

Report on the investigation of the capsizing of Z.19 -Sonja off the UK coast on 25 August 2018



Extract from European Directive 2009/18

(26) Since the aim of the technical safety investigation is the prevention of marine casualties and incidents, the conclusions and the safety recommendations should in no circumstances determine liability or apportion blame.

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4. Glossary of abbreviations and acronyms



5. Marine Casualty Information

5.1 Resume

August 25th 2018, 1530 LT (UK Daylight Saving Time, UTC+1), the Belgian Fishing vessel Z.19-Sonja capsized and sank in a position 25 nm ENE of Great Yarmouth.

A unequal, heavy load in PS and SB net led to a manipulation of these nets, causing a situation of instability of the vessel.

Shipping of water in this situation, due to overcoming waves, led to the capsizing of the vessel.

5.2 Classification of accident

According to Resolution A.849(20) of the IMO Assembly of 27 November 1997, Code for the investigation of Marine Casualties and Incidents, a very serious marine casualty means a marine casualty involving the total loss of the ship or a death or severe damage to the environment, consequentially, the incident was classified as

VERY SERIOUS

5.3 Accident Details

Time and date	25 August 2018
Location	Off the British coast, 25nm ENE Great Yarmouth
Persons on board	5
Deceased	2



6. Synopsys

6.1 Narrative

UK Local time, UTC+1, unless specified

Fishing vessel Z.19- Sonja left Zeebrugge on Sunday August 19th, bound for fishing off Norfolk, the south-east coast of the UK. The voyage was scheduled to take 10 days, but on Saturday August,25th, the vessel capsized and sank.

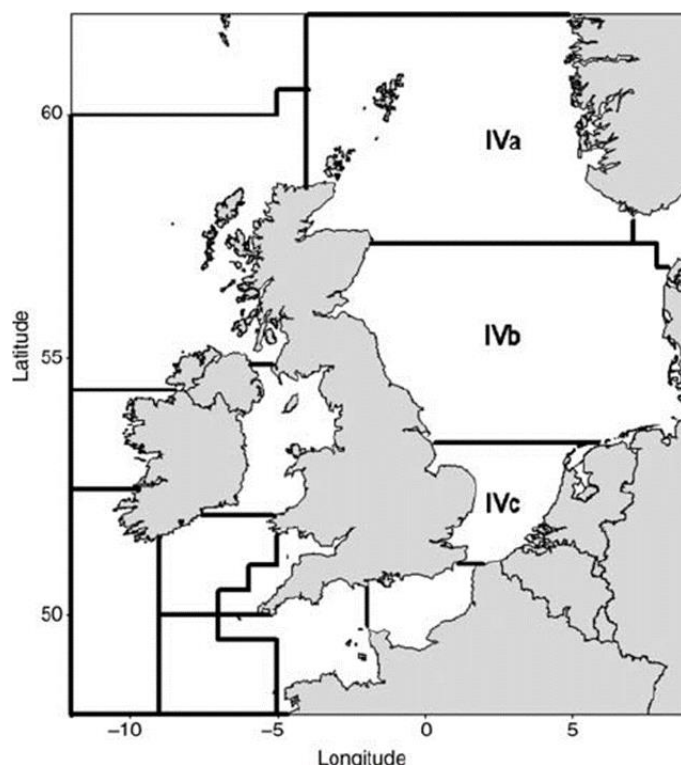


Figure 1 - Fishing Division

Z.19-Sonja started fishing on Monday August 20th in Division IVc, Southern Northsea.

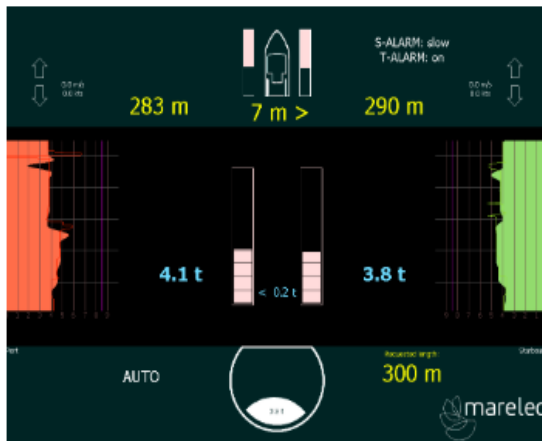
General Condition

Z.19-Sonja was manned according the regulations in the minimum safe manning certificate and equipped and maintained according applicable regulations as indicated by certificates and by the latest inspection report.

Major maintenance was executed in the months before the voyage. An extra safety button was installed to prevent free falling of the beams, as suggested by PREVIS, the prevention services for occupational accidents on board fishing vessels. This was a safety measure against falling derricks caused by accidentally pushing the lever or by small leaks in the air pressure system to keep the derricks in the upright position. Consequence of this button was that lowering the derricks only could take place by two-hand-service: pushing the lever and the safety button together.

Reportedly, it was the second time that year that Z.19-Sonja was fishing in these fishing grounds, however the fishing grounds were familiar to the skipper who sailed in that area before with another vessel. The skipper sailed on Sonja for two years.

Z.19-Sonja also was equipped with a Marelec system.



MARELEC D

Computerized wirelength & tension with indication on colourscreen. Specifications:

- Wirelength: 0-9999 m, precision 0,3%
- Wirespeed: 0-9,9 m/s
- Wiretension: 0-50 ton, precision standard < 1%
- Load registration: up to 8 hour
- Data output: NMEA 183

Figure 2- Marelec

Picture: Marelec brochure.

This was a safeguard in case a heavy weight comes into one of the nets or in case a net got stuck on the bottom. In such case the device gave an alert, the engine was slowed down and the wire was released up to a programmed maximum tension. As there was a continuous read-out of wire length and tension, the Marelec also increased the efficiency during fishing.

If the tension in the wires became (too) high during hauling the nets (when the lever was pulled) , there was no automatic reaction. In that case the lever needed to be pushed manually to release the wire.

