Norwegian Safety Investigation Authority

Investigation of aviation accident west of Sotra

On the evening of Wednesday 28 February 2024, a Sikorsky S-92A helicopter, LN-OIJ, operated by Bristow Norway AS crashed during SAR training in night conditions after departing from Flesland (ENBR).

The helicopter departed from Flesland (ENBR) to conduct SAR training west of Løno, Sotra.

All six onboard were picked up from the sea by a rescue helicopter and transported to Haukeland University Hospital Bergen. One person was seriously injured and one person was fatally injured.

The NSIA has been talking with the operator and with the crew from the accident helicopter. The Norwegian Coast Guard has salvaged some floating wreckage which will be made available to the NSIA. The Norwegian Coast Guard has also carried out a search for the helicopter wreck.

Update 28 February 2025

The NSIA has finished collecting the majority of factual information and has proceeded to a comprehensive analysis of the accident.

The main topics to be analysed are:

- **To explain the sequence of events to understand what happened:** The NSIA has spent considerable time to understand the effects of the technical fault of the pitch trim actuator. Based on current available information the NSIA is confident that the fault in the pitch trim actuator can explain the abnormal helicopter pitch-up motion. The pitch trim actuator is a non-critical component, and the flight crew can always override the trim actuator.
- **Explain how different contributing factors influenced why the accident happened**, including but not limited to:
  - Operational procedures and training
  - The tender process and time aspects relating to the contract for SAR-services on the Southern Norwegian Continental Shelf.
  - Survival aspects including evacuation from the helicopter, the rescue operation, personal equipment and training.

During the investigation, the NSIA has also become aware of the Part 26, Additional Airworthiness Requirements for Operations, Amendment 4, issued by EASA in July 2022. This regulation implements more stringent requirements regarding life raft deployment. The full ramifications of this regulatory change regarding the S-92A are currently handled by the Norwegian CAA.

The NSIA is also aware that EASA is investigating a possible unsafe condition regarding the automatic deployment logic of the Emergency Flotation System of the S-92A. The helicopter was equipped with emergency floats designed to automatically deploy during a controlled ditching. These were armed, but did not deploy automatically. The NSIA has not yet decided if a safety recommendation is warranted.

This is an ongoing investigation, and the information is preliminary and subject to change. It is to be expected that more information is required during the analysis.

Update 6 August 2024, preliminary report

The NSIA issues a preliminary report, including a safety recommendation.

Preliminary report

Update 13 May 2024

The accident happened in the evening of 28 February 2024. The helicopter took off from Flesland (ENBR) to carry out SAR training. There were six people on board the helicopter; two in the cockpit, two winchmen, a winch operator and a nurse. A training Emergency Position-Indicating Radio Beacon (EPIRB) was dropped into the sea west of Sotra, which was later to be searched for. The flight then continued in a northerly direction to Hjeltefjorden to practice winch operations with the ship Wilson Twisteden. After the winch operations, the course was set towards the beacon.

