

## SUMMARY IN ENGLISH

The flight was a navigation exercise that conducted as part of the Swedish Voluntary Air Corps (FFK) operations. The crew consisted of a pilot and an observer.

The airplane took off from Ronneby airport and proceeded first to Pukavik and then towards Karlskrona and Sturkö. The intention was then to return to Ronneby for landing.

Before reaching abeam Sturkö the pilot switched fuel supply tank by turning the tank selector. A few minutes later, just after Sturkö, the engine began to go rough and shortly thereafter, it stopped. According to the crew, the pilot went through the emergency checklist to try to restart the engine. When the engine restart attempt failed the pilot switched supply tank several times between the two tanks. The pilot experienced initially a short engine response but then the engine stopped completely.

As the altitude was low, the pilot quickly switched to trying to find a suitable emergency landing field and identified an open field on a small island. The pilot prepared the aircraft for landing, extended the flaps and reduced speed. Upon landing, the aircraft hit a tree and a large bush and ended up inverted. The aircraft was severely damaged, but the crew didn't suffer any injuries.

SHK has not found any technical faults in the aircraft that could have been able to adversely affect the engine power or indicate that carburetor icing or contaminated aviation fuel has caused the engine shutdown. Despite the fact that the engine could not be run, SHK has concluded that some form of fuel shortage has most probably caused the engine shutdown.

The investigation showed that the method used to calculate the fuel amount has not been reliable. Despite this, the total amount of fuel onboard was sufficient to complete the flight safely.

The investigation, however, shows that the fuel in the left tank was fully consumed. In addition, the pilot had shifted several times between the left and right tank after the engine shutdown. This in combination with the fact that it may take up to ten seconds for a stable fuel supply to be assured after supply tank change from an empty tank has probably led to an unsuccessful engine restart.

In addition, SHK has found that the SAR helicopter initially had difficulties locating the white painted aircraft against the white snow. Detection from the air would probably have been easier if the SAR helicopter had been equipped with a heat-sensing camera or the equivalent. However, in view of the fact that heat-sensing cameras are included in the current investment plans for the Authority in charge of Search and Rescue, the Accident Investigation Board will refrain from making any recommendations regarding this.

Although the rescue operation went relatively quickly, SHK identified some deficiencies. Initially a deviation from current routines occurred but the search operation by The Swedish Maritime Administration was initiated without delay. Other problems followed with the consequence that it took SOS Alarm Sverige AB<sup>1</sup> (SOS Alarm) more than four minutes to alert the municipal emergency services and ambulances. This is comparable to an average mean alert time of two minutes, stipulated in an agreement between the emergency service and SOS Alarm. It also took a long time to send out information about the event to the municipal emergency

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<sup>1</sup> The Swedish Emergency call centre.

service and ambulances, and there were deficiencies in communication and coordination between the state and municipal rescue services and ambulances.

The cause of the accident was the lack of control, planning and follow-up of the actual fuel amount before and during the flight, causing the fuel in the left tank to be used until it was nearly completely empty.

A contributing factor was probably the repeated transitions between the tank selector positions (left and right) after engine shutdown, which resulted in air remaining in the fuel lines and prevented a steady fuel supply from the right fuel tank reaching the engine and prevented a successful restart.

### **Safety recommendations**

#### **FFK is recommended to:**

- In addition to the declared own planned actions, establish routines for continuous follow-up of fuel planning and verification procedures and how they are fulfilled by the pilots. See section 2.4.3. (*RL 2019:02 R1*)

#### **The Armed Forces are recommended in cooperation with FFK:**

- Complete the work that is in progress to clarify the organization and accountability structure of the Home Guard (Hemvärnet) soldiers flying for FFK, clarifying the chain of command, and the occupational safety and employer responsibility. See section 2.7.1. (*RL 2019:02 R2*)