CASE STUDY 8
AIRCRAFT DE-ICING

PROBLEM

With ground temperatures of -17 DegC, an FDS customers' Boeing 737-800 had been routinely de-iced in accordance with standard operating procedures prior to flight. The take-off and cruise phases were both normal. On approaching the destination airport with autopilot and auto-throttle engaged, the aircraft suddenly pitched nose-up, reading a maximum of 38.5 degrees. The airspeed dropped to very near stall speed as the pilots struggled to maintain control of the aircraft. The stall warning alert had triggered.

INVESTIGATION

The horizontal stabiliser should have automatically maintained the correct aircraft attitude so the focus of the initial investigation was the serviceability of the stabiliser and associated mechanism.

Examination of the flight data by FDS, the aircraft operator and the accident investigator showed that the pilots had applied significant force to the control columns to regain control and that the autopilot had remained engaged. Through further data analysis it was subsequently discovered that both primary and secondary input arms on the right-hand Power Control Units (PCU) were blocked when the aircraft's autopilot unintentionally elevated the nose of the aircraft.

Aircraft testing led the investigators to determine that there had been significant ingress of pre-flight de-icing fluid into the tail cone compartment. It was established that in this specific instance, the input arms were blocked when the de-icing fluid froze.

SOLUTION

Boeing was not aware of the problem and as a direct result of this incident has subsequently amended procedures in the Boeing 737 Aircraft Maintenance Manual (AMM) and the Flight Crew Operations Manual (FCOM).