INCIDENT

Aircraft Type and Registration:	Britten-Norman BN2A Mk III-1 Trislander, G-LCOC
No & type of Engines:	3 Lycoming O-540-E4C5 piston engines
Year of Manufacture:	1974
Date & Time (UTC):	7 June 2006 at 0530 hrs
Location:	Saint Brieuc, Brittany, France
Type of Flight:	Public Transport (Passenger)
Persons on Board:	Crew - 1 Passengers - 3
Injuries:	Crew - None Passengers - None
Nature of Damage:	Baggage door damaged
Commander's Licence:	Commercial Pilot's Licence
Commander's Age:	40 years
Commander's Flying Experience:	2,900 hours (of which 205 were on type) Last 90 days - 75 hours Last 28 days - 27 hours
Information Source:	Aircraft Accident Report Form

Synopsis

Shortly after takeoff there was a loud bang. On inspection after landing the pilot found that the baggage door had been forced inwards into its aperture. The locking mechanism functioned normally and it is likely that the door was not properly secured prior to departure. The operator intends to change ground handling procedures to avoid a repeat occurrence.

History of the flight

The aircraft was operating a scheduled passenger service from Saint Brieuc to Guernsey. Shortly after takeoff from Saint Brieuc, after the aircraft had climbed to approximately 200 ft agl, there was a loud bang. The commander could not identify the cause but, after establishing that all three engines were operating normally and that the aircraft was under control, he returned to Saint Brieuc. The landing was uneventful and as the aircraft vacated the runway, neither the ATCO nor the AFRS, which was immediately in attendance, reported anything unusual about its appearance. After disembarking the passengers, the commander inspected the aircraft and found that the baggage door, though still attached to the aircraft, had been forced into the baggage compartment. An inspector from the DGAC who attended shortly after the incident found that the baggage door locking mechanism functioned normally.

Aircraft information

The Trislander is a stretched derivative of the Britten-Norman Islander twin-engined aircraft and

differs primarily in having a longer fuselage and an additional engine mounted on the vertical stabiliser. It is unpressurised. The two designs share many components, including the outward-opening rear baggage door which on both types is mounted on the left hand side of the rear fuselage. The door is constructed of glass-reinforced plastic and is attached to the fuselage by two hinges mounted on its forward edge. When closed, the door is secured by a plain latch which is operated from the outside by rotating a lever. Neither the lever nor the latch is sprung, so the latch must be rotated to the secure position by hand when the door is fully closed. The door is not fitted with any device, such as a warning light in the cockpit, to indicate to the pilot that it is not shut and its security can only be assessed by visual inspection of the door itself. However, a device fitted to each of the four passenger doors will illuminate a light in the cockpit if any of these doors is not closed.

Damage to the aircraft

One of the operator's engineers, who inspected the aircraft at St Brieuc, judged that the door had not been secured prior to flight and had been forced through its aperture by aerodynamic forces when the aircraft became airborne. The door lip, which normally would rest against the outside of the door frame, had been deformed sufficiently to allow the door to move inwards. One of the three rivets attaching each door hinge to the outer skin of the fuselage had been loosened by lever action. The engineer considered that the hinges were sufficiently secure to allow a new door to be fitted for the non-revenue return flight to the operator's base at Jersey Airport where the rivets were replaced before the aircraft was returned to service.

Previous occurrences of the baggage door opening in flight

Several Trislanders are in service with three operators in the United Kingdom and both Islanders and Trislanders have been exported widely. None of the four documented instances of baggage doors opening in flight were attributed to failure of the door or its locking mechanism.

Ground handling procedures

The operator provides staff to conduct the ground handling of its flights at all of the airports to which it flies except St Brieuc, where the airport provides this service. The operator stated that handling staff at each location have access to a copy of the company Ground Handling Manual (GHM) which describes the correct procedures for loading and dispatching the aircraft.

To avoid tipping the aircraft on its tail during loading, the procedure at the time of the incident was to place a trestle under the tail and embark passengers before baggage. The operator considered that it was not good practice to leave the cockpit unattended with passengers onboard and that consequently, a commander could not leave the aircraft interior to check the baggage door when loading was complete. Therefore, although a commander would bear ultimate responsibility for ensuring the safe conduct of the flight, responsibility for checking the security of the baggage door was delegated to a ground handler, whose duty it was to report to a commander that all the doors were secure prior to the engines being started.

Follow-up action

Another Trislander operator reported that, as a result of a similar incident several years ago, it introduced a procedure intended to ensure that a satisfactory check of baggage door security was made prior to flight. Judging that an unsecured baggage door could be identified more readily from behind (because it opens forwards, exposing the latch mechanism and parts of the irregular inner door structure on its trailing edge) the operator

instructed ground staff to walk clockwise around the aircraft from its starboard to its port side, checking each door in turn. The new procedure has been successful in eliminating this type of occurrence. The operator of G-LCOC stated that it intends to introduce a similar procedure, the relevant text of which is reproduced below together with a diagram (Figure 1).

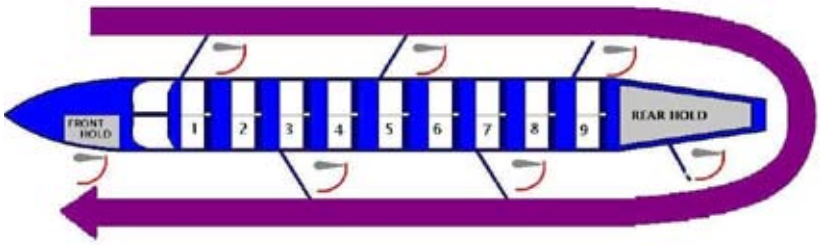

Figure 1

Trislander walk-round route for ground staff

The tail trestle must be in position at all times when the aircraft is parked on stand.

Once all baggage is loaded, call the passengers to the aircraft, with the approval of the Captain.

When all passengers are on board

a. *Remove steps from the vicinity of the aircraft.*

b. *Walk down the starboard side of the aircraft, checking each door is secured.*

c. *Remove the pogo-stick[1] (if being used) and secure in the hold.*

d. *Walk up port side of the aircraft, checking all the doors.*

e. *Ensure that the Captain has a copy of the load sheet, and no door warning lights are showing in the cockpit.*

When ready for start-up and the aircraft is secure, seek the Captain's permission to remove the trestle.

In this revised procedure, baggage is loaded before passengers. The pilot remains seated in order to counterbalance the weight of baggage and thereby reduce the load on the tail trestle which impinges upon an area of the fuselage which is not reinforced.

Although the 'pogo-stick' will contact the ground if the loading results in an excessively rearward centre of gravity, it will not always prevent the aircraft from tipping on its tail. Consequently, a tail trestle is used for support during loading. However, because the pogo-stick forms part of the aircraft's standard equipment, the operator has retained reference to it in the ground handling procedure to ensure that it is removed before flight. The operator also intends to paint the inboard surfaces of all baggage doors on its Trislander aircraft with red and white stripes to attract further attention when a door is open.

The organisation which holds the type design authority for Trislander aircraft is considering restarting production of the type. It has stated that it would equip all Trislanders produced in the future with a baggage door warning system including a light in the cockpit that would illuminate if the door was not properly closed. Attempts to retrofit such a system to existing airframes have proved complex and uneconomic.

Conclusion

The baggage door was probably serviceable prior to the flight but it was not secured prior to departure. During the short flight, aerodynamic forces shut the door with sufficient violence to push it into the fuselage aperture.

Footnote

[1] The pogo-stick is a pole which attaches to a point beneath the fuselage tail.