (each valid as of 00:00 h UTC time) were considered in addition to the wind sea and swell data reported by passing vessels (see Weather Situation).

Figure 5, Weather situation 00:00 h UTC on 22 January 2003

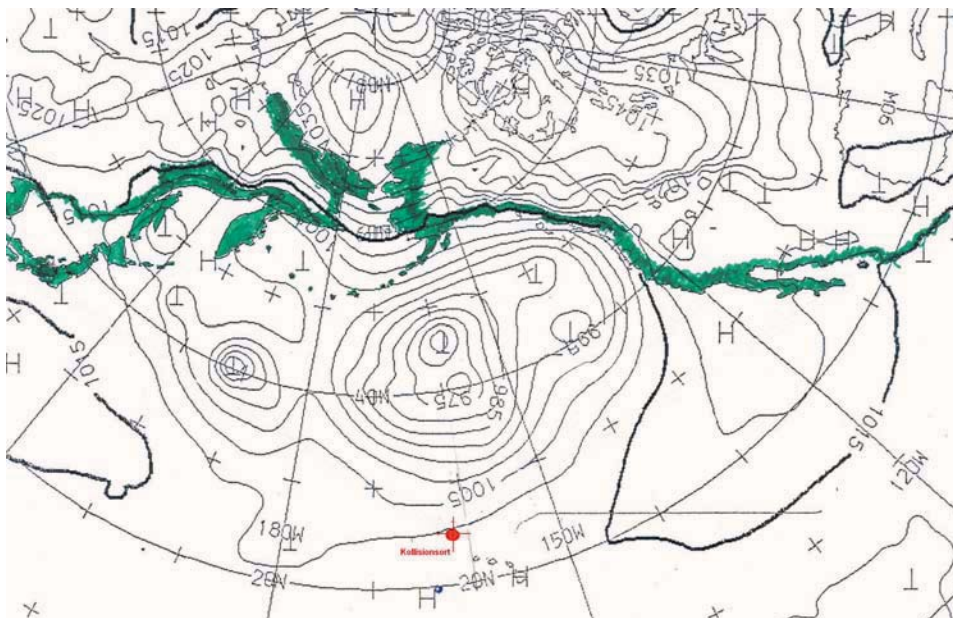


During the time 20 to 24 January 2003 the Mid-North Pacific was governed by an extensive high trough. The centre of the controlling depression area was on the ground in roughly the following positions (in each case at 12:00 h UTC analysis time).

20.01.2003	Depression 970 hPa, 45°N 162°W, E fluctuating
21.01.2003	Depression 970 hPa, 44°N 152°W, almost stationary Depression 975 hPa, 43°N 180°W, E shifting, became the controlling central depression during the next days
22.01.2003	Depression complex 970/965 hPa, between 40° and 48°N, 155° and 165°W, almost stationary
23.01.2003	Depression 970 hPa, 45°N, between 152° and 162°W, almost stationary, gradually filling up
24.01.2003	Depression 975 hPa, between 45° and 50°N, 154° and 160°W, almost stationary, gradually filling up.

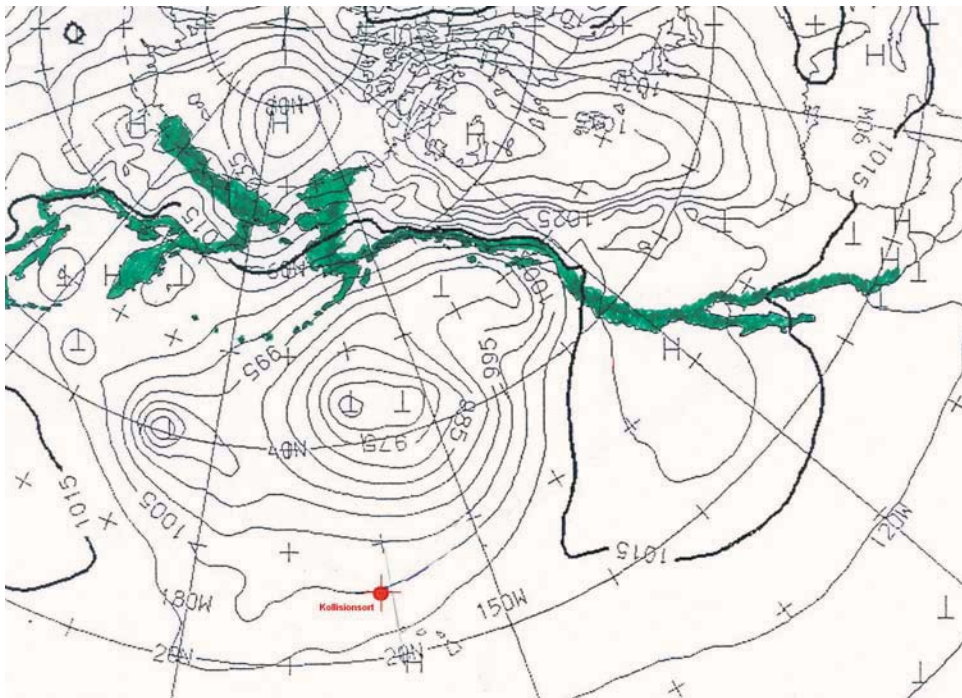
This large-scale depression complex was flanked by two areas of high pressure. The focal point of one of the high pressure areas was in the sea area of the west coast of America at about 120° to 130°W. The other, smaller area of high pressure wandered from about 180°W and 20° to 30°N by approx. 20 longitudinal degrees in a westerly direction. The exact position of the pressure structure is shown on the attached copies of the part circumpolar charts of air pressure distribution on the ground in the northern hemisphere.