Geology of fishing grounds

The area were Z19-Sonja was fishing consisted out of long but small ridges (with names as Smiths Knoll, Hearty Knoll, Winterton Ridge,...)surrounded by depths over 50m. The tops of the ridges were situated about 7m below the waterline. Admiralty Seachart N° 1504 indicated a bottom consisting out of mud, muddy sand, sand and shelves, gravel, pebbles. Reportedly, so called parts of sandstone are common in this area¹.

¹ Probably a kind of limestone, being well present on the Northern Norfolk coast: Limestone is a sedimentary rock (formed by the deposition and subsequent cementation of mineral or organic particles on the floor of oceans or other bodies of water) made up of calcite (CaCO₃) as its main mineral. One type of limestone which is very pure is called chalk, but most other limestones contain variable amounts of mud or sand or other material. There are many different individual types of limestone. All necessary ingredients to form a type of limestone are available in this area.

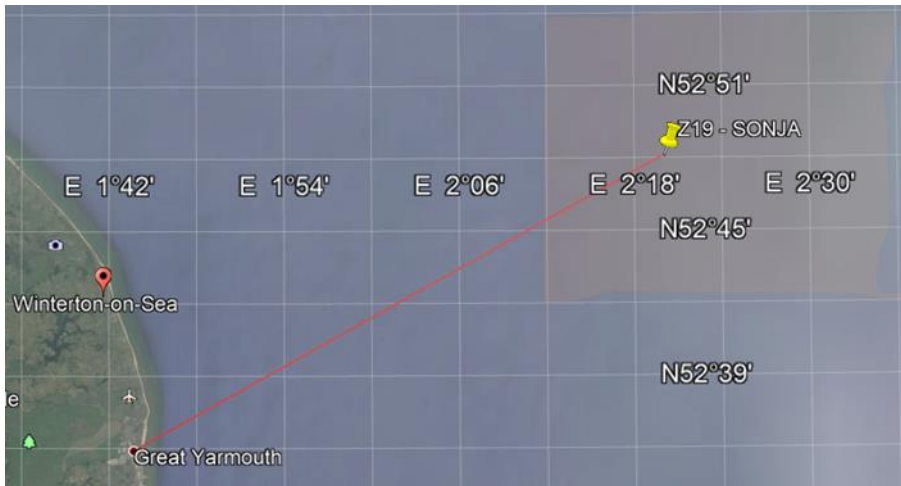


Figure 3- General map

A general view of the position of Z19-Sonja on Google Earth Pro. The red line measures a distance of 25nm.

