

DATA SUMMARY

LOCATION

Date and time	Tuesday, 3rd March 2004; 12:50 h local
Site	Seville Airport (Seville)

AIRCRAFT

Registration	EC-IQE
Type and model	DIAMOND DA40-180
Operator	Aerotec

Engines

Type and model	LYCOMING IO-360-M1A
Number	1

Crew

Pilot in command

Age	25 years
Licence	Commercial Pilot Licence (Aeroplane)
Total flight hours	846 h
Flight hours on the type	93 h

INJURIES

	Fatal	Serious	Minor/None
Crew			2
Passengers			
Third persons			

DAMAGES

Aircraft	Minor
Third parties	Not applicable

FLIGHT DATA

Operation	General aviation – Flight training – Dual
Phase of flight	Take-off – Take-off run

REPORT

Date of approval	27-09-06
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1. FACTUAL INFORMATION

1.1. Summary of the flight

The aircraft had planned to take off from Seville airport with an instructor and a student pilot to undertake a training flight.

When the aircraft was initiating the take-off run (still at very low speed) the rear door came away from the aircraft. The aircraft left the runway by the first available taxiway and, after warning the control tower, the door was retrieved from the runway by a signals vehicle.

The dropping of the door did not produce damage to any other part of the aircraft.

Both occupants were unharmed and were able to leave the aircraft by their own means and without any other problem.

The instructor was in possession of a current license and a medical certificate valid for the planned flight.

The aircraft had a current airworthiness certificate and, according to the documentation reviewed, it had been maintained as required by the approved maintenance schedule of the aircraft.

1.2. Tests and research

1.2.1. *Inspection of the aircraft*

The inspection of the aircraft found that the two hinges that connected the upper part of the door to the fuselage were broken in the area where the hinges join the door. There was no more damage other than those caused by the impact with the ground. All the attachment parts in the fuselage door frame were in perfect condition.

Various tests were performed on the detached door, which showed that the latching mechanism worked properly. It was also concluded that, assuming that the door was properly closed in accordance with its design, in the event of its detachment, damage would be produced in the area of the fuselage that surrounds the door. Such kind of damage was not present in this case.

It was verified that the electromechanical device that activates the warning in the cockpit panel, indicating that the rear door is open, worked correctly.

1.2.2. *Check-lists and flight manual*

In the «BEFORE START» check-list prepared by the operator, the fourth item is «rear door closed and locked» and the fifth is «front canopy in position 1 or 2». In position 2 the canopy is not closed and is used to improve the ventilation of the cabin.

In the check-list headed «AFTER START», in fifth place appears the item «check the annunciator panel».

In the «BEFORE TAKE OFF» check-list prepared by the operator, items 1 and 12 are the «doors and windows closed» and «check the annunciator panel».

In the flight manual the equivalent lists are more detailed. For example, in the list «BEFORE TAKE OFF», item one of the abbreviated list is equivalent to items 4 and 5 in flight manual, consisting of «rear door, check closed and locked» and «front canopy closed and locked».

1.2.3. *Aircraft systems and operation*

On the annunciator panel a warning lights up when the front canopy, the rear door or both simultaneously are open. It is impossible for the pilot to know which of the three circumstances is actually triggering the warning.

The usual operation of the aircraft, for reasons of cabin ventilation, is to have the front canopy in position 2 until the moment the «BEFORE TAKE OFF» check-list has to be carried out, and to close it at that time.

In the aircraft flight manual it is stated that (in the presence of strong winds) it is necessary to hold the door when it is open.

1.2.4. *Additional Information*

At the time of the incident the operator had another aircraft of the same model. It was found that the hinges of the rear door of this second aircraft were cracked. The manufacturer was consulted and they answered that such cracks were not important and that the aircraft could fly safely. The detached door was replaced and since then it has not been necessary to make more changes and the cracks that had been found in the door of the other aircraft did not progress. This was normal according to the manufacturer.

2. ANALYSIS

From the damage observed during the inspection of the aircraft (or rather, from the lack of it) it is concluded that the door was not closed at the moment at which the aircraft initiated the takeoff.

It is considered that the design of the hinges of the rear door is such that they will break almost immediately should the aircraft move without the door being closed (which was what happened in this case).

As the front canopy was in position 2 to improve the ventilation (the usual and allowed by the flight manual practice), it is considered that during taxi the crew ignored the open door warning on the annunciator panel since it was expected because the front canopy was not closed.

It is considered that the check-list «BEFORE TAKE OFF» was not completed (at least as refers to items 1 and 12). Had it been, then the crew would have known that the door was open.

3. CONCLUSIONS

It is considered that the most probable cause of the incident was that the rear door of the aircraft detached because it was not correctly closed and the origin of this latter situation was that the tasks in the check-lists that ensure the door is closed had not been completed. A contributory factor that can be considered is that the design of the closed-door warning system does not allow for the unequivocal identification of this circumstance.

4. SAFETY RECOMMENDATIONS

REC 12/06. It is recommended to AEROTEC that means are provided to assure that crews carry out the applicable check-lists.

REC 13/06. It is recommended to EASA to require the holder of the type certificate to modify the design of the door-open warning system in order to avoid that different situations trigger the same light.