Figure 6, Weather situation 12:00 h UTC on 22 January 2003



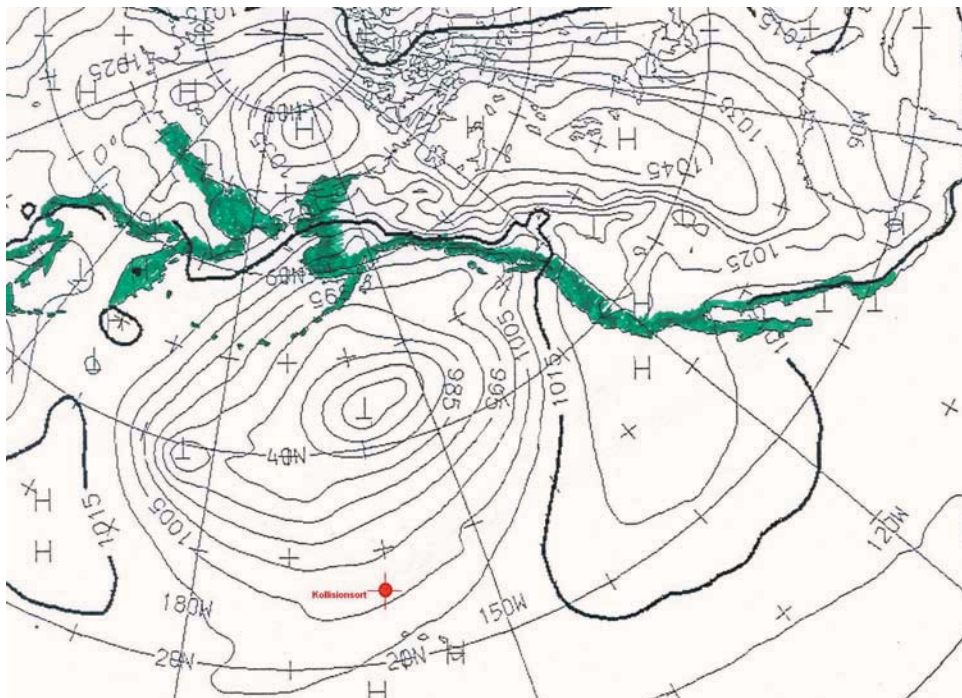
During the period 20 to 24 January 2003 there was brisk depression activity over the Mid-North Pacific. In the area of a comprehensive high trough a controlling low pressure complex controlled the weather on the ground, expanding widely in a southerly direction to about 20°N.

Figure 7, Weather situation 00:00 h UTC on 23 January 2003



In the area under review during the period from 20 to 22 January 2003 the prevailing winds came from sector SW to NW with medium strength and in intervals between 6 and 8 bft.

Figure 8, Weather situation 12:00 h UTC on 23 January 2003



For 23 January 2003 it was possible to carry out a precise analysis of the wind, weather, visibility and sea conditions over six hours thanks to the recording of the concrete vessel position.