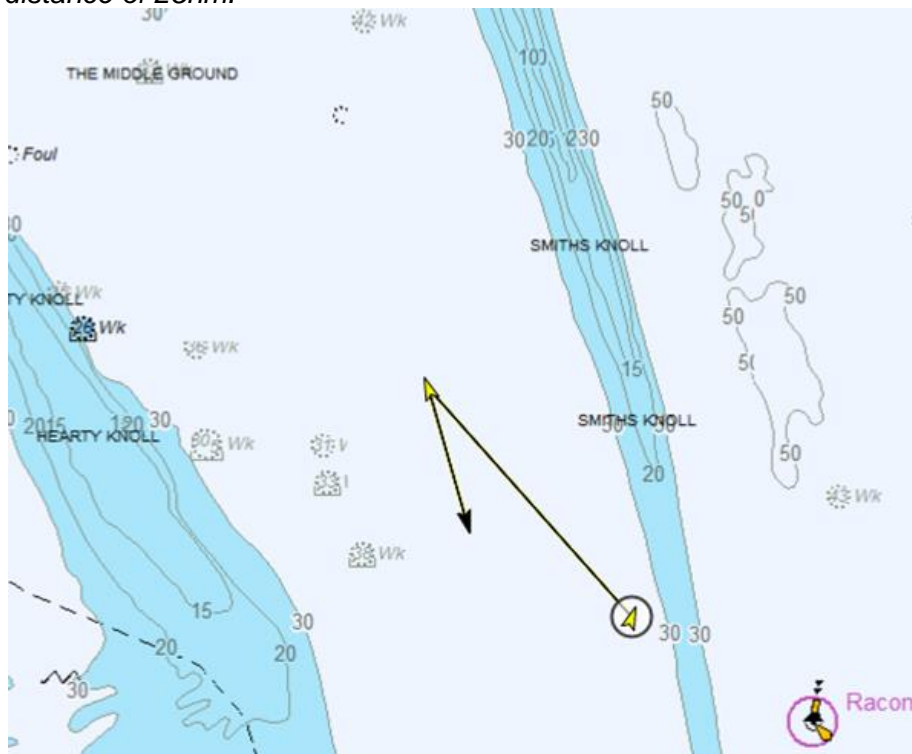


Figure 4- The latest received position by VMS at 1558

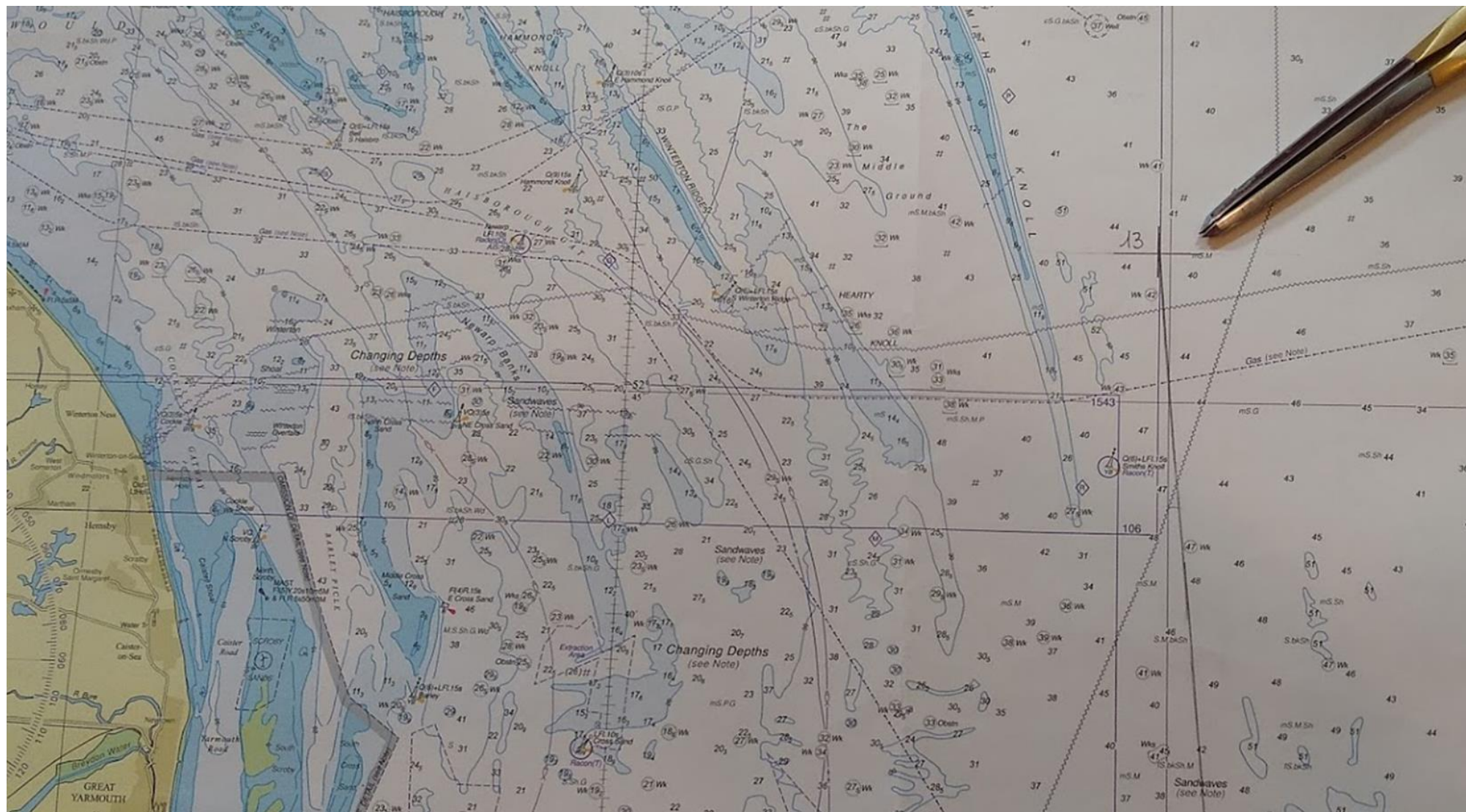


Figure 5- Admiralty Seachart 1504

The divider indicates the current position of Z.19- Sonja on the seabed - N52° 48.406' - E002° 19.569'



Tidal and weather

On Saturday , August 25th, full moon was predicted, causing a higher interval between high and low water, with stronger currents in between. Low tide on Saturday 25/8 took place at 1439 local time, high tide at 2017 (Winterton on sea).

In this area, tidal currents near to spring time could have speeds up to 3 knots.

Weather conditions on August 25th afternoon: There was a 5 Beaufort westerly wind veering to north. Buoy observations showed a moderate sea with significant wave heights between 1-1.5m meanly form N direction. Near surface sea temperature (0.5m below surface) was 19°C.

Date	UTC	Average Wind Dir (True)	Average Wind Spd (Knots)	Wind Obs	Average Seas (Feet)	Wave Obs
08-25-2018	1800Z	320	14	1	6	1
08-25-2018	1200Z	310	19	1	5	1
08-25-2018	0600Z	320	15	1	6	1

Figure 6 - Wind observations

Oil rig platform nearby - North Sea 53.102 N 2.800 E (53°6'9" N 2°48'0" E)

