



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

Investigation Report 234/03

Very serious marine casualty

Foundering of SY DEERN
following a collision with an unknown vessel
northeast of Rügen
in the night of 3 August 2003 to 4 August 2003

20 March 2004

Table of contents

1	Summary of the marine casualty	3
2	Scene of the accident.....	4
3	Vessel particulars and photos	6
4	Course of journey / course of accident	7
5	Salvage of the yacht.....	8
6	Summary of damage / photos of damage.....	10
7	Analysis	12
8	Recommendations	15
9	Sources	16

List of figures

Figure 1: Scene of the accident - Overview.....	4
Figure 2: Scene of the accident - details	5
Figure 3: SY DEERN	6
Figure 4: Photo of damage - view from the front.....	10
Figure 5: Photo of damage - view to the forward part - interior.....	11
Figure 6: Photo of damage - view from aft.....	11
Figure 7: Sketch of the collision.....	13

1 Summary of the marine casualty

On 3 August 2003 during the period between approx. 23:45 h and 24:00 h CEST the German sailing yacht DEERN collided between the positions 54°40.6'N 13°59.0'E and 54°40.83'N 14°02.76'E outside German coastal waters with an unknown vessel that fled from the scene. The sailing yacht was on a passage from Karlshagen, Usedom, to Rönne, Bornholm, and was crewed by the owner as skipper and his wife.

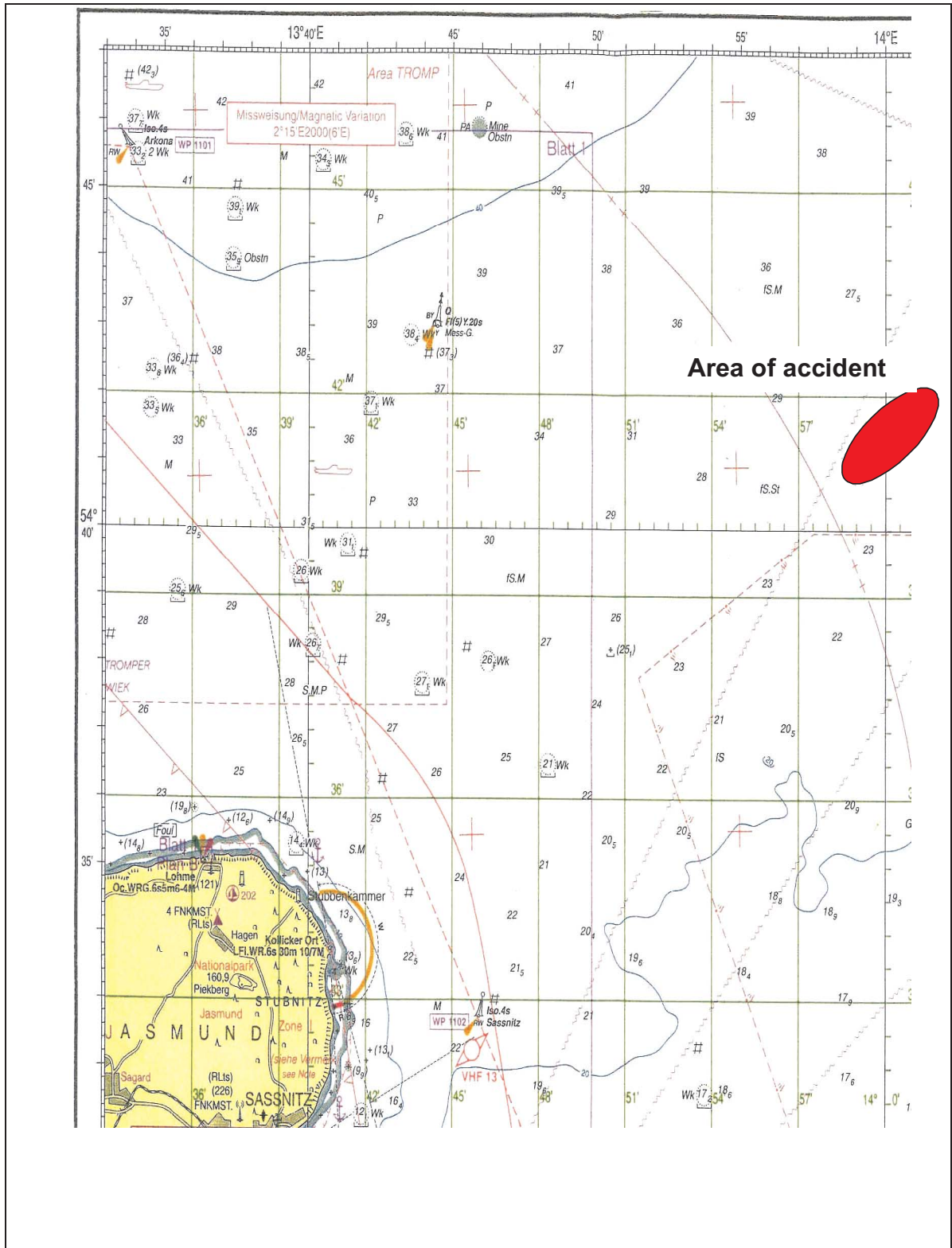
As a consequence of the collision SY DEERN sank with the skipper's wife who was resting below deck. The skipper who was on deck, was flung overboard and was rescued 11 hours later by chance by SY JAN.

