

AAIB Bulletin No: 11/93

Ref: EW/C93/6/1

Category: 1.1

INCIDENT

Aircraft Type and Registration: Boeing 757-236, G-BIKC

No & Type of Engines: 2 Rolls-Royce RB211-535C turbofans

Year of Manufacture: 1983

Date & Time (UTC): 1 June 1993 at 1030 hrs

Location: Little Hill Primary School, North-east Glasgow

Type of Flight: Scheduled passenger

Persons on Board: Crew - N/K Passengers - N/K

Injuries: Crew - None Passengers - None

Nature of Damage: Overwing fairing section, on right side of fuselage, detached

Commander's Licence: Airline Transport Pilot's Licence

Commander's Age: Not known

Commander's Flying Experience: Total - Not known
On type - 3,220 hours

Information Source: AAIB Field Investigation

During the climb out after take off from Glasgow, a vibration was felt by the crew for a short period which ceased at an altitude of about 7,000 feet. Since there were no indications of any abnormalities after the vibration had stopped, the flight was continued to London Heathrow. During the approach to London Heathrow, the crew observed again that the vibration level was higher than normal.

After landing it was found that part of the right overwing fairing had become detached from the aircraft. The detached sections of the GRP/honeycomb sandwich fairing consisted of a complete panel, 3 feet x 4½ feet, which had subsequently torn off a further L shaped section, about 5 feet x 5 feet. These had separated from the aircraft during the climb out of Glasgow and the parts had descended into the playground of a Primary School. Nobody in the playground had sustained any physical injuries. The panel was transported, immediately, to Heathrow and inspected in conjunction with the aircraft.

The panel, which formed part of the wing top surface to fuselage fairing, was normally retained along three of its four edges by a row of countersunk head screw fasteners, the top edge being free to move against the fuselage side. It was established, from the lack of damage to a number of the fastener holes in the panel, that a considerable number of fasteners, in particular all those attaching the panel leading edge, had not been installed at the time that the panel had separated from the aircraft.

A test of the friction locking properties of the captive nuts installed on the aircraft to retain these fasteners was performed. This showed that all the nuts associated with fasteners which had been missing at the time that the panel separated had lost their locking properties and it was possible to screw a new fastener in and out of any of them effortlessly using the fingers. The panel involved in this incident was not normally removed at any time during the maintenance cycle between inter-checks, which occur at about 2 year intervals, and the nuts are specified as being reuseable 15 times.

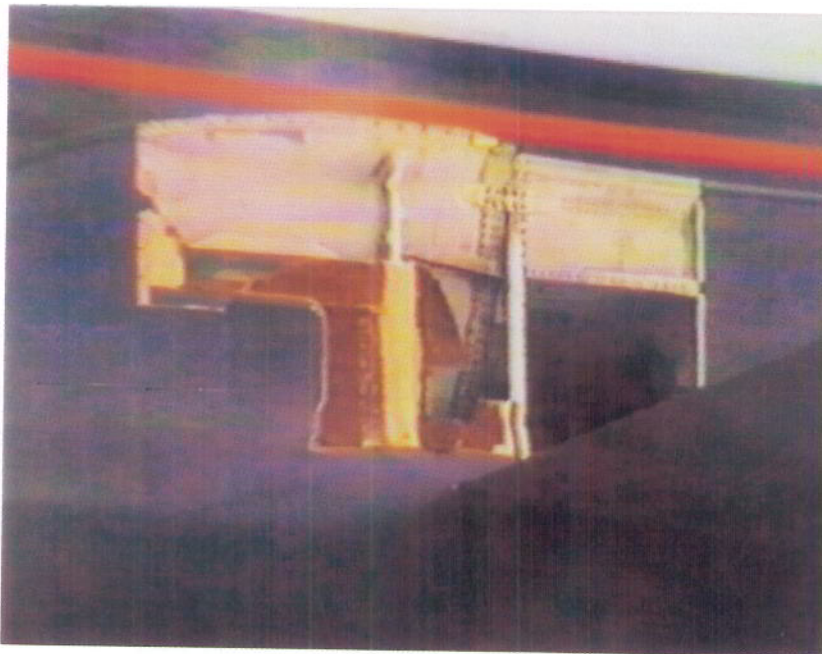
As a result of this incident, the operator instituted a fleet inspection to check the attachments of these particular overwing panels and it was found that on 75% of the aircraft in their fleet there were some loose or missing fasteners. The incidence of these was not confined to the older aircraft only but was randomly distributed over the age spectrum of all the aircraft in the fleet.

Examples of the degraded captive nuts were returned to the aircraft manufacturer whose investigations revealed that the captive nuts were no longer to specification in relation to their self locking properties, the threadform having become worn, but appeared to conform to the required material specifications. The manufacturer also stated that they had no reports from other Boeing 757 operators of problems with these fasteners.

As a result of these findings, the operator has instituted a programme to check the rundown torque of the fasteners of all the overwing panels on the entire Boeing 757 fleet as part of a revised maintenance procedure. This check requires that the servicability of the nuts is checked at the next scheduled removal of each overwing panel and that sub-standard nuts must be replaced before panels are refitted. They have also conducted a survey of the levels, practices and frequencies of inspection of the fasteners on similar panels on all the other aircraft fleets which they operate. This revealed that inspection of the fasteners in this type of zone on the Boeing 757 fleet was markedly less frequent than on the other fleets. As a result of this survey, the operator's Boeing 757 Maintenance Schedule has been amended to increase the frequency of inspection of these fasteners from the previous period, of 2 years or 4,500 hours, to the current period of 1 year or 2,000 hours.



Fig 1 General view showing area of fairing which detached above flap.



Leading edge
all fasteners missing

Fig 2 Closer view showing forward rectangular section which detached as a result of missing fasteners and L shaped section of panel immediately aft which was torn off with it.