Source : www.ndbc.noaa.gov

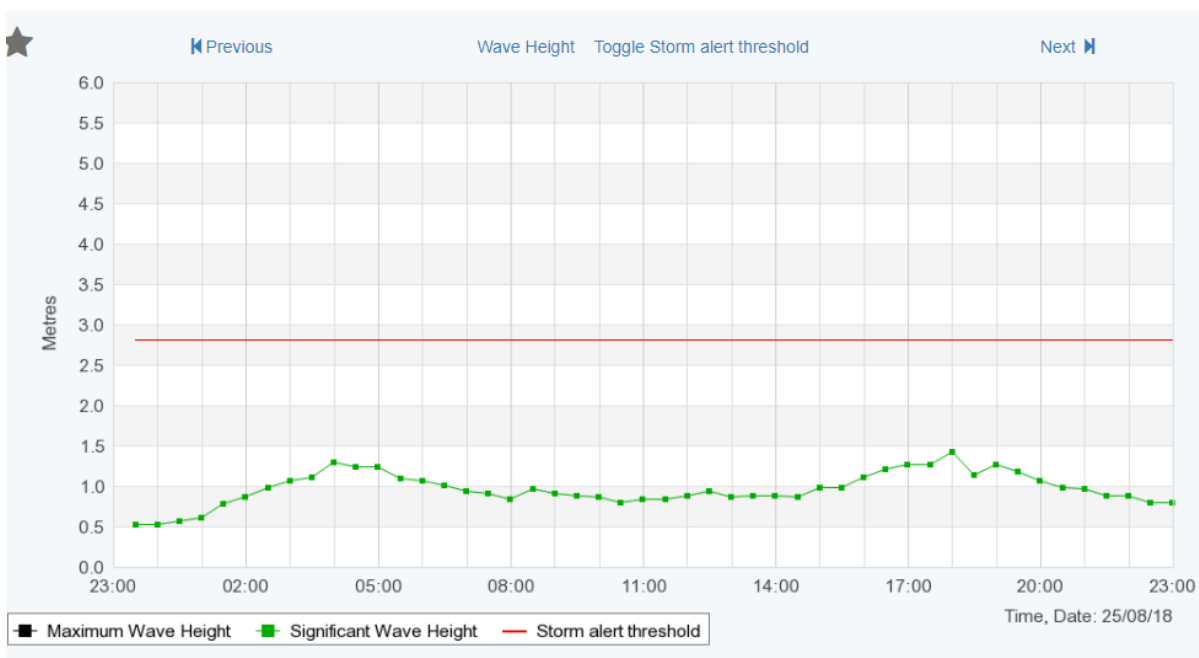
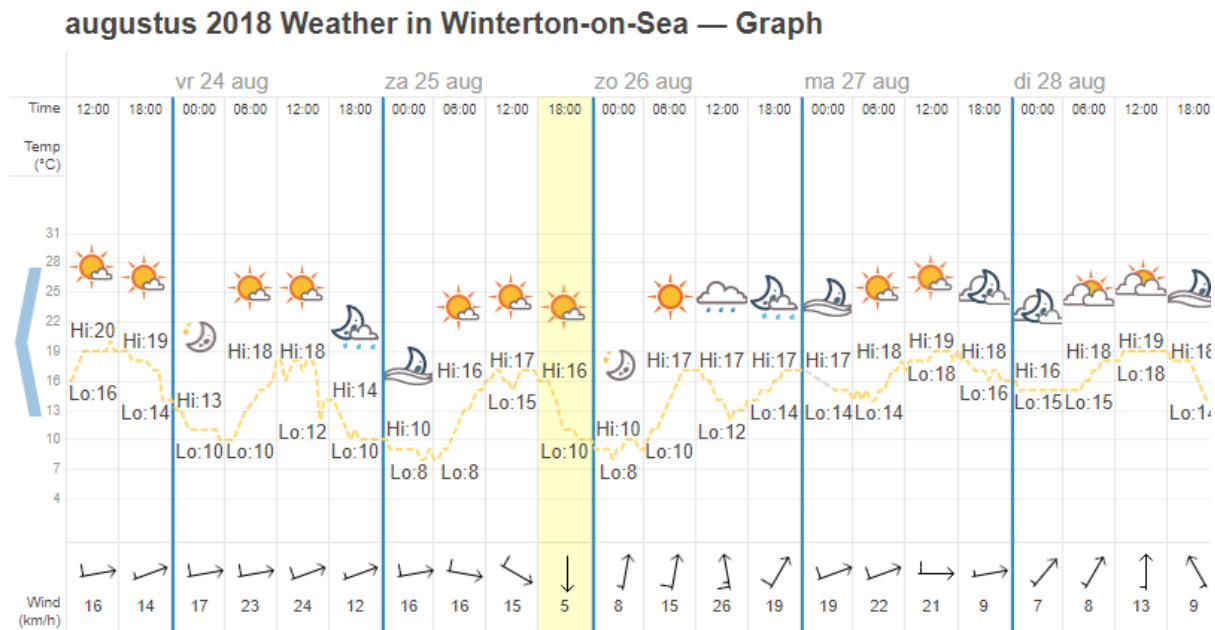


Figure 7- Wave Bouy Habbisburgh

52° 49'.57N - 001° 32'.99E

Source: www.channelcoast.org





*Figure 8- Weather Report Winterton-on-Sea
40km WSW of place of capsizing
Source : Timeanddate.com*

Chronology

Reportedly, the previous fishing track ended around 14.45 on the 25th of August. During the next track, it was noticed that the speed of the vessel was slowing down and the Marelec indicated a strong force in the cables, presenting a heavy weight in the nets. Reportedly, the indication on PS was 6 tons.

It was not the first time that the nets were filled with sandstone. In case sandstone was detected in the nets, it needed to be washed out. First attempts to wash the stones out was by making speed through the water with the nets in the water and derricks at an angle of 45°, the normal fishing position. This attempt was not very successful, so it was decided to turn the nets upside down to have a better result.

Reportedly the vessel was stopped head in the wind. Wind was veering from west to north on that moment. There was a swell from northern direction and a strong tidal current.

Reportedly, PS net came under the vessel, probably by influence of the wind on the vessel.

PS net contained more weight than SB net. This caused a list over PS.

This list increased by topping the derricks. Waves came on deck. Reportedly, 15 seconds later, the vessel capsized. Reportedly no emergency release of the wires or derricks had taken place.

On the moment of the incident, one man was in the wheelhouse, the four other persons were on deck. None of them was wearing a lifejacket.

The man in the wheelhouse had been able to get out of the wheelhouse, but did not survive the incident.

One man on deck turned under the vessel and did not survive the incident.

Both deceaseds were seen afloat by the survivors, face down in the water. The man in the wheelhouse had some injuries.

Another man on deck fell into the water and climbed back on the hull of the capsized vessel by means of the PS fishing gear hanging partially over the hull.

A third man on deck also fell into the water. He was able to grab the lifebuoy with smoke signal.

A fourth man on deck managed to stay on board and to climb onto the hull.

Reportedly, the liferaft came free after 10 minutes, but had not been inflated yet. There was one liferaft on board. The liferaft had to be activated manually by pulling the painter line. The three fishermen managed to climb into the liferaft. Although the fishing vessel was still afloat on that moment, they decided to cut the painter line to prevent that the liferaft got damaged by the fishing gear.

Reportedly the vessel sunk within 2 hours after capsizing.

No radio signal (not DSC nor EPIRB) had been broadcasted, no portable VHF or SART was available in the liferaft.

The only means to attract the attention of visible vessels was by means of pyrotechnics. Not the most efficient way, as sun set was predicted at 1844 that day.

The first vessel they noticed, did not correspond to the pyrotechnics, a second vessel, cruise vessel Pacific Princess, did notice the liferaft and picked up the three survivors.

Saturday 25th, 1844, Cruise vessel Pacific Princess alerted that the 3 seaman in the liferaft were on board and that 2 persons were still missing. As from that moment SAR had been initiated by the UK Coastguard with support of the float of RNLI.





Figure 9- Arrival SAR

Picture taken by A. Rosen on board Pacific Princess when SAR helicopter arrives on the scene , after the cruise vessel picked up the surviving crewmembers.

Around 2130 (Belgium, UTC+2) , a first informal phonecall arrived at the federal police department in Zeebrugge, informing about any news regarding the capsized Belgian fishing vessel Z.19-Sonja.

From that moment onwards, MIK and MRCC were contacted and came into contact with UK authorities.