Directly after the skipper was rescued the Maritime Rescue Co-ordination Centre (MRCC) Bremen was notified of the marine casualty and the search for the missing wife was started.

By decision of the German Sea Rescue Service (DGzRS) search leader the search was discontinued without success at about 19:10 h on 4 August 2003.

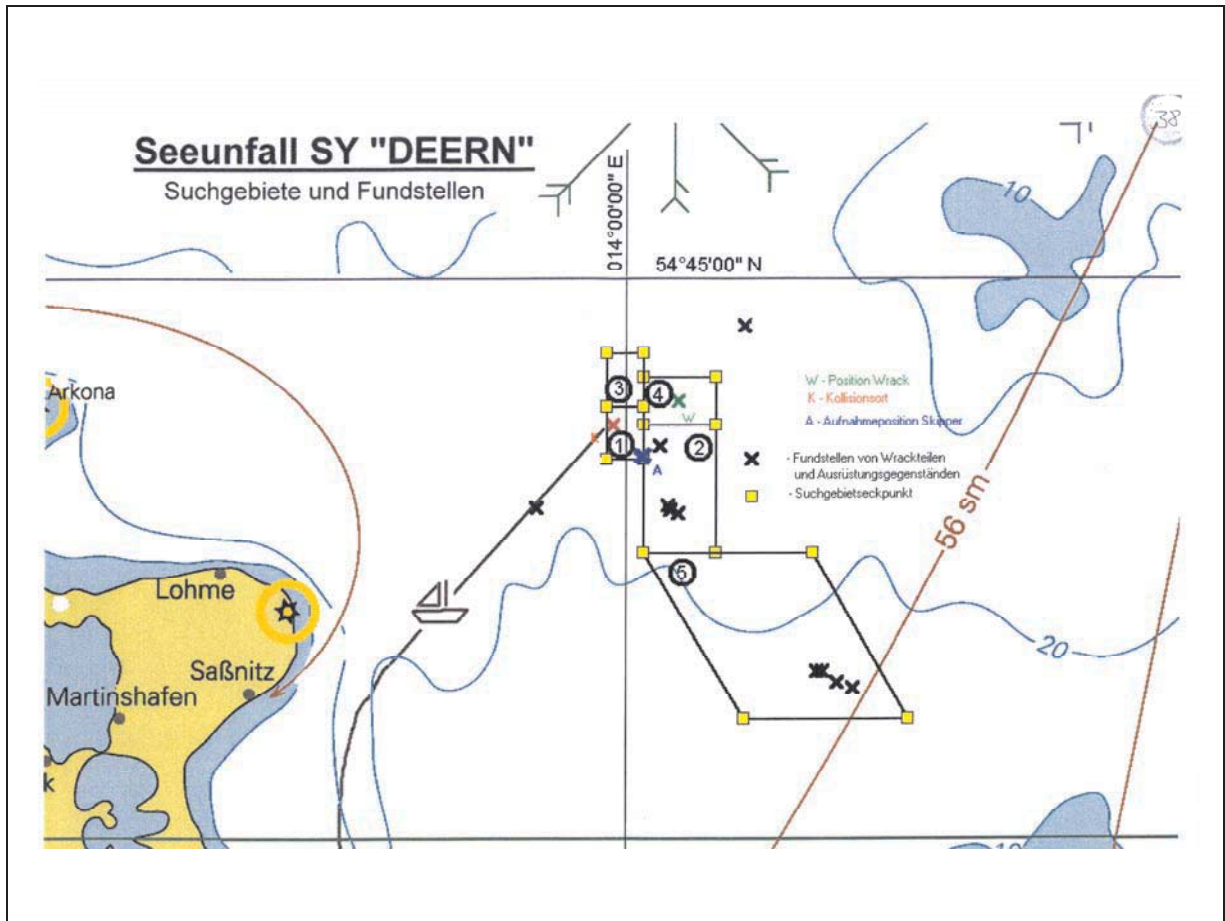
The other party to the collision had not been determined up to the time of publishing this report. Investigations by the Bundesgrenzschutzamt See (Federal Border Police Sea - BGSAMT SEE) are still continuing.

