

**MEDIA STATEMENT****04 October 2011****CAA releases final report on the Merebank accident**

*Midrand* - The South African Civil Aviation Authority's (SACAA) Accident and Incident Investigation Division has released the final report on its investigation into the cause of the accident that involved SA Airlink's Jetstream 4100 aircraft that took place on 24 September 2009 in Merebank, Durban. The aircraft was registered as ZS-NRM.

In a statement, the Authority stated that the investigation process took into consideration all the different factors, possible causes and essential safety recommendations. "The sole purpose of any accident investigation is to establish the cause(s) of the accident in order to prevent recurrence as a result of similar causal factors. It is thus important to note that the report is not produced with the aim of apportioning any blame or legal liability," the SACAA pointed out.

**History of flight**

On the evening of 23 September 2009, the aircraft flew from Johannesburg on a scheduled flight to Pietermaritzburg Airport. Due to poor weather conditions at the destination, the pilots made two failed approaches and then diverted to Durban Airport, where the aircraft landed safely. The passengers were then bused to Pietermaritzburg. The crew rested overnight at a local hotel before reporting for duty at 06:45 the next day to reposition the aircraft to Pietermaritzburg. The crew consisted of the captain, co-pilot, and a cabin attendant. The co-pilot was designated as the pilot flying (PF) and the captain as the pilot not flying (PNF).

**Details of events prior to the accident**

There were no reported technical problems during the pre-flight preparation and at 07:30 the co-pilot requested permission from the Air Traffic Controller (ATC) to start the engines. As the aircraft had not been scheduled to be at Durban Airport, no ground power unit was immediately available and the crew therefore attempted to start the aircraft using the internal battery. Two unsuccessful attempts were made to start engine number one (the left-hand engine), after which the ground engineer left to obtain a ground power unit. On returning to the aircraft, he noted that the crew had managed to start both engines and subsequently gave them a thumbs-up signal as the crew taxied off. There was no-one present to witness the start but it was determined from the cockpit voice recorder and flight data recorder that engine number two (the right-hand engine) had been started first.

The co-pilot called for taxi instructions at 07:48:59. The aircraft was cleared to taxi to the holding point for Runway 06 and at 07:56:16 the ATC cleared the aircraft for takeoff. The aircraft commenced its takeoff roll from Runway 06 at 07:56, with the co-pilot as the pilot flying.

The tower controller later stated that the aircraft was still on the runway and in the vicinity of the intersection with taxiway G when he became aware of smoke coming from it. He could not, however, make out exactly where on the aircraft the smoke was coming from.

## **Witnesses**

A technician on the ground in one of the parking bays reported that he saw the accident aircraft take off. He also stated that the takeoff roll appeared uneventful but that just after rotation there was "a large cloud of black smoke that erupted from the right-hand engine". During the climb, the smoke changed colour to a whitish-brown and diminished in volume. As the aircraft crossed the end of the runway, it appeared to yaw to the right and then started to lose altitude. It then veered suddenly to the left, rapidly losing altitude, before disappearing from view.

Another witness, an airline pilot, stated that his own aircraft was taxiing to the apron as the accident aircraft started rolling. According to this pilot, ZS-NRM became totally engulfed in smoke from the moment it increased power. This pilot then enquired from the tower whether the aircraft was aware of the smoke. By the time the ATC responded, ZS-NRM was already in the air, but with its landing gear still down. The pilot of another aircraft, waiting at the holding point, informed ZS-NRM that their undercarriage was still lowered. The captain of ZS-NRM then transmitted (instead of using the intercom) an instruction to his co-pilot to raise the gear. During this transmission, the sound of the fire-warning bell could be identified in the background. At that point, the witness pilot reported that he could no longer see ZS-NRM.

The cabin attendant stated that just after take-off, as they were about to retract the undercarriage, an alarm had gone off in the cockpit. The co-pilot reached to the lights that flashed just below the dashboard and switched off the warning. The cabin attendant reported that she could feel the aircraft losing power. As she was looking outside the windows, she also saw the captain reach to the console between their seats and pull a pale-green lever to the right of the thrust levers (the left fuel-condition lever). The aircraft began to lose height. At this point, the co-pilot placed her hands on her lap. The cabin attendant looked outside the windows, and to her left could see a grass field towards which the captain now began to guide the aircraft.