4.4.3 Sea conditions

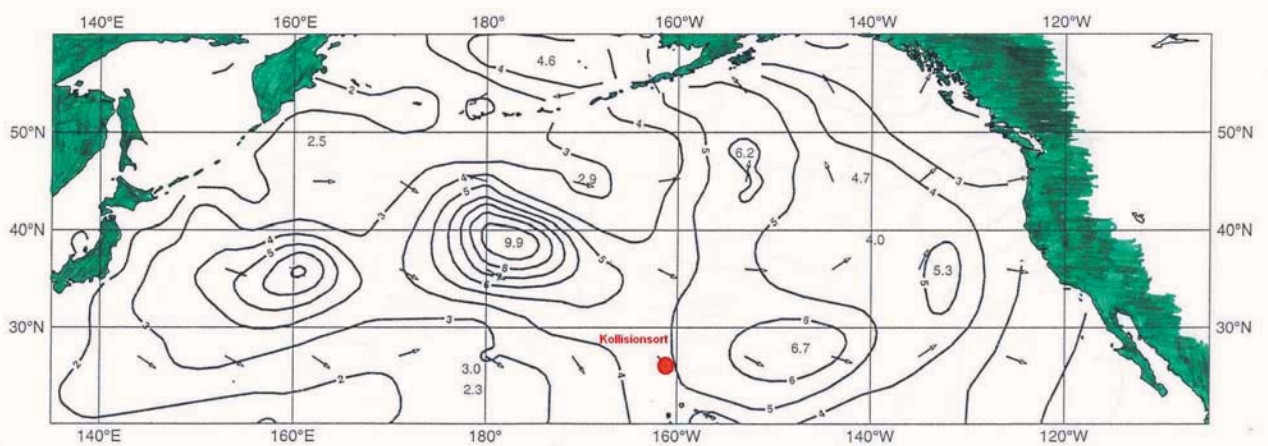
In accordance with this analysis the following weather conditions prevailed between 00:00 h and 12:00 h UTC:

Wind from SW between 6 and 7 bft, moderate to light drizzling rain, visibility 1 to 2 sm, wind sea height 3.0 to 3.5 m, wind sea period 6 to 7 sec., swell from WSW at a height of 4 m, swell period 10 to 11 sec., sea height 4.5 to 5.5 m.

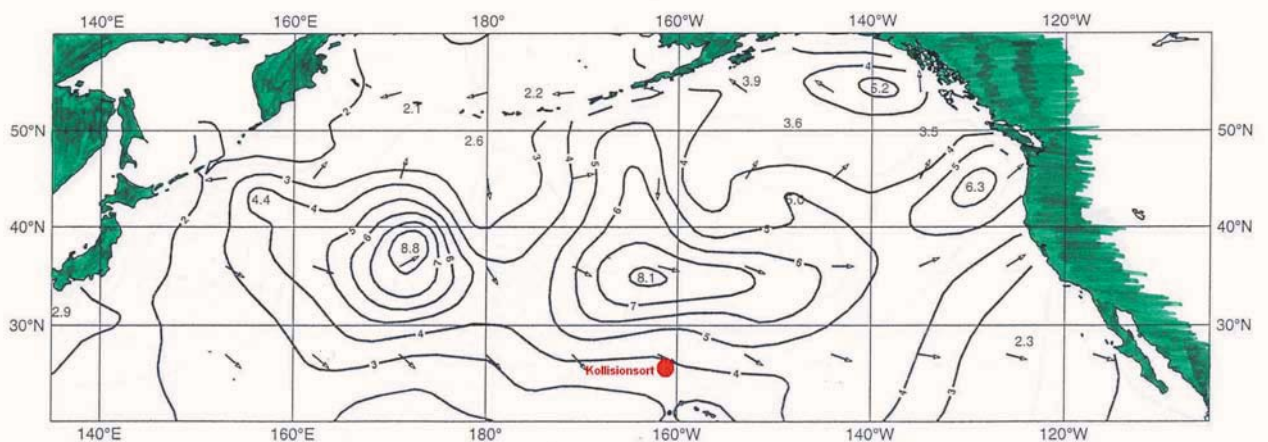
The sea area under review lies between 20°/50°N and 150°/180°W.

(Sea plot from the sgglo model, wave height above 2.0 m on 22 January 2003/ 00:00 h UTC)

(Sea plot from the sgglo model, wave height above 2.0 m on 23 January 2003/ 00:00 h UTC)



(Seegangsplot vom Modell sgglo, Wellenhöhe über 2,0 m vom 23. Januar 2003/ 00:00 Uhr UTC)



The characterising wave height of the sea results from the wind sea and the swell. The wind sea runs from the direction from which the wind blows. The swell is triggered in the neighbouring or more distant sea areas and can thus come from a different direction than the wind sea.

5 Summary of the investigations

The investigations by the Federal Bureau of Maritime Casualty Investigation (BSU) had to remain fragmentary since no information on the course of the collision between the vessels could be learned from the command of the bulk carrier "TOP GLORY". The IMO -Marine Accident Report was not filled in and the letters from BSU to the operator of "TOP GLORY" in Hong Kong were not answered. The information from the Marine Accident Investigation Section/Hong Kong (MAIS) was scanty, incomplete and leaves many doubts open. Nor was it possible to learn from whom the information supplied by MAIS originated.