2 Scene of the accident



Extract from sea chart 151 (BSH)

Figure 1: Scene of the accident - Overview



Extract from sea chart BGSAMT SEE

Figure 2: Scene of the accident - details

Marine Casualty SY "DEERN"
 Search area and locations of items found

- W = Position of wreck
- K = Scene of collision
- A = Position where skipper was picked up
- X = Places where wreck parts and items of equipment were found

Search area corner points

3 Vessel particulars and photos

Name of vessel:	SY DEERN
Port of registry:	Greifswald
Nationality/Flag:	Federal Republic of Germany
Type of vessel:	Sailing yacht "Flirt 30"
Crew:	2
Year built:	1988
Building yard:	Hull: Messrs. Stöcker, Ueckermünde – otherwise by owner
Length overall:	9.24 m
Width overall:	3.20 m
Draft max.:	1.90 m
Main engine:	Diesel, Nanni (Japan)
Engine rating:	11.04 kW
Speed:	4 - 10 kn

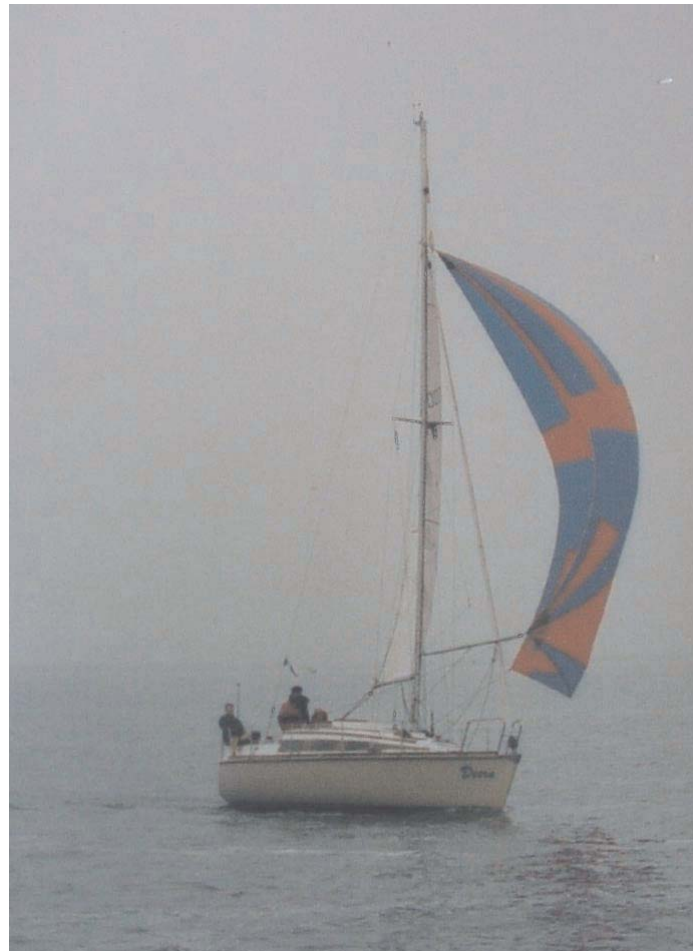


Figure 3: SY DEERN

4 Course of journey / course of accident

The day began for the married couple at about 07:00 CEST on 3 August 2003. After breakfast they took on fuel in Karlshagen and equipped out the sailing yacht for the coming holiday period. According to the statement by the skipper, the sea passage began at 11:30 h, initially under engine power and later then under sail too. The wind came from the east with a strength of Bft 2. The voyage proceeded at a speed of 2 to 5 kn in the direction of Sassnitz. The wind then turned to north and a course to Lohme as target port for the day was set.