At 2230 (UTC+2), MRCC Oostende reported the incident (free translation from Dutch):

FROM: MRCC OSTEND

TO: ACCORDING COASTGUARD MATRIX

INCIDENT NAME: INC 400 Z19 Sonja

DATE AND TIME CREATED: 25/08/2018 22h30lt

SITREP NUMBER: 01

A - IDENTITY OF CASUALTY: Z19 – Sonja possibly sunk at about 25 nm ENE off Great Yarmouth, near Smiths Knoll buoy.

B - POSITION: 52-48.5 N 002-20.5 E

C - SITUATION: Z19 – Sonja probably sunck in UK waters

D - NUMBER OF PERSONS: 05 pob of which 03 persons have been rescued out of a liferaft in good health and on board a passenger vessel, Pacific Princess, 02 persons still missing.

E - ASSISTANCE REQUIRED: 02 helicopters and 02 lifeboats and Pacific Princess still searching.

F - COORDINATING RCC: Humber Coastguard



G - DESCRIPTION OF CASUALTY:

H - WEATHER ON SCENE:

J - INITIAL ACTIONS TAKEN: MIK informed - company and Previs informed

L - COORDINATING INSTRUCTIONS:

N - ADDITIONAL INFORMATION:

Sunday, August 26th, 0000 - 0600: Search with SAR Helicopters and all weather lifeboats was suspended due to crew welfare and fatigue. The broadcasting of a mayday message to all vessels transiting the search area to keep a sharp look out was ongoing. Trinity House vessel "Alert" arrived on scene and was searching for the location of the wreckage.

Sunday, August 26th, 1415 -1447: Confirmation to Belgian authorities that 2 bodies were found between debris from vessel Z.19, in position 52°-46.61 N 002-22.85 E and 52-46.56 N 002-22.62 E. The bodies had been brought to the hospital of Lincolnshire and SAR actions have been stopped.

Sunday, August 26th, the three crewmembers that survived the incident arrived by ferry at Dunkerque from Dover and were brought back home.



7. Factual information

7.1 Vessel's details



*Figure 10 - Z.19 Sonja
Picture : facebook page "Visserij"*

Type: Beam trawler (fishing vessel)

Flag: Belgian

Port of registry: Zeebrugge

Call Sign : OPAS

IMO N° : 7524627

Vessel-ID: 1844

Year of Built: 1974

Yard : Scheepswerf De Graeve L. - Zeebrugge

Current owner since 1998: BVBA Rederij

Thysebaerdt

Previous owner 1974- 1998: A. Vantorre

Length over all : 30.70m

Length between perpendiculars: 26.76m

Width: 7.27m

Maximum summer draught: 2.72m

Depth: 3.62m

Length derricks: 11m

Gross Ton.: 159

Net ton.: 55.15

Engine power: 700 hP/ 515 kW

Engine type: Cummins KTA 38 (installed 2012)

7.2 Beam Trawling

Beam trawling had been developed in England in the 19th century.

In 1950, first attempts were made to have beam trawling used in open water. Because of the successes, by 1957, most Dutch shrimpers were rigged for beam trawling. In 1959, the first two Belgian shrimpers with home port Zeebrugge were rigged for beam trawling. Today, the majority of the Belgian commercial fishing fleet is rigged for beam trawling.

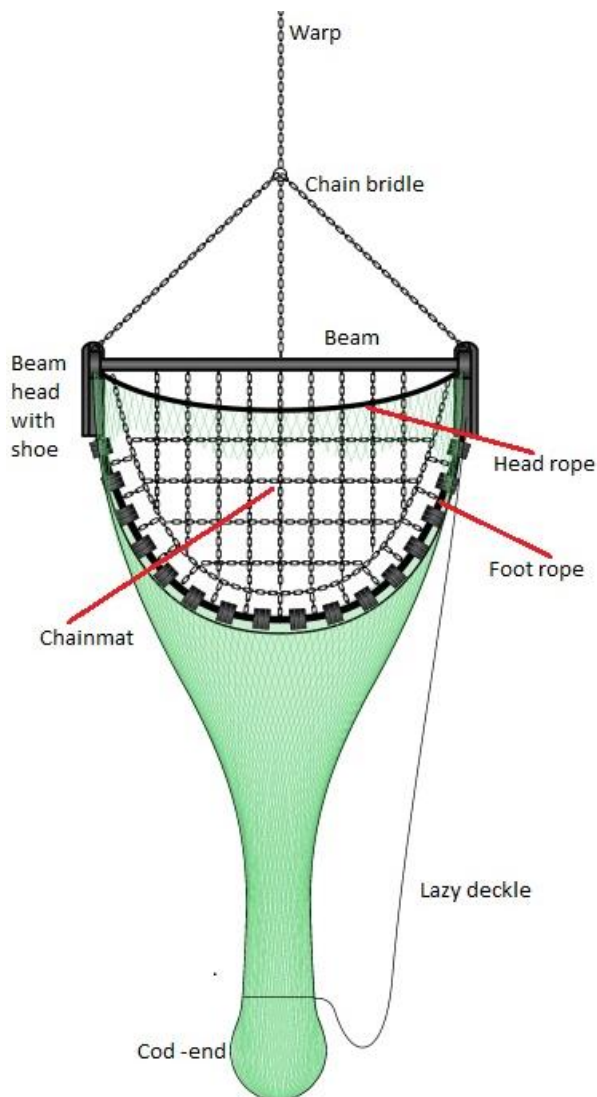
Most commercial beam trawlers use two beam trawls towed from long derricks on each side of the vessel.

The target species are usually bottom-dwelling flat-fish such as plaice , sole, megrims, etc.



Figure 11 - Beam Trawler

Impression of a fishing vessel rigged for beam trawl – source: www.seafish.org



The beam trawl consists of a heavy tubular steel beam supported by beam heads at each end.

These beam heads have wide shoes at the bottom which slide over the seabed. The beam and beam heads form a rigid framework that keeps the mouth of the trawl open and supports the net.

The cone-shaped net is towed from this framework with the headline attached to the beam, and each end of the footrope connected to the bases of the shoes.