The statements by the command of "VILLE D'ORION" and USCG in Honolulu submitted to the BSU could not be used unrestrictedly to clarify the course of the incident, but were instead only suitable to a limited extent.

"VILLE D'ORION" stated the time of the accident as 04:45 h LT (-11 hours). As regards "TOP GLORY" the collision occurred at 02:35 h LT (-11 hours).

The sunrise at the scene of the collision on 23 January 2003 was at 06:32 h LT.

The port of San Marcos in Chile, from where "TOP GLORY" had reportedly come on its way to Japan according to the investigations by the USCG, could not be located on the Chilean coast. Accordingly BSU investigated further and found a port with the name San Marcos Island/Mexico (27°11'N 112°06'W) which is in Bahia de California and could certainly take vessels at the size of "TOP GLORY". Here too no clarifying information could be obtained from the Mexican authorities to whom BSU wrote. No information about the route of the vessel could be obtained from either the operator in Hong Kong or from MAIS.

"VILLE D'ORION" could describe the course of its voyage from Pusan, Korea, to Los Angeles, USA, plausibly without any doubt.

No information could be obtained from "TOP GLORY" about the weather conditions at the time of the collision. MAIS stated that at the time of the collision there had been very poor weather with wind forces 9 to 10 bft from south-westerly direction with heavy rain showers and reduced visibility.

The statements by the officer on duty and his deckhand on watch on board "VILLE D'ORION" about the weather conditions prevailing at the time of the collision were compared with an expert opinion issued by Deutscher Wetterdienst (DWD).

Both stated, that the visibility was so poor, in other words less than 0.5 sm, and that it had not been possible to see the mast on the foreship anymore. It had not been possible to see anything from the port bridge wing after the felt contact with "TOP GLORY" either.

The statement by MAIS that the command of the "TOP GLORY" had been able to see "VILLE D'ORION" optically at close range shortly before the collision is interesting here.

No sound signals were given by either vessel. According to the statements by MAIS the crew on watch on "TOP GLORY" had not heard any sound signals prior to the collision either. The crew on watch of "VILLE D'ORION" made the same statement.

It was not possible to clarify clearly whether the watch operation was changed after switching off the "Guard Zone Alarms" on the radar sets of "VILLE D'ORION" and actions were taken in accordance with Rule 6 of the Collision Prevention Rules in conjunction with Rule 19, which require reduction of speed (own speed) under reduced visibility.

According to the information supplied by MAIS the Container M/V "VILLE D'ORION" passed M/V "TOP GLORY" at a speed of 20 kn. "TOP GLORY" had only been travelling at a speed of 8 to 9 kn over ground because of the poor weather.

With the rain density described by DWD, moderate to light drizzle, no attenuation making radar reception impossible was to be expected at the time of the collision. The possibility that the radar sets were not optimally adjusted as regards the automatic acquisition functions cannot be ruled out completely.

The "Guard Zone Alarm" was switched off on board "VILLE D'ORION" since it continuously gave off an acoustic and optical alarm as soon as a rain cloud or a high wave came into its range.

It was not possible to evaluate sufficiently from the incomplete remarks by the officer on duty (OOD) exactly how the radar sets were adjusted to the weather conditions on board "VILLE D'ORION", to establish the cause, and to assess the behaviour of the other party to the collision. Further questions concerning the IMO-Sea/Marine Accident Report Form presented and a selected catalogue of questions by BSU have not been answered.

It has not been possible to date to clarify which ARPA radar sets were switched on on board "TOP GLORY" at the time of the collision, what make these were, who operated them and how they were set, when they were last serviced, and many other open questions in this connection.

According to the statement by MAIS the "VILLE D'ORION" passed "TOP GLORY" at a speed of 20 kn. How was it possible to make this statement so definitely if other vessels were not sighted on the radar screen? The speed of the other vessel can only be determined by good radar observation. Was "VILLE D'ORION" possibly plotted earlier on the radar screen of "TOP GLORY" after all?

The radar ranges of 3 and 6 sm set on board "VILLE D'ORION" were set too low for weather conditions such as prevailed here. At an own speed of 20 kn and an assumed speed of the approaching party of approx. 9 kn, with the routing stated here we have an encounter speed of approx. 29 kn.