During the sea passage none of the eight life jackets on board was worn. The VHF radio set on board was not switched on. The radar reflector was not set. No alcohol was consumed.

At about 20:00 h, according to the skipper's statement, SY DEERN was approx. 3 nm east of Stubbenkammer. In view of the favourable weather conditions it was decided to continue further to Rønne on Bornholm. The couple ate their supper at a course of 45° with a pin pilot system. At about 21:00 h they switched on the navigation lights. They sailed up to 22:00 h using the pin pilot system, and then continued under engine power. The skipper rested in the cabin from 22:30 h to approx. 23:10 h while his wife sat in the cockpit.

She did not hold any sailing certificate, since she had not applied for this after successfully passing the examination for a sailing certificate in 1987. However, she possessed practical experience due to frequent sailing with others.

A little wind rose again so that the skipper went on deck and set the sails anew and continued with the aid of the pin pilot. His wife thereupon retired to the cabin at about 23:30h. Two lights of other vessels were noticed, one on the port side ahead and the other on the port side aft of abeam. The moon had already set at 23:07 h, but despite this according to a Germany's National Meteorological Service (DWD) weather expertise visibility was very good (approx. 25 km).

The last position prior to the collision was ascertained at about 23:45 h: approx. 35 nm with a bearing of about 43° to the waypoint Rønne 55°8.8'N 14°41.6'E entered by the skipper (from the Danish port manual).

During the period from approx. 23:45 h to 24:00 h CEST the German SY DEERN collided between the positions 54°40.6'N 13°59.0'E and 54°40.83'N 14°02.76'E outside German coastal waters with an unknown vessel that fled from the scene. The bow wave of the other party in the collision pushed the port side of SY DEERN right up directly before contact, so that the yacht capsized over the starboard side. The skipper, who was on deck, was flung overboard, and his wife resting below deck went under with the yacht.

After the skipper rose up out of the water again he could only see the dark outlines of the vessel running away. At the same time he thought he could recognise the sinking mast of his yacht. While the skipper called for his wife various items drifted up from the yacht so that he was able to hold himself above water on a child's life jacket and other small items until he was found and rescued by chance at about 11:00 h on 4 August by the yacht JAN. Due to his generally good physical condition and the

prevailing environmental conditions rescue after such a long time in the water is considered plausible under medical aspects.

Directly after rescuing the skipper SY JAN notified the Maritime Rescue Co-ordination Centre (MRCC) Bremen of the marine casualty and the search for the missing wife was taken up.

After the skipper was taken over on board the Federal Border Police Boat BG 21 on 4 August 2003, he stated in response to questioning regarding the course of the accident that the collision had occurred at approx. 23:45 h at a position 35 nm southwest of Rönne with an unknown motor vessel coming from astern on the port side. At that time the course of the sailing yacht was reportedly 43°. The skipper's data were analysed in the sea chart on board the BG 21 and in this way the position was determined by latitude and longitude from the sea chart. This position was assumed on initiating the search measures and further investigations to be the most probable collision positions. Deviations from the actual position were not ruled out, however.

By decision of the DGzRS search leader the search was discontinued without success at about 19:10 h on 4 August 2003.

Up to the time of publishing this report it has not been possible to determine the other party in the collision. Investigations by the Federal Border Police BGSAMT SEE are still continuing.

5 Salvage of the yacht

During the period 4 August 2003 to 9 August 2003 four vessels of the Federal Border Police (BGS), the Federal Maritime and Hydrographic Agency (BSH) and the Shipping and Waterways Administration (WSV) as well as a helicopter were used to locate the wreck of the DEERN and thus to secure the evidence. During the search many parts of the wreck and items of equipment from the yacht were found on the surface of the water and recovered to secure the evidence.

At about 20:55 h on 9 August 2003 at position 54°40.83'N 14°02.76'E (approx. 15 nm northeast of Stubbenkammer) a wreck that on the basis of the characteristics corresponded to the foundered sailing yacht DEERN was located by sonar equipment by the BSH vessel DENEK outside German coastal waters.

