

3 Conclusions

3.1 Findings

- 1 The pilots and the cabin crew were qualified to perform the flight.
- 2 The aircraft was airworthy.
- 3 Clear ice formed on the upper surfaces of the wings overnight.
- 4 The clear ice was not discovered during the check made before the aircraft was de-iced.
- 5 The de-icing carried out before the flight did not remove the clear ice from the wings.
- 6 The company's instructions, routines and equipment were insufficient for ensuring the discovery and removal of clear ice.
- 7 On liftoff, clear ice was broken off the wings and ingested by the engines, damaging the engine fan stages.
- 8 The damage led to engine surging in the right engine.
- 9 The pilots had insufficient knowledge and training to enable them to identify the malfunction and take the necessary action. The pilots did not use the emergency/malfunction checklist.
- 10 Without the pilots noticing it, engine power was increased automatically through the effect of ATR, which involved an increase in the intensity of the surging.
- 11 There was no knowledge of ATR within SAS.
- 12 The surges loaded the engine so that its stage 1 stator broke up and the engine failed.
- 13 The increase in engine power also caused the left engine to start surging until – two seconds after the right engine – it failed in the same manner.
- 14 In connection with the engine failures, titanium fires broke out in both engines, and a fuel fire in the left engine. The titanium fires went out spontaneously. The fuel fire was extinguished by the first officer with the engine fire extinguishing system.
- 15 After the engine failures the captain lost his EFIS presentation in consequence of electrical power failure.
- 16 When both engines had lost all thrust the aircraft was glided to an emergency landing.

- 17 The emergency/malfunction checklist for MD-80 did not include sufficient instructions regarding speed and flap position for approach and landing with MD-80 with both engines unserviceable.
- 18 The pilots sent no distress signals.
- 19 Shortly before impact with the ground the aircraft collided with some trees, whereupon the major part of the right wing was torn off.
- 20 On impact with the ground the fuselage was broken into three parts.
- 21 Extensive damage was caused to the cabin fittings. Overhead bins fell down. A large number of bin doors opened.
- 22 Three of the eight emergency exits could not be used for evacuation.
- 23 On impact with the ground loads arose that – at least in the forward part of the cabin – exceeded the certification requirements for the aircraft.
- 24 All those on board survived, most without physical injury. One passenger suffered a disabling back injury.
- 25 The site of the accident was located from a helicopter after about 20 minutes and land rescue forces were at the location ten minutes later.
- 26 Transport of those on board was completed after about 3 hours and 30 minutes.
- 27 A complete passenger list was available to rescue personnel after about 5 hours.