The cabin attendant also mentioned that after the captain had shut down the engine, he unlatched his safety harness. She also felt vibrations at about this time; however, she thought this was turbulence as there were some clouds about.

## **Impact point**

The aircraft came down in a small open area within the residential suburb of Merebank, 1,4km from the end of Runway 06. After the initial impact, it continued across the open area, slid across a road and struck a concrete palisade fence, coming to rest on the sports field of the Merebank High School. A municipal road worker was seriously injured when he was struck by the wing of the aircraft. The three crew members were all seriously injured and had to be freed from the wreckage by the emergency services. The captain subsequently died from his injuries. The aircraft was destroyed during the forced landing due to impact forces.

## **The state of the aircraft**

The investigation revealed that prior to the accident, the aircraft was serviceable (in a working condition) when certified for the flight and no record of any malfunction or defect was recorded that could have contributed, or caused, the accident. In addition, the captain and co-pilot were correctly licensed with valid medical certificates. There was no record of any anomaly that could have affected them or could have contributed to the cause of the accident. The prevailing weather conditions at the time of the accident were considered not to be a factor in this accident.

The Jetstream 4100 aircraft is certified to be operated by two pilots and is able to take-off and climb with one operating engine, even at its maximum certificated mass.

The aircraft was equipped with a cockpit voice recorder (CVR) and flight data recorder (FDR) as required by the relevant South African Civil Aviation Regulations. Both the CVR and FDR were recovered from the wreckage and successfully read out. Playback of the cockpit voice and flight data recorder information confirmed the sequence of events in the cockpit.

Examination of the wreckage confirmed that the right-hand engine (engine 2) had suffered a catastrophic failure of the second-stage turbine seal plate and that subsequently the serviceable (operating) engine (left-hand engine) had been shut down, resulting in a forced landing. The incorrect identification of the failed engine is attributed to the apparent breakdown of the crew resource management action within the cockpit and total deviation from the operator's prescribed standard operating procedures.

A review of the Fuel Control Unit test and design requirements indicated that the fuel shut-off valves of both engines were in the closed position following the accident flight.

No defects other than the second-stage turbine seal plate failure were found in the right engine and all the physical evidence and recorded data point to this as being the cause of failure of the engine. There were no defects found on the left engine other than the seal plate which was worn beyond limits. The physical and recorded evidence shows that left engine was shut down and its propeller feathered.

### **Conclusion and safety recommendations**

Following the conclusion of the investigation, three safety recommendations that came about as a result of deviation by the crew from the operator's prescribed Standard Operating Procedures have been developed. These are:

1. The SACAA conduct a comprehensive audit of compliance with all aspects of its Air Operator Certificate requirements, including training procedures and assessments of the involved operator. This recommendation has already been implemented by the SACAA and as a result, a satisfactory action plan was submitted and implemented by the operator.
2. Because of the inappropriate crew response to propulsion system malfunction that resulted in the loss of control prior to shutting down the wrong engine, it is recommended that:
  - the SACAA conduct a comprehensive audit of the compliance with all aspects of engine inoperative training at flight schools and put more focus on the simulator training.
3. In addition, the SACAA makes the following safety recommendation to the United States' Federal Aviation Administration (FAA):
  - the FAA should mandate Honeywell Aerospace to expedite efforts to produce an engineering solution to the problem of second-stage turbine rotating air seal failures on Honeywell TPE331-14G/H engines.

Acceptance and implementation of these safety recommendations may well ensure improvement in the level of safety within the South African civil aviation safety system and thereby enhance the management of risk.

**-ENDS-**

#### ***About the SACAA:***

The South African Civil Aviation Authority ("SACAA") is a juristic body established in terms of the Civil Aviation Act, 2009 (Act No. 13 of 2009) ("the Act"). SACAA is governed and controlled by the Civil Aviation Authority Board ("the Board"). In terms of mandate, the SACAA is tasked with promoting and maintaining a safe, secure and sustainable civil aviation environment, by regulating and overseeing the functioning and development of the industry in an efficient, cost-effective, and customer-friendly manner according to international standards.

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