This wreck was investigated by police divers from BGSAMT SEE from 08:15 h to 09:50 h on 10 August 2003 and identified as the wreck being sought. Video pictures were taken to secure the evidence.

The wreck of the yacht was lying in a northwesterly direction with its bow pointing to NW in water 24 m deep and had sustained heavy damage mid-ships on both sides. There were traces of blue paint on the portside which was not completely severed. The bow and the stern had remained relatively undamaged. The centre-board that was bent towards the starboard side of the SY had buried its way into the sea bottom according to the information supplied by the police divers and was thus not visible under the wreck.

According to the information supplied by police divers fragments of the boat hull and items of equipment from the interior were spread over the bottom of the sea both on the day the vessel was first inspected by divers (10 August 2003) and on the day the wreck was recovered (18 August 2003). The parts of the wreck spread about were collected by the salvage divers, and recovered using a recovery cage on 18 August 2003. According to the information supplied by the divers no traces of drifting were found from either the wreck or the fragments of the wreck. Drifting of the wreck on the bottom of the sea during the period 10 August to 18 August 2003 can be ruled out with almost virtual certainty on the basis of the situation.

A lifeless female person was found in the foreship of the yacht and was recovered at about 09:32 h on 10 August 2003 with a rescue cage of the BSH vessel DENEK. Extensive investigations revealed drowning as the clear cause of death.

On behalf of the Public Prosecutor's Office the wreck of SY DEERN was recovered by the Federal Border Police BGSAMT SEE during the period approx. 07:00 h to 18:20 h on 18 August 2003 from the position 54°40.83'N 14°02.76'E approx. 15 nm northeast of Stubbenkammer with administrative assistance from the Local Office for Waterways and Shipping (WSA) Lübeck. The German navy that was by chance in the same sea waters conducting diver upgrading sessions supported the salvage of the wreck with naval divers. The wreck was taken to the Federal Border Police BGSAMT SEE in Neustadt/Holstein on 19 August 2003 for securing of evidence and for criminal investigation and examination and was kept in storage there.

6 Summary of damage / photos of damage

The vessel owner's wife drowned in the sunken yacht as a result of the collision. The yacht was declared a total loss after recovery, since it had been divided into two halves by the party in the collision.

The photos were kindly made available by BGSAMT SEE.



Figure 4: Photo of damage - view from the front



Figure 5: Photo of damage - view to the forward part - interior



Figure 6: Photo of damage - view from aft

7 Analysis

As a result of the investigations it is clear that the SY DEERN was rammed on the port side midships by an unknown vessel at an angle of approx. 100° and overran after capsizing. According to the statement by the Skipper the two vessels perceived at about 23:30 h come into consideration as possible parties to the collision. The results of the BGSAMT SEE on the presumed angle of collision show that the vessel perceived aft of port abeam was most probably the other vessel involved. In any case the yacht was rammed on its port side. In so far the other party to the collision must have had the yacht on his starboard side and should have assumed that he was liable to take avoiding action in accordance with Regulation 15 of the Collision Prevention Regulations (Colreg), since SY DEERN was carrying the lights of a power-driven vessel (see below).

The yacht was found at position 54°40.83'N 14°02.76'E. In view of the difference to the approximate location of the collision, BSU has examined various theories.

First of all a current analysis by the BSH was requested for the period from 3 August to 9 August 2003, the day on which the wreck was found. This stated clearly that on 3 and 4 August the current ran on average to the west with a strength of 2.5-5 cm/sec. During the following four days from 5 to 8 August 2003, however, this current turned to north. Taking into account the fact that SY DEERN sank with its sails set, and that according to the records of the first diving inspection these sails were lying clearly open in the water, it is possible that the yacht moved further to the north on the sea bottom during these days. On the basis of calculations (with a minimum movement of 2 cm/sec), this would cover approx. 1700 m.

However, the statements by the police divers that the yacht centre-board was bent and had dug into the sea bottom appears to rule out drifting.

It is also conceivable that after seven hours of sleep the day before and not sleeping at all since 07:00 h on the day of the accident the skipper fell into a so-called "micro-sleep" directly after fixing the last position. Such "micro-sleep" of approx. 10 to 20 minutes would explain both how the other party in the accident appeared so suddenly for the skipper and the difference in distance of at most 2.6 nm between the collision position and the wreck. If this had happened, the skipper might possibly have been suddenly awoken by the noises of the vessel approaching shortly after 23:45 h and tried to take evasive action by swiftly pulling on the pin pilot, though according to his statement this no longer produced any effect. However, the skipper repeatedly refuted this supposition. Instead he admitted that he had only estimated the course and speed of the other vessel as not dangerous on the basis of the lights carried.

