

RTCA Special Committee 209 / EUROCAE WG49

ATCRBS / Mode S Transponder MOPS Maintenance

Joint Meeting #11

RTCA Headquarters, Washington, DC

8 – 10 September 2010

Potential Changes to RTCA DO181 & EUROCAE ED 73

As a Result of the

**Provision of ‘Quick Selection’ of Emergency code 7700 - Incident to EMB154, SE-DZB, on
9 November 2009**

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SUMMARY

This Working Paper contains an extract of an accident report affecting an Embraer 145 which performed an emergency descent due to loss of cabin pressure. The crew donned their oxygen masks, which made communication with ATC difficult.

The Swedish Accident Investigation Board has raised a Safety Recommendation that transponders, in the future, should be equipped with a quick selection feature for the emergency code 7700.

1. Introduction

The following extract is taken from the Swedish Accident Investigation Board draft report and describes the accident. I have highlighted 'in **bold**' the relevant part of the extract which concerns the poor quality of the radio communications. The safety recommendation is contained in section 2 of this Working Paper.

'This aviation event involved two separate incidents, where the first was a loss of cabin pressure and the other reduced aircraft separation.

The aircraft, an Embraer 145 with call sign SDR051, had taken off from Gothenburg/Landvetter Airport for a scheduled flight to Prague. When the cruise altitude at FL 370 (approx. 11,300 metres) had been reached, the warning system indicated a fault in one of the systems that supplied air to, among other things, the pressure cabin. The pilots had started to take measures in accordance with the emergency checklist when the other system generated a warning and shut down.

The air conditioning system on this type of aircraft has a generally high failure rate. During fault tracing on the system the Pack Temp Sensor was changed, after which the system returned to normal operation. Whether the warning and system shutdown were caused by a fault in the unit that had been replaced has not been verified, but is entirely possible. The warning and shutdown could also, according to the manufacturer's analysis, have been caused by incorrect connections in two electrical units.

It seems very likely that the remaining system became overloaded or overheated, and therefore shut down automatically as a result of the first fault.

The pilots observed that the cabin pressure reduced rapidly, and they began the actions in accordance with the checklist for falling cabin pressure. The pilots donned their oxygen masks and reported to air traffic control that they were starting an "Immediate descent". The pilots did not activate the transponder emergency code. The aircraft was initially cleared to FL290 but because an "emergency descent" had been reported to air traffic control, clearance was given to FL150. The crew also reported that they wished to land at Malmö/Sturup airport. The limitation of FL150 was due to other traffic, and an ATR72 with call sign CIM027, who was cruising on a possible collision course at FL130.

When the aircraft was handed over to the next air traffic controller who handled the lower airspace, information was received from the colleague that the aircraft had requested a descent to FL150, which was not the case. When the aircraft reported descent to FL100, on the new frequency there was not enough time for the air traffic controller to plan a traffic redirection that would comply with the separation rules. When interviewed, the pilots related that the procedure with the oxygen masks was awkward and that they perceived the quality of radio communications was poor during the entire sequence of events.

Despite the air traffic controller instructed CIM027 to descend immediately, minimum separation was lost and SDR051 passed 1.27 nm in front of CIM027 with an altitude difference of 800 feet.

However the crew of CIM027 reported that they had visual contact with the descending aircraft all the time.

The first incident was caused by deficiencies in the air conditioning system in respect of automatic shutdown.

The second incident was caused by a lack of co-ordination between the air traffic controllers. A contributory factor was the poor quality of radio communications between the aircraft and air traffic control. ‘

2. Swedish Accident Investigation Board Safety Recommendations

It is recommended that EASA (note: relevant safety recommendation is highlighted **in bold**):

- Takes the necessary measures to minimise the risk of unjustified shutdown on the CPU, and to ensure that the two air conditioning systems operate independently of each other, (RL 2010: ~ R1).
- Ensures that the checklists for emergency descent always include providing information to air traffic control (RL 2010: R2).
- Ensures that checklists for emergency descent always include switching to the emergency transponder code 7700, (RL 2010: R3).
- **Investigates the conditions for that transponders in the future will be equipped with a quick selection feature for the emergency code 7700 (RL 2010: R4).**
- Investigates the conditions for making emergency descent training mandatory in connection with PC and ATPL/Type rating tests, (RL 2010: R5).

It is recommended that the Swedish Transport Agency should:

- Ensure that training and continuation training of air traffic controllers is changed in respect of the altered traffic procedures necessary in the case of a - reported or suspected - emergency descent, so that the aircraft is always assumed to be descending to FL100 or lower, (RL 2010: R6).
- Ensure that training and continuation training of air traffic controllers is changed in respect of the altered traffic procedures necessary in the case of a - reported or suspected - emergency descent, so that it will be assumed that communication could be interrupted, (RL 2010: R7).
- Investigate the conditions for the introduction of a system in the Eurocat air traffic management system, equivalent to the “pointer symbol” that was in the previous ATCAS (Air Traffic Control Automatic System) system, (RL 2010: R8).

3. Action

The meeting is invited to review the working paper and decide if any changes are required to existing documentation.