As the gear is towed over the seabed, the footrope forms a 'U' shape curve behind the beam and shoes, with the net and cod-end behind this.

The beam is usually towed using a chain bridle arrangement from both shoes and the centre of the beam attached to the end of the trawl warp leading to the vessel.

Figure 12- Trawl gear

Beam trawlers are prone to capsizing due to the nature of the activities. Although the stability conditions imposed upon fishing trawlers by the competent authorities are in most cases met, slight alterations in symmetrical load between the two fishing nets, starboard and portside, during fishing and especially during recovery can have detrimental effects on the initial stability of beam trawlers.

8. Analyses

8.1 Mission with BNS Bellis to wreck of Z19-Sonja September 24-28th

As the wreck of Z19-Sonja is no obstruction for sea traffic, it had not been salvaged.

The exact position was determined by UK Coastguard on September 4th, being N52 48.406 , E002 19.569.

September 24-28th, BNS Bellis undertook a mission to the wreck of Z19-Sonja .

Purpose of the Mission:

Investigation to circumstances of capsizing and sinking of Z19- Sonja

1. Identification of wreck
2. Position of fishing gear and content of nets
3. Position and length of derricks
4. EPIRB: position after incident, reason for not broadcasting
5. Wheelhouse: position of operating levers regarding emergency release of nets and/or derricks



Available equipment on board BNS BELLIS:

- A. Sonar built into the ship's hull
 - Used to trace Z19-SONJA
- B. Kongsberg Remus - Autonomous Underwater Vehicle
 - Provided a general overview of the position of the wreck on the bottom

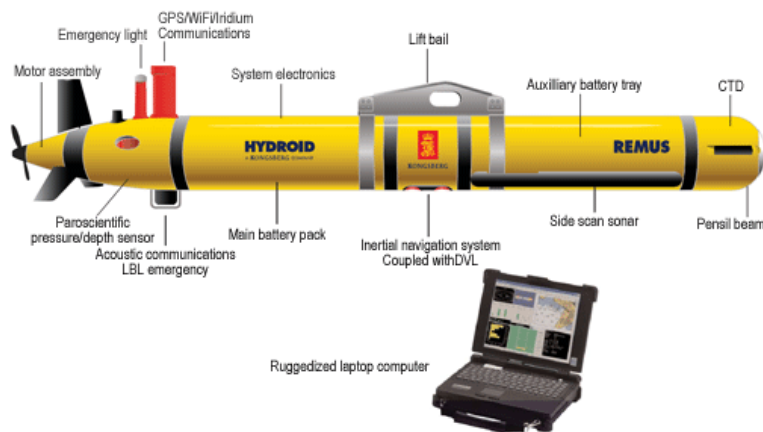


Figure 13- REMUS

Source: www.kongsberg.com

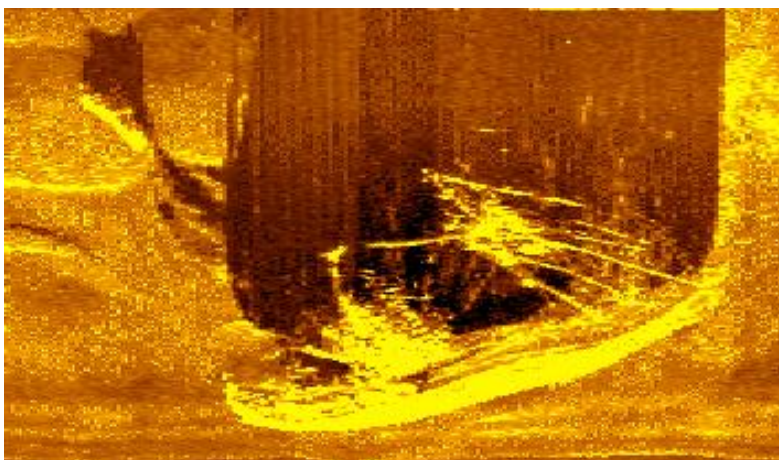


Figure 14- Remus Image of Z.19

- C. Divers fitted with camera
 - Due to strong currents and the depth of the vessel, the time to take video pictures was limited to 15 min. for each diving window. During the mission, three diving windows were available during a day (daylight only).
 - Bad visibility under water: 1.5-2 m

Observations during mission with BNS Bellis

1. Wreck was identified by name and number

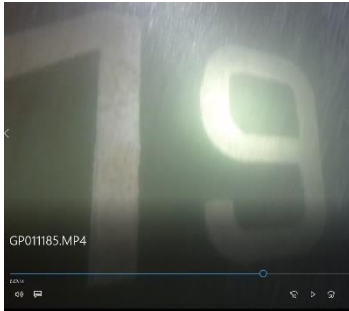


Figure 15 - Vessel's ID number at the stern

2. Nets :

- PS net lied on a distance of +- 10m from the ship. Due to depth and distance from the vessel it was not possible to dive to this point within the available time windows.
- SB net covered a part of the deck and the wheelhouse (SB side and top of wheelhouse). A lot of cables were running over ship and deck, making access difficult for divers.

3. Derricks: upright position (SB topped), measured length +- 10.5m : indicating that original fishing gear has been used, as indicated on plans.

