

SUMMARY

The incident occurred during a commercial flight from Gothenburg/Landvetter Airport. The aeroplane, of the model AVRO 146-RJ 100, was operated by Braathens Regional Aviation AB (BRA). The aeroplane had been parked outside for approximately 40 hours before the incident and was heavily contaminated with precipitation of snow and ice. A one-step de-icing of wings, stabiliser, rudder and fuselage was ordered by the commander. The de-icing was performed by the subcontracted company Aviator Airport Services Sweden AB (Aviator).

Shortly after take-off, heavy vibrations occurred at an indicated airspeed of around 195 knots. The commander took control of the aeroplane and disconnected the autopilot while the co-pilot made a distress call to air traffic control. The indicated airspeed was reduced whereby the vibrations ceased. The crew then decided to abort the flight and return to the airport. Thereafter, the speed was increased again and the vibrations returned until the speed was reduced a second time. The engineers of the company inspected the airplane after landing and discovered extensive ice coverage on multiple flight control surfaces.

According to the investigation, the aircraft type appears to be sensitive to mass balances in the control system. This means that even very thin layers of ice are sufficient to make the flight control system unbalanced beyond the tolerances specified in the aircraft's approved maintenance manuals. In this case, the ice contaminations on the aircraft were relatively extensive. Against this background, SHK has concluded that the vibrations were due to the unbalance of the elevator system that arose due to the ice contamination.

It is apparent from the investigation that the personnel who were to inspect the aircraft prior to the flight did not detect all ice contamination, which meant the de-icing order did not cover all of the ice contamination, and that there were shortcomings in the de-icing actually carried out.

The incident was partly caused by the fact that the operator lacked enough detailed procedures for performing a complete contamination inspection, and that the existing routine's was not fully applied, partly by the fact that the operator had not properly checked, evaluated and controlled the subcontractor's working methods.

A contributing factor was that the de-icing operation had insufficient organisational support to help the staff to resist requests of departure on time and to ensure that the de-icing was properly executed despite actual or experienced time shortage.

Safety recommendations

ICAO is recommended to:

- Investigate and evaluate the risks of recommended methods for de-icing and post-de-icing check, especially the incorporated method as referred to in the ICAO Annex 6, Part I, Doc 9640, and consider and decide whether the reference should be changed. *(RL 2017:10 R1)*

EASA is recommended to:

- Investigate and evaluate the risks of recommended methods for de-icing and post-de-icing checks, especially the incorporated method referred to in the referenced documents in GM3 CAT.OP.MPA.250 of Commission Regulation (EU) No 965/2012, and consider and decide whether the reference should be changed *(RL 2017:10 R2)*

The Swedish Transport Agency is recommended to:

- Evaluate the needs of changing their monitoring procedures to better ensure that AOC holders have appropriate procedures for contamination check and de-icing operations. *(RL 2017:10 R3)*