It can be derived from this that it would have been possible to locate the other party to the collision on the outer 6 sm radar spacer ring and from this moment the vessels would only have approx. 12 minutes time to evaluate the radar image and collide. Up to clear recognition of the party coming from the starboard side the time would normally have been too short to take evasive action with a starboard rudder manoeuvre in accordance with Rules 7 and 8 of the Collision Prevention Rules. With this possible collision variant it is presumed that "TOP GLORY" was steering a course from South America to Japan.

With a starboard rudder manoeuvre both vessels would have made contact port to port and in this case "TOP GLORY" would have been damaged at its port foreship. However, its bow was damaged on the starboard side.

A last minute manoeuvre with the starboard rudder on board "VILLE D'ORION" was therefore very improbable.

According to the remarks by the Master of "VILLE D'ORION" the manoeuvre recorder on the bridge had failed and the course data recorder had a paper blockage. Thus no suitable data can be viewed here that might have contributed to clarifying the marine casualty further. The command of the vessel did not secure the data of the electronic sea chart system either.

According to the statement by the Master of 23 January 2003 and the statement by the OOD of 25 January 2003, the Master of "VILLE D'ORION" was able to plot a vessel at a distance of approx. 4.5 sm on a course of 140° at a speed of approx. 9 kn after the collision and after adjusting the radar sets and when the rain decreased.

The remarks by MAIS state that "TOP GLORY" was steering a course of 154° before the collision, and that its foreship was damaged on the starboard bow on contact with "VILLE D'ORION".

The course of 154° leads to South America and not to Japan. According to the information by the USCG aircraft scout who had radio contact with the Master of "TOP GLORY" after the collision, the latter proposed to continue his voyage to Japan.

It is possible that in order to withstand the heavy sea conditions "TOP GLORY" turned on an opposite course because of the poor weather conditions. The heavy sea running from aft from a south-westerly direction had evidently been too much for "TOP GLORY" for a course to Japan in the long term.

It was planned to take up the course to Japan again following improvement in the weather. This could explain why the vessel was sighted on an opposite course. However, here too we can only make suppositions.

No clarifying information on the radar observations prior to the collision were obtained from the two officers on duty.

On the VHF channels the attempts by the command of "VILLE D'ORION" to call remained unanswered. MAIS made the same remarks.

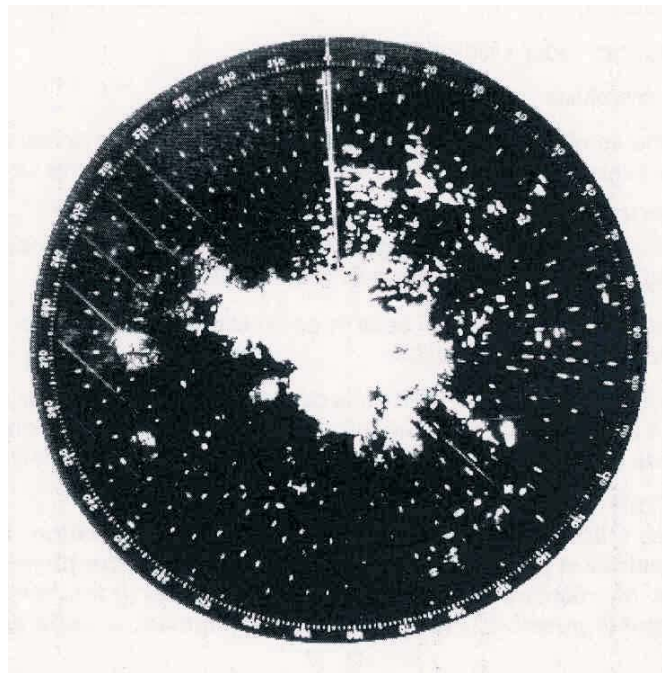
6 Radar image position observation under poor weather conditions (rain, hail, snow and sea)

6.1 X-Band-Radar image display:

The radar image shown below shows a radar display impaired by a heavy rain shower.

Dense raindrops, snow and hail showers can impair the radar radiation emitted so heavily, especial in 3 cm long X-Band radar waves, that the range is drastically reduced and even major radar echoes are not visible in this zone. By bringing in the FTC reflecting edges are emphasized. With this function the outer edge of the precipitation field, as well as targets in the precipitation field, are emphasized. Despite this, this technology does not make it possible to increase the reduced range due to range attenuation existing under normal propagation conditions. In particular in the case of very heavy tropical rain showers it is quite possible that no useful radar targets can be distinguished from the rain.

