Safety Regulation Group
Safety Information and Data Department

Follow-up Action on Occurrence Report

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ACCIDENT TO AIRBUS A320-211, JY-JAR, AT LEEDS BRADFORD AIRPORT ON 18 MAY 2007

CAA FACTOR NUMBER	:	F37/2007
FACTOR PUBLICATION DATE	:	11 December 2007
OPERATOR	:	Jordan Aviation
CAA OCCURRENCE NUMBER	:	2005/03628
AAIB REPORT	:	AAR 6/2007

SYNOPSIS

From AAIB Report:
While landing on Runway 14 at Leeds Bradford Airport the aircraft touched down just beyond the end of the marked touchdown zone with low autobrake selected. Manual wheel braking commenced shortly after mainwheel touchdown. At a groundspeed of around 70 kt the brakes ceased operating, for about 17 seconds. A pronounced dip in the runway surface initially prevented the pilots from seeing the runway end. When it became apparent to the commander that it would not be possible to stop before the end of the runway, he deliberately did not select alternate braking, as this would have caused loss of nosewheel steering, but instead used nosewheel steering to turn the aircraft sharply to the right. The aircraft skidded sideways and came to a halt with its nosewheels off the runway, shortly before the end of the paved surface and the start of a steep down slope.

The cause of the braking loss could not be positively established but it was consistent with the effects of excessive noise in the electrical signals from the mainwheel tachometers used to sense groundspeed. Two of the tachometer driveshafts were found bent and it was known that this encouraged a resonant condition that could cause tachometer signal errors above the groundspeed at which they would be detected by the aircraft's monitoring systems. Should the condition affect both main landing gears simultaneously, the brake control system logic could generate an erroneous aircraft reference speed, which could activate the anti-skid system and release the brakes. Fluctuation in the signal errors would prevent the system from detecting and correcting the braking loss or providing a warning to the crew.

It was found that there were a number of other known anomalies with the brake control and monitoring system that could cause either brake failure or locking of the wheels, some of which had resulted in previous incidents and accidents. The aircraft manufacturer and the Airworthiness Authority had defined and implemented corrective actions, and redesigned tachometer driveshafts and updated software intended to correct some of the faults were available, but had not been incorporated on a substantial number of aircraft, including JY-JAR. The findings raised concerns about the aircraft manufacturer's procedures intended to ensure design quality and continued airworthiness.

The investigation identified the following causal factors:

1. Excessive wheel tachometer signal noise, caused by a bent tachometer driveshaft on each main landing gear assembly, resulted in loss of braking using the Normal system.

2. Inadequate fault tolerance within the brake control system led to the sustained loss of Normal braking during the landing ground roll.

3. There was no flight deck indication of brake system malfunction, and this delayed the crew's recognition of the loss of braking.

4. There was a lack of effective action to fully rectify brake system anomalies apparent from previous incidents and accidents.

Seven Safety Recommendations were made.

FOLLOW UP ACTION

The seven Safety Recommendations made by the AAIB following their investigation are reproduced below together with the CAA's responses.

Recommendation 2007-012

The Jordanian Civil Aviation Authority should ensure that aircraft operators under their jurisdiction have procedures in place to ensure the continued airworthiness of mandatory flight recorders.

CAA Response

This Recommendation is not addressed to the CAA.

CAA Status - Closed

Recommendation 2007-013

The Civil Aviation Authority should publish information with the Aeronautical Information Package relating to runways which do not comply with the provisions of CAP 168, or which have profiles that reduce the ability of pilots to assess landing performance distance remaining visually, in the form of a 'Warning' within the 'Local Traffic Regulations' section or the 'Remarks' area of 'Runway Physical Characteristics' for all affected UK airports.

CAA Response

The CAA accepts this recommendation.

In the case of Leeds Bradford Airport, information on the line of sight characteristics of runway 14/32 is now published in the AIP in the 'Remarks' area of AD2.12, 'Runway Physical Characteristics'.

The CAA will carry out a review to ensure that all runways that possess profiles or line of sight characteristics that do not comply with the provisions of CAP 168, or which have profiles that reduce the ability of pilots visually to assess landing performance distance remaining, are identified and appropriately notified in the Aeronautical Information Package (AIP) for all UK licensed aerodromes.

This work will be completed by June 2008.

CAA Status - Open

Recommendation 2007-014

The International Civil Aviation Organization (ICAO) should re-assess the benefits and disadvantages to runway situational awareness of runway distance markers for any runway which has a profile that prevents the end of the paved surface from being in view continuously from the flight deck. If the re-assessment concludes that a net benefit is likely, the ICAO should encourage the installation of such markers at relevant civil airports.

CAA Response

This Recommendation is not addressed to the CAA.

CAA Status - Closed

Recommendation 2007-015

The European Aviation Safety Agency should require the expeditious replacement of the long hollow titanium tachometer driveshaft in the braking systems of the A320 family or aircraft with a driveshaft of improved design.

CAA Response

This Recommendation is not addressed to the CAA.

CAA Status - Closed

Recommendation 2007-016

The European Aviation Safety Agency should ensure the replacement of software Standards 7 or 9 with Standard 9.1 or a proven later version, in those remaining Airbus A319 and A320 brake and steering control units not yet so modified.

CAA Response

This Recommendation is not addressed to the CAA.

CAA Status - Closed

Recommendation 2007-018

The European Aviation Safety Agency should consider requiring, for aircraft in the A320 family and other aircraft with similar combined Brakes and Steering Control systems, changes that allow manual selection of Alternate braking without consequent loss of nosewheel steering.

CAA Response

This Recommendation is not addressed to the CAA.

CAA Status - Closed

Recommendation 2007-019

The European Aviation Safety Agency should require Airbus to take measures aimed at ensuring that anomalies in A318/319/320/321 aircraft braking systems that may lead to loss of Normal braking are clearly indicated to the flight crew.

CAA Response

This Recommendation is not addressed to the CAA.

CAA Status - Closed