

**AIRCRAFT ACCIDENT REPORT No 1/2007**

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**REPORT ON THE SERIOUS INCIDENT TO  
BRITISH AEROSPACE ATP, G-JEMC  
10 NM SOUTHEAST OF ISLE OF MAN (RONALDSWAY) AIRPORT  
ON 23 MAY 2005**

<b>Registered Owner and Operator</b>	Emerald Airways
<b>Aircraft Type</b>	British Aerospace ATP
<b>Nationality</b>	British
<b>Registration</b>	G-JEMC
<b>Place of Accident</b>	10 nm southeast of Isle of Man (Ronaldsway) Airport
<b>Date and Time</b>	23 May 2005 at 1740 hrs

**Synopsis**

This serious incident was notified to the Air Accidents Investigation Branch (AAIB) by ATC at the Isle of Man (Ronaldsway) Airport, at 1855 hrs on 23 May 2005. The following Inspectors participated in the investigation:

Mr P T Claiden	Investigator in Charge
Mr T Atkinson	Operations
Mr A H Robinson	Engineering
Mr P Wivell	Flight Recorders

Under the *Isle of Man Civil Aviation (Subordinate Legislation) (Application) Order 1992*, the *United Kingdom Civil Aviation (Investigation of Air Accidents) Regulations 1989* are applicable in the Isle of Man. Accordingly, Inspectors of Air Accident from the AAIB carried out an investigation into this occurrence.

The aircraft was configured with 64 seats; 33 passengers were on board. Shortly after takeoff, a seal associated with the retraction line for the hydraulically operated

integral airstairs at the front left cabin door, failed. This allowed hydraulic fluid to escape in the form of a fine mist, depleting the contents of the main hydraulic system. This misting was perceived by the cabin crew as smoke, and they informed the flight crew accordingly. In flight, this line is normally de-pressurised but, owing to a jammed airstairs UP selection switch and a stuck door safety microswitch, it had remained pressurised.

The intensity of the misting in the forward section of the cabin led the cabin crew to reposition the passengers towards the rear of the cabin. As a result, the aircraft's centre of gravity (CG) position moved beyond the operator's specified aft limit.

An emergency was declared to ATC and the aircraft returned to Ronaldsway. During the approach, the EGPWS system alerted the crew to an incorrect flap setting for landing.

After landing, the aircraft was taxied clear of the runway but difficulties encountered with the nosewheel steering system forced the commander to stop the aircraft short of the terminal buildings. One passenger, who was asthmatic, was taken to a local hospital but later discharged as medical treatment was not considered necessary.

The investigation identified the following causal factors:

1. A combination of a stuck door safety microswitch plunger and a jammed-on airstairs UP switch caused hydraulic pressure to remain applied to the airstairs retraction actuators in-flight.
2. The failure of the hydraulic seal associated with the airstairs operating mechanism occurred in-flight; this resulted in the fluid contents of the main hydraulic system being discharged as a fine mist into the passenger cabin.
3. At the time of the incident, there were no periodic inspection or maintenance checks required on the airstairs operating system.
4. The rearward movement of the aircraft's CG position beyond the aft limit as specified by the operator, was caused by the cabin crew moving passengers towards the rear of the cabin in an attempt to minimise their exposure to the 'smoke'.
5. There was no requirement for cabin crews to obtain agreement from the commander prior to moving passengers towards the rear of the cabin although, on this occasion, the commander was informed of their actions.

6. The flight crew's non-adherence to SOPs<sup>1</sup> and associated checklists put the aircraft and its occupants at unnecessary increased risk from potential handling problems as well as risk of fire and prolonged exposure to hydraulic fluid mist.

One safety recommendation was made.

### Findings

1. The crew was properly licensed and qualified to conduct the flight, and the flight crew held valid medical certificates.
2. The crew had rested adequately before commencing duty.
3. The aircraft's documentation was in order and there were no outstanding defects recorded in the log.
4. Shortly after takeoff, a hydraulic connection associated with the forward left door airstairs sprang a leak and caused the forward part of the passenger cabin to fill with hydraulic fluid mist.
5. The cabin crew diagnosed the mist as 'smoke'.
6. The mist mostly affected the forward part of the cabin, but also entered the flight deck.
7. The cabin crew reported the 'smoke' promptly and clearly to the commander via the interphone.
8. Immediately after the report of 'smoke' had been passed to the commander, the aircraft's

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### Footnote

- <sup>1</sup> Standard Operating Procedures.