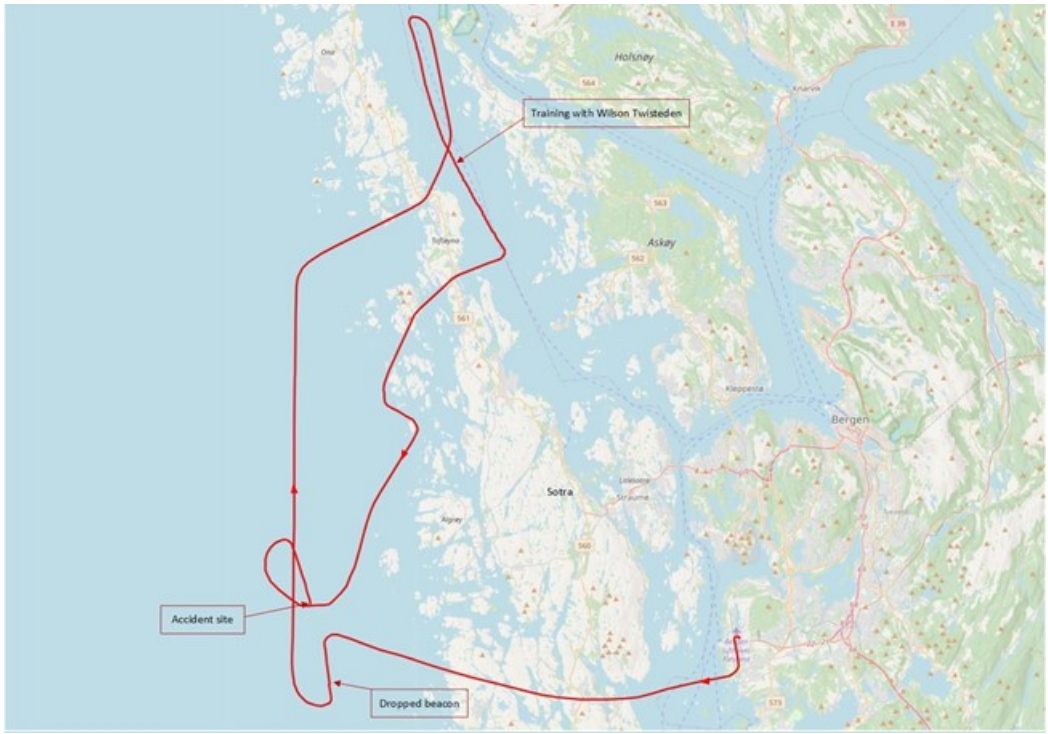
The crew was about to position the helicopter to retrieve the beacon when the accident occurred. It was dark with few external visual references. The wind was southerly at about 35 kt. The flight was carried out according to Visual Flight Regulations (VFR) without the use of Night Vision Goggles (NVG). The crew had activated the mode Mark on Top (MOT) of the Automatic Flight Control System (AFCS). This mode is only installed in SAR-helicopters. Analysis of data from the Flight Data Recorder (FDR), HUMS information and data from the Flight Control Computer (FCC) indicates that the pitch attitude started to increase abnormally when the helicopter was near the training beacon (150 ft radio altimeter altitude and speed decreasing to near 10 kt). The nose of the helicopter started to rise from the expected 10°–12° nose up attitude to a 30° nose up attitude over several seconds. When the crew became aware of the situation, they attempted to correct the unusual attitude however the aircraft impacted the water and sank to a depth of 220 metres. The NSIA is working to determine the cause of the pitch up manoeuvre.

Two different rescue helicopters retrieved the six people from the accident helicopter from the sea and transported them to Haukeland University Hospital in Bergen. One person was found floating without a deployed life jacket and any sign of life when the first rescue helicopter arrived at the accident site. Life jackets used in helicopters must be deployed manually. It was therefore prioritized to pick up the five survivors. The situation for one of the survivors became critical and the helicopter was consequently unable to pick up the person without any life signs. The person without any life signs was picked up by the second rescue helicopter which arrived somewhat later. The investigation also includes survival possibilities. This includes, among other things, the helicopter's emergency equipment such as flotation elements and rafts, the possibility of evacuation and the rescue operation itself and the crew's personal equipment. This includes emergency breathing apparatus, life jackets with lights, personal locator beacon and survival suits.

The helicopter was equipped with floats. These were armed but were not automatically deployed during the uncontrolled impact with the sea. The flotation system of the helicopter type is designed to function in a controlled emergency landing on water. When the main rotor blades hit the sea, the power supply required for automatic deployment stopped and thus prevented the possibility of an automatic deployment of the flotation elements. The investigation includes the functionality and system design of the floats. New international regulations which, among other things, include emergency flotation elements for helicopters have been published. The S-92 helicopter type will have to undergo modifications to satisfy these new regulations. The date for full implementation is set to August 2026.

The NSIA has not made any unequivocal findings that are believed to affect immediate flight safety. Any safety findings of importance will be immediately notified to the European Aviation Authority, the Norwegian Civil Aviation Authority, the manufacturer Sikorsky and the operator Bristow Norway.

The NSIA is working closely with Sikorsky and Bristow Norway in order to better understand the accident.



The route flown by LN-OIJ. Source: GPS Visualizer / NSIA. Map: ©OpenStreetMap

A training beacon like the one the helicopter crew dropped: Photo: Bristow Norway AS / NSIA

Update 8 March 2024

It is still the early phases of the investigation. The NSIA has interviewed the five persons who survived the accident. This, together with analysis of data from the Flight Data Recorder, is important information to understand how the accident could happen. The NSIA maintains a good dialogue with all involved parties. All findings related to aviation safety will immediately be forwarded to the CAA Norway and to EASA. The National Transportation Safety Bureau has appointed an accredited representative.