Figure 9, Radar display 1



(Example of disturbances on the radar screen caused by heavy rain)

6.2 S-Band-Radar display analysis:

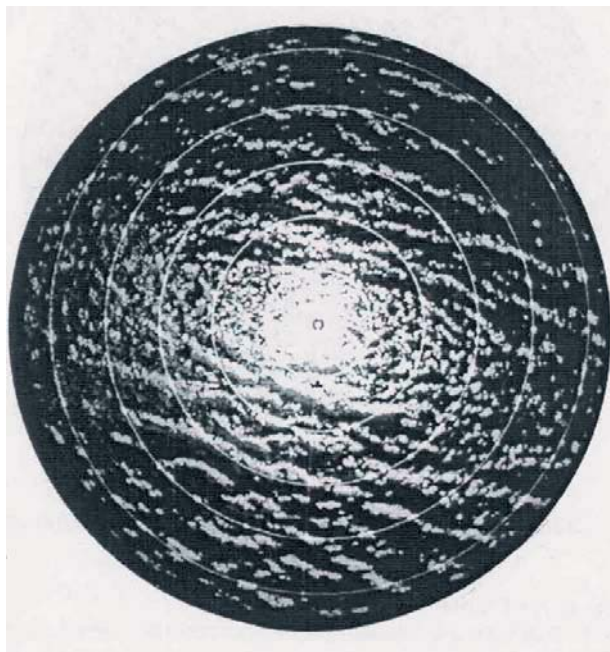
In the 10 cm radar wave section it is customary that an analysis of an S-Band radar display is more successful under heavy rainfall, since the longer radar waves can "look through" the rain area better.

Thus radar target behind the rain cloud can certainly be recognised and the same applies for hail and snow conditions. Despite this it must be conceded that in the case of very heavy rain showers a sudden loss of radar target can occur. Because of its longer wave frequency by comparison with the 3 cm X-Band radar, the S-Band radar set remains the better "bad weather radar" but requires continuous observation and analysis of both radar sets in operation at the same time with different radar visibility ranges. Given the quality of the radar set on board it is certainly possible to plot another vessel/approaching echo if the ARPA radar set is operated and analysed continuously (e.g. S-Band), even when there is a drizzle rain cloud.

6.3 Interference by sea reflection in X- and S-Band radar sets:

This interference depends on the height of the antenna of the radar set, the sea height and the wave period. This problem can be processed with the switch "sea decluttering".

Figure 10, Radar display 2



(Presentation of a radar display without the sea decluttering switched on. The course of the waves against the vessel can be seen well. Dark to light centre point. Radar target difficult to recognise in the wave echoes.)

When the sea decluttering (STC) is used the necessary reception energy level is raised. This can suppress weak radar targets or only display them on the radar screen after two to three radar antenna revolutions. This means that the radar operator must concentrate fully on the radar screen.

6.3 Automatic target recording

In automatic target recording heavy sea reflections and dense rain fields are acquired as targets. This occurs especially when they are present over a certain period, for example six antenna revolutions. As a result a large number of error echoes are shown by the radar computer as "useful goals to be plotted".

Since these sea reflections are only short-term error echoes they are alerted as a "lost target" after a short time. Rain areas are frequently of a constant nature, but can behave in a similar fashion.

7 Result of the investigations

The data of both vessels regarding the time of the accident are two hours and ten minutes apart.

The course of the journey of "TOP GLORY" is not clarified.

Neither the command of "TOP GLORY" nor its operator management provided information on the collision.

The official letters from BSU to the operator were not answered.

The IMO Marine Accident Report Form sent to the operator was not completed or a copy returned to BSU.

The weather conditions were described differently by the two vessel commands also.

It is also not clarified why the crew on watch on "TOP GLORY" could make out "VILLE D'ORION" visually prior to the collision, while on board "VILLE D'ORION" the other party in the collision reportedly could not be seen.

We also ask why neither vessel gave sound signals, despite the reduced visibility.

MAIS and the crew on duty on "VILLE D'ORION" stated they had not been able to locate any vessels on the radar screens because of the poor weather.

It remains unanswered how it was possible to ascertain on board "TOP GLORY" that "VILLE D'ORION" passed their bow at a speed of 20 kn. This knowledge could only have resulted from plotting the vessel. In this case it must have been possible to locate the vessel on the radar screen.

On the basis of this assumption it can also be presumed that the acoustic and optical Guard Zone Alarm on board "VILLE D'ORION" might have reported a vessel, in other words "TOP GLORY".

According to the expertise by DWD the rain conditions could not have been so bad that ships of this size could not have been made out on the screen with careful radar observation. This is also stated in the expert opinion by the Bundesamt für Seeschifffahrt und Hydrographie (Federal Maritime and Hydrographic Agency).