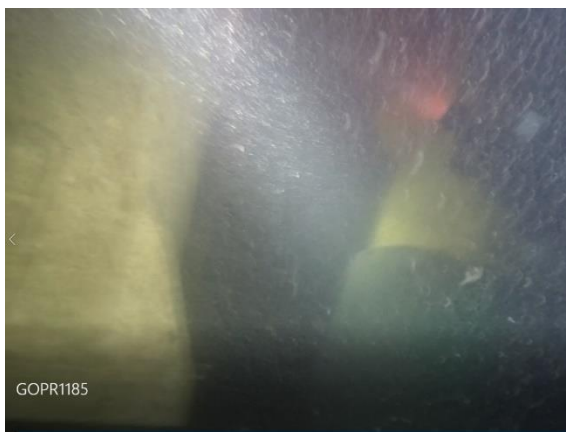
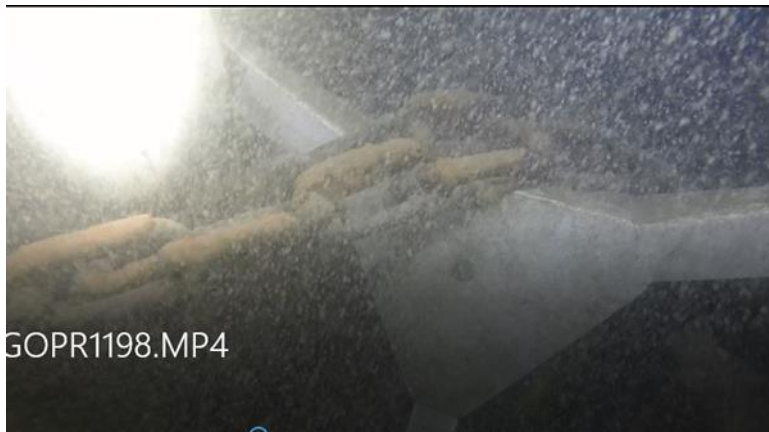


Figure 16- Position Derrick

SB derrick in almost upright position, indicated by the angle between the derrick (left on this picture) and A-frame

4. EPIRB: The EPIRB was not found during diving operations. No EPIRB signal was broadcasted. The EPIRB was replaced and tested in May 2018, the certificate was valid to 17/05/2019. It was not clear if the EPIRB did not come free by hydrostatic release or was obstructed under the vessel/net.
5. Wheelhouse: No damage to the wheelhouse was observed. A part of the wheelhouse was covered by the SB net. Damages to navigation equipment (Satellite antenna, GPS antenna,...) on the monkey bridge were observed, but equipment was not wiped away. It could be concluded that the net fell on the wheelhouse during sinking .



*Figure 17 - Position net
Part of chain net of the trawl gear damaged the GPS compass antenna.*

Due to the poor visibility, it was not possible to make any images inside the wheelhouse.

Further observations during the mission

- During the mission with BNS Bellis, strong currents were observed, up to 3 knots. Days spent on site included spring time (full moon on September 25th – Winterton on Sea).
- The wheelhouse seemed to be intact on the outside. Only the window of the wooden access door to the wheelhouse on PS was completely damaged.

- Damage was detected at the aft of the vessel. It looked like a small but deep impact. It was not clear how this damage was caused. It might have been caused when the vessel landed on the sea bottom.

The sternlight right above this impact was not damaged and there was no fishing net near the place of the incident. These observations could exclude damage by own fishing gear during capsizing.

There were no other scratches or tears nearby, what could exclude damage by fishing gear of other vessels after the incident.



Figure 18- Damage Aft



Figure 19- Damage Aft (2)

8.2 Release of the liferaft

There was one liferaft on board, situated on the aft deck, behind the wheelhouse on SB side, inside the railing.

The vessel turned upright down over PS. The automatic release to free a liferaft only reacts when it is under water. This means that the release was only been activated when the vessel was completely turned upside down.

The consequence was that the liferaft was released, when it was stuck under the vessel. By the motion of the wreck in the waves, the liferaft became free after 10 minutes, according to witnesses.

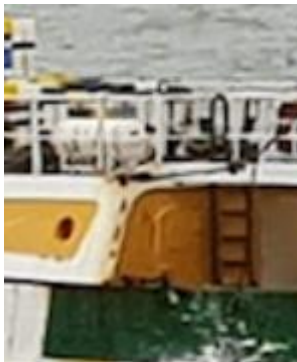


Figure 20- Liferaft

Position of the liferaft on SB side of the vessel.

8.3 Stability of the vessel

Stability of the vessel was calculated according Service Regulation 15 “Stability of fishing vessels”. Most recent stability calculations of Z19- Sonja were published and approved in 2012.

To determine the stability of the vessel at the time of the incident, following circumstances were taken into account:

A. Actual weight of the lightship

Last time the lightship was calculated, was in 2012.

B. Actual weights on board

As reported, following weights were taken into account:

- Fuel: 20 000 L , equally spread over the four fuel tanks and day tank filled
- Fresh water: 3000 L
- Lube oil: 300 L
- Crew and luggage : 5 persons (all previous calculations took 700kg into account)
- Fish and ice: 3500 kg
- Weight of fishing gear: 3800 kg
- Weight PS, incl. trawl gear: 6000kg
- Weight SB, incl. trawl gear: less than 6000kg, assumed to be 5000kg

All other weights (spare parts, spare shackles, wires, ropes, crates, ...) could be considered as part of the lightship. It could not be guaranteed that the actual lightship weight still corresponded with the calculated weight in 2012.

C. Position of derricks and nets

The point of application of the force executed by the fishing gear (and the content in the nets) is the point where the trawl gear is attached to the derrick.

The higher the derrick is lifted, the higher this point of application and the more negative influence on the stability of the vessel.

The moment the vessel capsized, the derricks were being topped to bring the nets close to the ship's side. Distance between the A-frame of the foremast and the ship's side is 1.3m. A



distance of 2m has been taken into account in the calculations, resulting in an angle of 11.48° between derrick and A-frame.

*Derricks have a length of 11m according to **plan 30**.*

The stability limits into service regulation 15 are set as such that there should be no danger during manipulation of the derricks or nets during fishing.

D. Amount of water on deck

Reportedly, seawater came on deck before the vessel capsized.

Water on deck is an extra weight to be taken into account during stability calculations.

Water runs free on deck to the lowest side.

As there was a list to PS due to unequal loads in the nets, water ran to PS.

There are scuppers in the ship's side to allow this seawater to flow down.

Generally, the flow rate of the seawater flowing down, depends on the amount of scuppers being affected by the water (due to the list and trim of the vessel) and the size of the opening of the scupper (sometimes limited by the opening of the flaps that are in place to prevent fish being fled down when nets are emptied)

The stability limits into service regulation 15 do not take into account any water on deck. It can be concluded that the stability limits are set as such that there should be no danger for a certain amount of water being on deck.