So far no significant findings impacting aviation safety has been found.

The investigation will also look into survival aspects. Helicopter systems, crew equipment, evacuation possibilities and the rescue operation will be investigated.

The helicopter was equipped with emergency floats. These were armed, but did not deploy automatically. The floats are designed for a controlled emergency landing in water. Even though the accident appear to be a relatively low energy impact, it can not be called a controlled emergency landing. The fact that the floats did not deploy can be because the situation that occurred was outside

the limitations of the system. The NSIA can therefore not state that there were any technical faults with the flotation system.

Update 5 March 2024

Data is extracted from the flight-recorder. The work of analyzing the data is ongoing, but it is expected that this work will take a long time.

Update 4 March 2024

Film from the recovery of the helicopter.

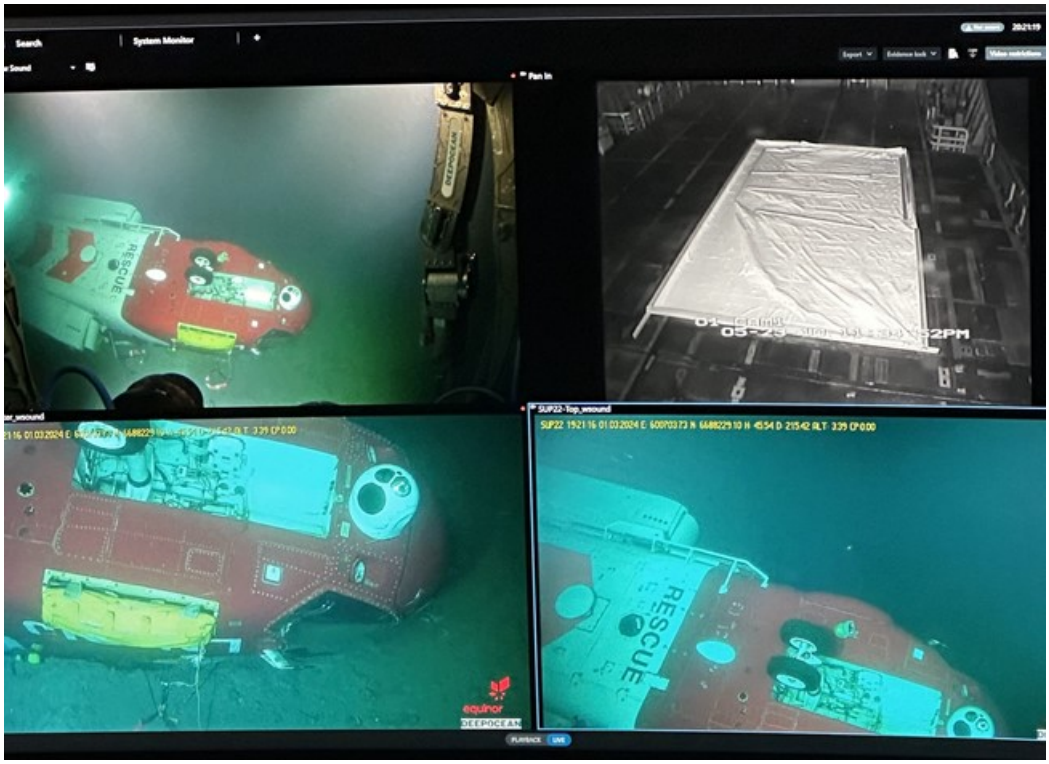
Update 2 March 2024

The NSIA has contracted an offshore ship to continue the search and recovery of the helicopter. During March 1st. 2024, the ship was in position at the accident site. The wrecage was found at 20:14 hours at approx. 220 meters depth. Recovery was carried out during the night and the helicopter was taken to Haakonsvern naval base.