Since only very little information could be obtained from M/V "TOP GLORY" and the data by the OOD of "VILLE D'ORION" regarding the radar image analysis were inadequate, it was not possible to draw up any complete analysis of the incident.

It is also not clear why the speed was not adjusted accordingly on board "VILLE D'ORION" in view of the allegedly poor visibility.

No further information could be obtained for final clarification of the incident.

8 Analysis

The cause of the accident was that the officers on duty on both vessels did not carry out proper radar observation prior to the collision.

In radar observation, especially under poor weather conditions, it is necessary to work continuously. Both radar display sets are to be analysed together and the radar ranges must be observed alternately. A radar visibility range on one radar set of 3 sm and on the second set of 6 sm at an own speed of 20 kn is too low.

There should have been off-centre setting and continuous observation in the 12 sm range of the radar display of the S-Band radar set and this would certainly have been more successful.

Moreover the Guard Zone Alarm was switched off on "VILLE D'ORION", even though the alarm was sounding. In the investigation doubts arose as to whether "TOP GLORY" could have been located and plotted in drizzle rain after all. The data on the radar observations on board "VILLE D'ORION" were regrettably not detailed enough for a specific assessment of these conditions. This naturally also applies for the command of "TOP GLORY". Enquiries remained unanswered.

Despite this automatic recording of the target should only be activated up to certain sea conditions under which it is ensured that it is still possible to distinguish safely between useful signals and interference signals with the radar sets used.

It should be mentioned that both vessels could have seen each other on the screen, even in a rain cloud, if they had both been equipped with AIS (Automatic Identification System). The other vessel would have been visible as an AIS signal and it would have been possible to call up the data. These new modern techniques are offered by manufacturers today on radar sets and electronic sea chart systems of the new generation within the framework of the collision prevention rules. Even older radar sets such as e.g. ATLAS 9XXX can reportedly be retrofitted for displays of AIS targets. The manufacturer advises that this will be possible by 2004.

Naturally the precondition for this would have been proper settings of the radar sets.

Finally it remains to be stated that at reduced visibility on both vessels they evidently did not travel at a safe speed and did not give any sound signals either.

Moreover one lookout might not have been enough on board "VILLE D'ORION", since on board "TOP GLORY" the other vessel was sighted optically before the collision.

The fast development of electronic navigation aids makes it very difficult for ships' crews to keep pace with the corresponding technical knowledge. Different manufacturers, makes, modes of operation and service of the products on the market do not make it any easier for the navigators. Regular refresher training of ships' crews could take these circumstances into account.

Securing data in navigation systems such as electronic sea chart and tracking systems after a collision should be included in the training of bridge watch staff.

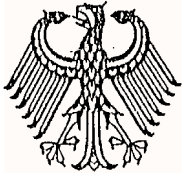
9 Sources

The investigation report relates to the investigations of the Federal Bureau of Maritime Casualty Investigation (BSU) and

- Expert Opinion by the Bundesamt für Seeschifffahrt und Hydrographie – Hamburg, with extracts from the Operating Instructions Radar ATLAS 9XXX, Doc.-No.: ED 3024 G711, Issue: 02 (2002-06)
- Expert Opinion by Deutscher Wetterdienst
- Accident Record Report of the United States Coast Guard
- Information from Marine Accident Investigation Section / Hong Kong (MAIS)

The investigation was conducted in conformity with the law to improve safety of shipping by investigating marine casualties and other incidents (Marine Safety Investigation Law - SUG) of 24 June 2002. According to this the sole objective of the investigation is to prevent future accidents and malfunctions. The investigation does not serve to ascertain fault, liability or claims.

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Bundesstelle für Seeunfalluntersuchung
Federal Bureau of Maritime Casualty Investigation
Bundesoberbehörde im Geschäftsbereich des Bundesministeriums
für Verkehr, Bau- und Wohnungswesen

18 July 2003

Supplement to the
Summary
Investigation Report No. 19/03

Serious Marine Casualty:

Collision

CMV "VILLE D'ORION"
and
MV "TOP GLORY"

on 23 January 2003 near Hawaii

After completion and printing of the Investigation Report the BSU (Federal Bureau of Maritime Casualty Investigation) received the completed additional catalogue of questions from the First Officer on Duty of "VILLE D'ORION" on 16 July 2003. This Supplement to the Investigation Report is necessary in order to ensure the greatest possible objectivity, but it alters nothing in the summary of the results and the analysis of the report.

The 1st OOD of M/V "VILLE D'ORION" supplied the following further information in his statement of 8 July 2003:

All the information provided in the datasheets had been supplied to the best of his knowledge and belief.