Further attempts to explain the difference between the stated collision location and the place at which the wreck was found are imprecise values noted for the last bearing (35 nm / 43° to Rönne), an imprecisely programmed waypoint in the GPS receiver, and also the possibility that although the DEERN sank in front of the eyes of the skipper, it might possibly have been pulled along under the water until the last connection with the other party in the collision was severed. It is conceivable that pieces of sail ropes might have become caught under the bulbous bow.

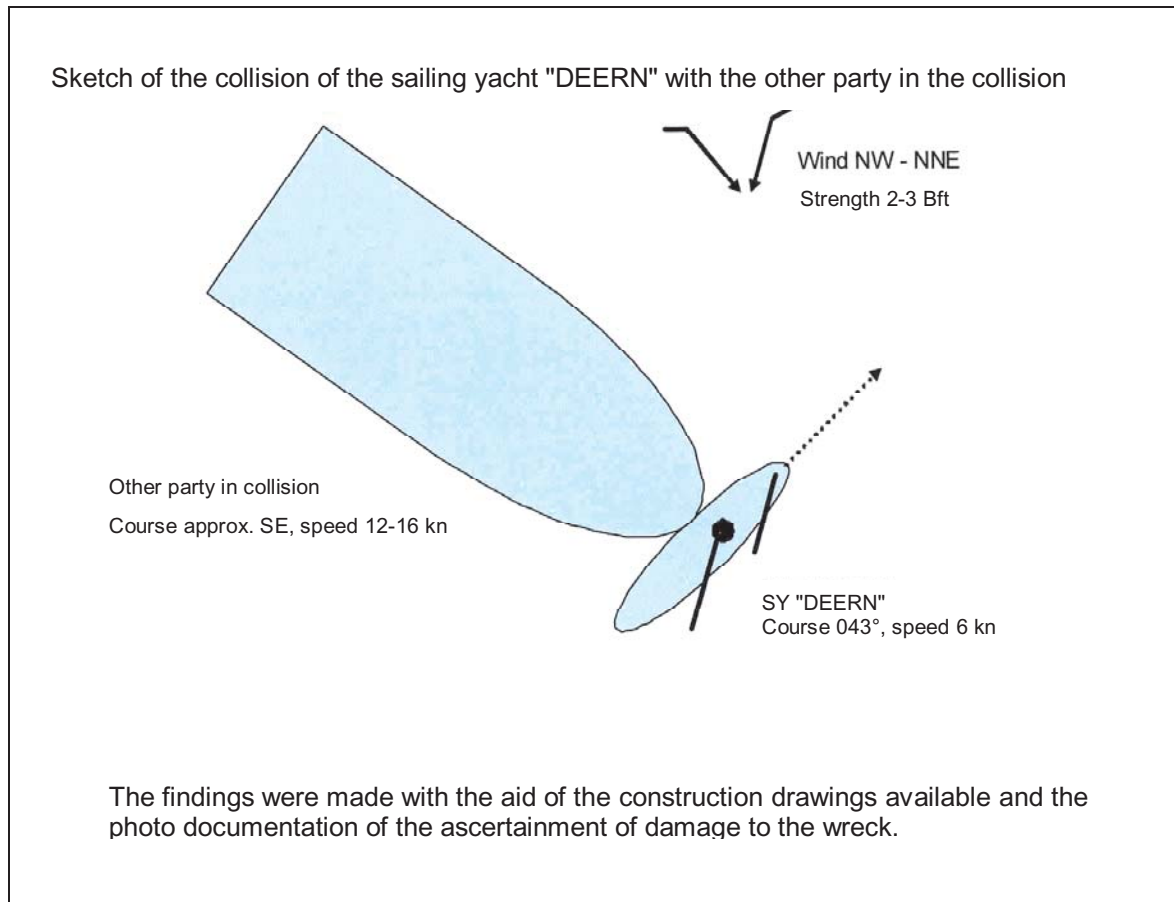


Figure 7: Sketch of the collision

An expertise on the electrical system of the wreck was drawn up by the BGSAMT SEE which documents that at the time of the collision the side lights (here in the design of a two-colour lamp approved by BSH according to Rule 21 Colreg), the masthead light on the mast, and the stern light were switched on and very probably functioning. Only the white all-round light was not operable. Regrettably it was not possible to secure the side light when the yacht was recovered so that a more reliable statement on the two-colour light cannot be made.