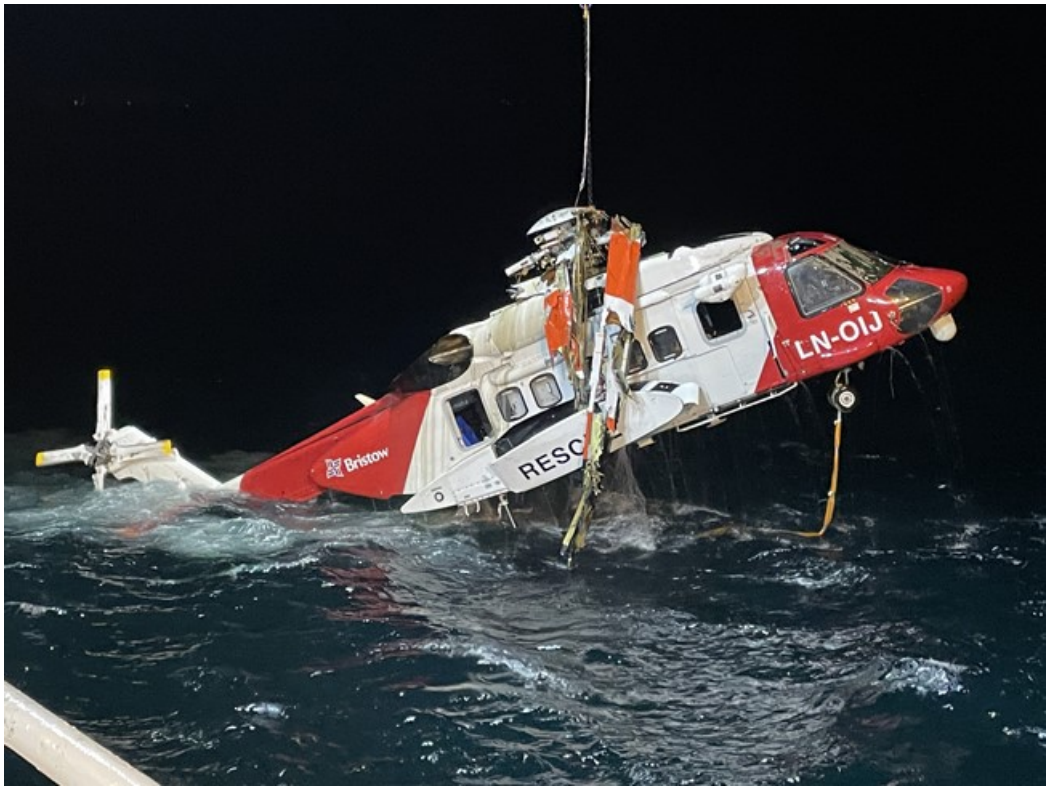
Preparation of the wreck and initial technical investigations will continue throughout the weekend.

The NSIA is having a press conference on Monday 4 March. Information about this is available here. (In Norwegian only).

The helicopter recovered on deck of the offshore vessel Normand Ocean. Photo: NSIA



ROV images of the helicopter when discovered on the sea bed. Photo: Normand Ocean/NSIA



Helicopter recovered in position west of Bergen. Photo: NSIA

Helicopter lowered onto the pier at Haakonsvern naval base. Photo: NSIA

Helicopter on the pier at Haakonsvern naval base. Photo: NSIA

Safety recommendation

Safety Recommendation Aviation no 2024/10T

On the evening of Wednesday 28 February 2024, a Sikorsky S-92A helicopter, LN-OIJ, operated by Bristow Norway AS crashed during SAR-training. There were few external visual references due to dark night conditions. The helicopter was in the Automatic Flight Control System (AFCS) SAR mode "Mark on Top". When approaching the hover position the helicopter will pitch nose up as it slows down and descends. In this accident the helicopter continued to pitch up. The helicopter had reached a nose up attitude of 30° and had entered rearward flight when the pilots realised and acted. During the investigation Sikorsky has stated that when MOT is engaged the helicopter should normally not exceed 12–13° nose up attitude. This information is not stated in the Rotorcraft Flight Manual Supplement describing SAR modes but could help S-92 helicopter crews recognize AFCS anomalous behavior.

The Norwegian Safety Investigation Authority therefore recommends that Sikorsky Aircraft Corporation immediately ensure that expected attitude values when flying on autopilot is made known to all operators and included in any relevant Sikorsky manuals.

Facts

Location	2 NM south-west of Løno, west of Sotra in Øygarden municipality in Vestland, Norway
Occurrence date	28.02.2024
ICAO Location indicator	ENBR
Aircraft	Sikorsky øvrige
Operator	Bristow Norway AS
Registration	LN-OIJ
Meteorological conditions	VMC
County	Vestland
Type of occurrence	Accident

Type of operation	Offshore
Category of operation	Heavy, helicopter (> 2 250kg)
Aircraft category	Helicopter, Multi-engine, Turbofan/Turbojet
FIR/AOR	ENSV (Stavanger ATCC)