- warning system alerted the flight crew to a HYDRAULIC LOW LEVEL condition.
9. The commander elected to return to Ronaldsway, which was the nearest available airport.
  10. The flight crew did not comply with Standard Operating Procedures regarding checklist use and crew co-ordination.
  11. The commander did not action the HYDRAULIC LOW LEVEL checklist correctly, and did not comply with its instructions.
  12. The commander declared to ATC a state of urgency (PAN) and, later, emergency (MAYDAY), but did not use the standard radiotelephony phrases.
  13. Following depletion of the hydraulic system's contents, flight crew did not follow correctly the '*EMERGENCY AND ABNORMAL LOWERING OF LANDING GEAR CHECKLIST*'.
  14. The crew did not associate the near-simultaneous low hydraulic fluid quantity warning with reports of smoke from the cabin.
  15. No review of available information was carried out by the flight crew, and they did not endeavour to establish whether the hydraulic system problem and the onset of 'smoke' were related.
  16. The flight crew did not follow the actions proscribed in the company's Operating Manual with regard to smoke on board the aircraft.
  17. The flight crew did not action any checklists referring to smoke on board the aircraft.
  18. After the onset of the 'smoke', the cabin crew moved a number of passengers to seats towards the rear of the cabin.
  19. At takeoff, the aircraft's loadsheet indicated that the aircraft's CG position was at about 24% MAC; the limits were 21% to 29%.
  20. The cabin crew could not recall with precision where the passengers were seated after they had been moved.
  21. The best estimate of the new CG position suggested that it had moved to between 30% and 31% MAC, beyond the company's specified aft limit.
  22. The cabin crew did not inform the commander that most of the passengers had been re-located in the rear section of the cabin.
  23. The commander did not seek amplification of the information regarding the movement of the passengers nor take action to address the implications associated with the rearward movement of the aircraft's CG position.
  24. The commander selected the Environmental Conditioning System packs to OFF, without reference to a checklist, and contrary to the instruction contained in the '*FIRE, SMOKE AND FUMES WITHIN FUSELAGE CHECKLIST*'.
  25. An alert from the EGPWS drew the flight crew's attention to the incorrect flap setting as the aircraft passed below the

Decision Height; the flaps were then set correctly.

26. Prior to landing, the flight crew were not aware that the nose wheel steering system was inoperative.
27. The flight crew experienced difficulty in controlling the aircraft on the ground whilst manoeuvring the aircraft by using differential thrust and brakes.
28. The commander's decision to continue to taxi the aircraft after landing was not in accordance with the checklist requirement to keep taxiing to a minimum.
29. The commander's decision to attempt to continue to taxi the aircraft to the stand after landing did not minimise the occupants' exposure to the 'smoke' or the risk of a serious fire.
30. The operator had not brought to the attention of their flight crews the information contained within the CAA FODCOMs on the topic of fire and smoke.
31. The cause of the hydraulic leak was not identified by the investigation; the seal appeared to be undamaged but had been installed for a considerable period of time.
32. Prior to this incident, there were no periodic inspections or maintenance requirements covering the forward left door safety microswitch.

### Safety Recommendations

#### Safety Recommendation 2006-069

It is recommended that the Civil Aviation Authority advises all operators of Commercial Air Transport aircraft on the UK register of the need to ensure that the training of cabin crew members includes an awareness that handling problems may result from the movement of the aircraft's CG position, should a significant redistribution of passengers be required in flight. This awareness training should include the necessity to both inform and seek the approval of the flight crew prior to such a redistribution taking place and should be reflected in the appropriate Cabin Crew Safety Manuals.

#### Safety actions

On 4 May 2006, the CAA suspended the operator's Air Operator's Certificate (AOC). The company has effectively ceased trading and, therefore, no further safety recommendations are made to the Civil Aviation Authority or Emerald Airways.