A further expert opinion on the lights carried by SY DEERN, prepared by BSH, confirms that all lights were fastened in accordance with approved measures. With the exception of the masthead light all the lights themselves were approved by the BSH. The top light was an outmoded light type that is no longer approved, but in this case should not have been carried by a vessel under sails. However, since it was switched on the entire lighting represented a power-driven vessel.

However, this was insignificant for the course of the accident since the ramming vessel should have taken evasive action, both under Regulation 15 Collision Prevention Regulations Colreg and under Regulation 18 (a) (iv) Colreg, and the sailing boat was the stand-on vessel.

It is remarkable that the stern light was equipped with a 25-W bulb instead of the specified 10-W bulb, so that accordingly its range was greater than necessary. According to the official weather expertise of DWD visibility was good and approx. 25 km. In the evening the wind came from NW with a strength of 2 to 3 Bft. As of 22:00 h CEST the wind turned to NNE. The wave height was 0.2 to 0.3 m. The moon set at 23:07 h, the sky was cloudless.

In conclusion it is therefore to be stated that with its lighting and taking into account the good visibility, SY DEERN should have been visible for the other party to the accident from every direction.

Under Regulation 17(a) (i) Collision Prevention Regulations (Colreg) the skipper of SY DEERN was the vessel which shall keep her course and speed. According to Regulation 5 Colreg he was obliged to maintain a proper look-out in order to take action under Regulation 17 (a) (ii) Colreg and ultimately in accordance with Regulation 17 (b) KVR to take such action as will as best aid to avoid collision, when he recognised a collision cannot be avoided by the action of the give-way vessel alone.

According to the statements made by the skipper, he tried a hard-to-starboard manoeuvre as soon as he recognised the danger. This must have happened too late since a collision did occur. The cause for this can still not be clarified.

8 Recommendations

- A comprehensive tour plan should be a matter of course for every leisure craft skipper. This also includes the skipper being rested and physically and psychically in a position to fully satisfy the requirements of watch duty.
- Every leisure boat should always set a radar reflector. It has been proven that this makes every leisure boat more easily identifiable regardless of its size.
- Every leisure craft skipper should know that he can and should make himself perceivable in good time. This is possible in darkness with light signals, otherwise always with sound signals or by VHF where this is available.
- In addition the basic rules for participating in marine traffic and the responsibility of the skipper according to the Regulations of the Colreg are listed again here:
 - If deviation from the regulations of these rules make it necessary, all necessary measures must be taken to avert any directly threatening danger and taking into account the special circumstances.
 - Every participant in traffic must behave in such a way that the safety and ease of traffic are ensured and no other party is damaged, endangered, impeded or bothered more than unavoidable under the circumstances. In particular he must pay attention to the rules of caution that seamanship or the particular circumstances of the case require.
 - The vessel's command and every member of the crew that temporarily determines the course and speed of the vessel must observe the regulations of the KVR regarding behaviour in traffic and the equipment of vessels with facilities for carrying and showing lights and signals and issuing sound signals.
 - Every vessel shall at all times maintain a proper look-out by sight and hearing as well as by all available means appropriate in the prevailing circumstances and conditions, so as to make a full appraisal of the situation and the risk of collision.

9 Sources

The investigation report is based on the investigations, calculations and inspection of the vessel by the BSU and on

- investigations by the Bundesgrenzschutzamt-See Neustadt/Holstein
- sea charts of the BSH and BGSAMT SEE
- photos by the owner and BGSAMT SEE

The investigation was conducted in conformity with the law to improve safety of shipping by investigating marine casualties and other incidents (Maritime 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.

Issued by:
Bundesstelle für Seeunfalluntersuchung
Bernhard-Nocht-Str. 78
20359 Hamburg

Director: Dieter Graf
Tel.: +49 40 31908300, Fax.: +49 40 31908340
posteingang-bsu@bsh.de www.bsu-bund.de