He had appropriately filled in the datasheets/forms that he had received on board and that had concerned him personally. He had been unable to answer some questions regarding data as he wanted to avoid sending incorrect data from the vessel. The Captain had intended to forward subsequently any data that might be missing and that had not been accessible to the 1st OOD at the time of completion of the forms. This had been the information supplied to him (the 1st OOD).

Note by BSU:

The Master of VILLE D'ORION made these remarks to BSU in his letter of 10 June 2003. His remarks were considered in the Investigation Report.

The IMO Standard Lists of questions stated with details concerning the second radar set etc. had not been available to him at this time. It had not been his intention to fill in the forms incompletely. He had no longer been able to complete them due to being prematurely relieved by the vessel operator.

In answer to the individual questions he stated the following:

The autopilot had been in operation at the time of the marine casualty. The engine telegraph had been switched in such a way that it engaged in the individual speed stages. The navigational equipment on the bridge had been checked prior to leaving the last port with the aid of the "Bridge Clear" checklist, with periodic weekly checks in accordance with ISM-Titan Maintenance, and at the start of each watch. The vessel had not been running with the track guidance system NACOS 25-2 on board. Nor was there any electronic sea chart system on board.

He only located the other party in the collision for the first time after the rain front had passed at a distance of about 4.5 sm, after the accident had already occurred. At the same time he had been able to make out the vessel visually. All attempts to enter into contact with the vessel had been unsuccessful.

The course data recorder had not been in operation and it had only been switched on in manoeuvre operations.

Note by the BSU:

According to the statement by the Master this unit had become unfit for use due to paper blockage.

The engine recorder had been switched on.

The collision alarm had not been switched off on the radar sets. CPA had been set to 1 sm and TCPA to 12 min.

Note by the BSU:

During the questioning by USCG in Honolulu the 1st OOD had stated that he had not used the collision alarm because of the bad weather and the sea and their excessively strong clutter.

In this report it was also stated: The Chief Mate disabled the collision alarm on the ARPA due to false alarming caused by the heavy weather.

Is it possible to rely on the automatic plotting procedure/target tracking and the setting of the CPA and TCPA in the given poor weather conditions?

The 1st OOD also stated to the BSU:

Two radar sets had been in operation in different ranges and under permanent observation. Radar set 1 in the 6 sm range and radar set 2 in the 3 sm range. Both radar sets had been finely adjusted manually. Moreover there was short-term switching to the 12 sm range in order to be able to make out any other objects. This was done standing and sitting, but mainly sitting because of the heavy rolling motion of 20°. The night visibility conditions had been strongly influenced, with reduced visibility due to heavy rain showers. Although the rain clutter had been switched on, the rain clouds could be seen up to 12 sm away on the radar screen. The rain and sea anti-clutter control had been finely adjusted by hand. The automatic target checking had been acquired and he had selected a "centre" and "off centre" display on the radar screen. Navigation had been carried out with the GPS sets 1 and 2 on an hourly basis.

The deckhand on watch had started his watch at 24.00 h. The deckhand on watch regularly allocated for the 04.00 to 08.00 h watch had been engaged in daytime service.

A manoeuvre printer for the engine had been in operation, but no rudder indication recorder.

Operating checks of all navigational and technical equipment had been carried out. In response to the question as to how the Chief mate could make a statement that "visibility had been less than ½ sm" if the visibility was so poor, the 1st OOD replied that he had not made the statement in this way. At the time of the accident the visibility had been virtually zero due to the heavy rain shower. The forward mast could no longer be seen.

Note by the BSU:

The statements to the USCG said: Chief Mate and Lookout stated following weather conditions: visibility 0 - 5 miles, seas 7 metres, wind SSW bft force 7 - 8 (28 - 40 knots), skies- passing heavy rain - temp – 20 degrees.

Due to the prevailing weather conditions, high swell/sea with constant rolling amplitudes of up to 20°, the engine had not been running at full power at the time of the casualty. The Master had not instructed tracking of the vessel. However, the USCG had been requested for assistance in the search for the other party in the collision.

Because of the heavy rolling of the vessel (up to 20°) and the high swell the first inspection could not be comprehensive for safety reasons. That was why a renewed inspection had been carried out 1 ½ hours later during daylight after sunrise in which it had been necessary to bend very far over the railing in order to be able to see the damage.

The 1st OOD stated that he had answered all questions subject to reservations to the best of his knowledge and belief.

Due to the lack of documents that he did not have available on his new vessel he was unable to answer all questions precisely. He was available for further questioning after his period on board.

Signed 1st OOD "VILLE D`ORION"