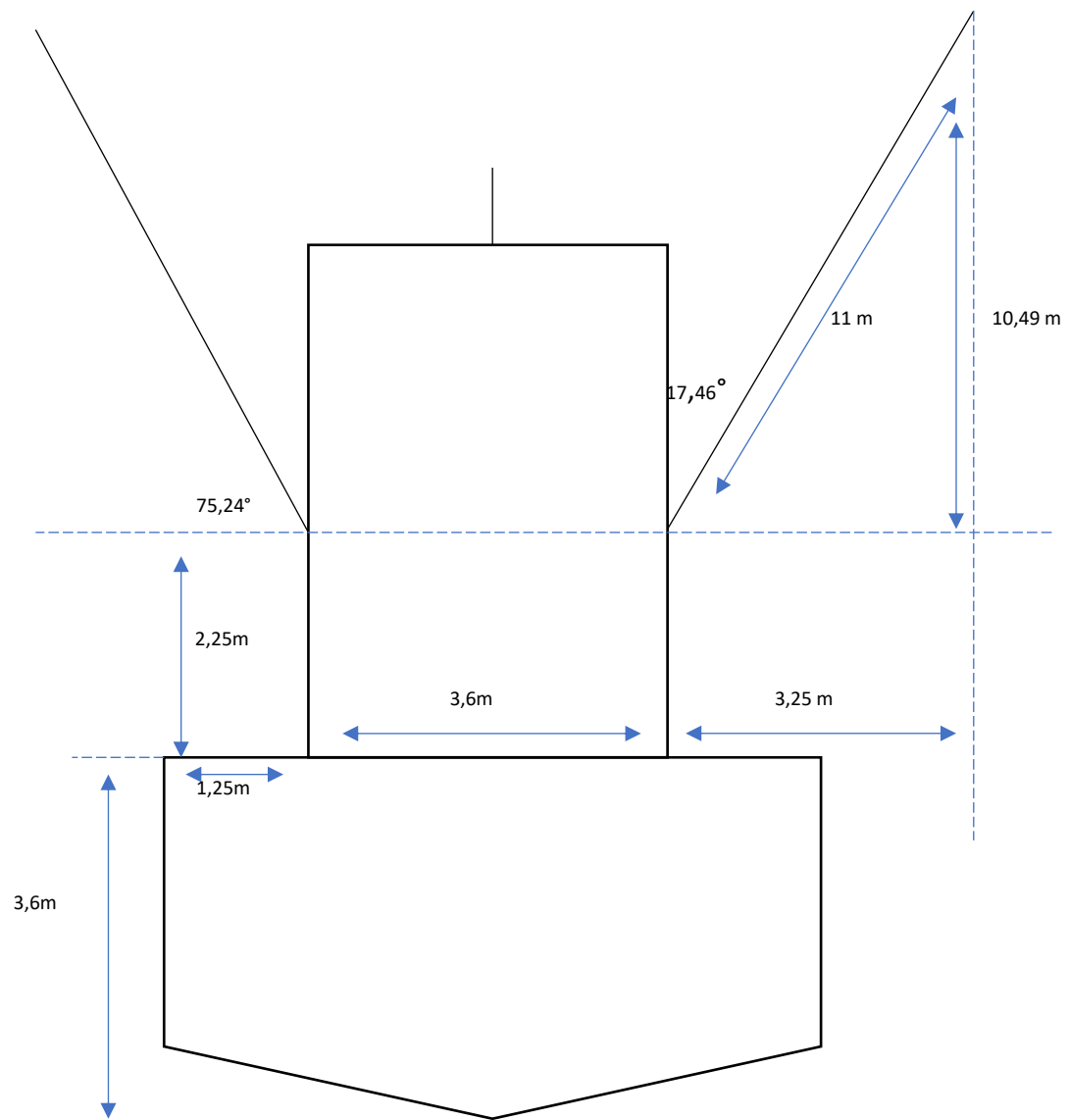


Figure 21- Vessel's dimensions

STCW-F code : CHAPTER II

CERTIFICATION OF SKIPPERS, OFFICERS, ENGINEER OFFICERS AND RADIO OPERATORS

Regulation 1. Mandatory minimum requirements for certification of skippers on fishing vessels of 24 metres in length and over operating in unlimited waters and

Regulation 3. Mandatory minimum requirements for certification of skippers on fishing vessels of 24 metres in length and over operating in limited waters

8 Fishing vessel construction and stability

8.1 General knowledge of the principal structural members of a vessel and the proper names of the various parts.

8.2 Knowledge of the theories and factors affecting trim and stability and measures necessary to preserve safe trim and stability.

8.3 Demonstrate ability to use stability data, stability and trim tables and pre-calculated operating conditions.

8.4 Where applicable, knowledge of effects of free surfaces and ice accretion.

8.5 Knowledge of effects of water on deck.

8.6 Knowledge of the significance of weathertight and watertight integrity.

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8.5 Knowledge of effects of water on deck.

8.6 Knowledge of the significance of weathertight and watertight integrity.





9. Appendices

A. Certificates and inspections

As indicated during flag state inspection dd 16/08/2018:

Logbook (latest ingediend)	16/07/2018
Meetbrief – O.5794 (date of issue)	21/09/2012
Zeebrief – ZVIS.780	08/10/2022
Certificate of sea worthiness	15/05/2019
Visruimmeting	15/02/2022
Radio License (date of issue)	24/01/2018
Stability booklet date of issue)	22/08/2012
AIS	17/05/2019
EPIRB	17/05/2019
SART	17/05/2019
VHF (2-way)	17/05/2019
Inflatable liferafts	22/05/2019
Inflatable lifejackets	02/2019
Pharmacy	18/05/2019
Portable fire extinguishers	23/05/2019
Fixed fire fighting system	09/2019
Hydro test cilinders fif system	2024
Compass	30/04/2016
Dry dock inspection	15/05/2019
Thickness measurements	15/05/2020
Propeller shaft clearance (unprotected shaft)	15/05/2020

1 - Mast and derricks - Extract plan n°30



2 - General plan - Extract plan n° 23

