Australian Government
Australian Transport Safety Bureau

ATSB TRANSPORT SAFETY INVESTIGATION REPORT

Aviation Occurrence Report – 200604949

Final

Flight control system event
120 km north of Brisbane Airport, QLD
25 August 2006
VH-VBN
Boeing Company 737-76N

Australian Government

Australian Transport Safety Bureau

ATSB TRANSPORT SAFETY INVESTIGATION REPORT

Aviation Occurrence Report
200604949

Final

Flight control system event
120 km north of Brisbane Airport, QLD
25 August 2006
VH-VBN
Boeing Company 737-76N

Published by: Australian Transport Safety Bureau
Postal address: PO Box 967, Civic Square ACT 2608
Office location: 15 Mort Street, Canberra City, Australian Capital Territory
Telephone: 1800 621 372; from overseas + 61 2 6274 6130
Accident and serious incident notification: 1800 011 034 (24 hours)
Facsimile: 02 6274 6474; from overseas + 61 2 6274 6474
E-mail: atsbinfo@atsb.gov.au
Internet: www.atsb.gov.au

ISBN and formal report title: see 'Document retrieval information' on page iii.

DOCUMENT RETRIEVAL INFORMATION

Report No.	Publication date	No. of pages	ISBN
200604949	10 May 2007	8	978-1-921164-73-6

Publication title

Flight control system event, 120 km north of Brisbane Airport, QLD, Boeing Company B737-76N, VH-VBN, 25 August 2006

Prepared by

Australian Transport Safety Bureau
PO Box 967, Civic Square ACT 2608 Australia
www.atsb.gov.au

Reference No.

May2007/DOTARS 50231

Acknowledgements

Figure 1 courtesy of the operator.

Abstract

The flight crew of the Boeing Company 737-76N aircraft reported that during descent and taxi operations, they felt several rudder 'kicks' in the pilot in command's rudder pedals, accompanied by an audible noise.

Subsequent examination of the pilot in command's rudder pedal jackshaft assembly revealed two bearings and a universal joint were worn excessively.

The wear of the components of the jackshaft assembly, although not desirable, was not an immediate safety of flight concern for the operation of the aircraft.

The operator issued a flight crew operations notice and an engineering notice to highlight the occurrence to personnel.

THE AUSTRALIAN TRANSPORT SAFETY BUREAU

The Australian Transport Safety Bureau (ATSB) is an operationally independent multi-modal Bureau within the Australian Government Department of Transport and Regional Services. ATSB investigations are independent of regulatory, operator or other external bodies.

The ATSB is responsible for investigating accidents and other transport safety matters involving civil aviation, marine and rail operations in Australia that fall within Commonwealth jurisdiction, as well as participating in overseas investigations involving Australian registered aircraft and ships. A primary concern is the safety of commercial transport, with particular regard to fare-paying passenger operations.

The ATSB performs its functions in accordance with the provisions of the Transport Safety Investigation Act 2003 and Regulations and, where applicable, relevant international agreements.

Purpose of safety investigations

The object of a safety investigation is to enhance safety. To reduce safety-related risk, ATSB investigations determine and communicate the safety factors related to the transport safety matter being investigated.

It is not the object of an investigation to determine blame or liability. However, an investigation report must include factual material of sufficient weight to support the analysis and findings. At all times the ATSB endeavours to balance the use of material that could imply adverse comment with the need to properly explain what happened, and why, in a fair and unbiased manner.

Developing safety action

Central to the ATSB's investigation of transport safety matters is the early identification of safety issues in the transport environment. The ATSB prefers to encourage the relevant organisation(s) to proactively initiate safety action rather than release formal recommendations. However, depending on the level of risk associated with a safety issue and the extent of corrective action undertaken by the relevant organisation, a recommendation may be issued either during or at the end of an investigation.

The ATSB has decided that when safety recommendations are issued, they will focus on clearly describing the safety issue of concern, rather than providing instructions or opinions on the method of corrective action. As with equivalent overseas organisations, the ATSB has no power to implement its recommendations. It is a matter for the body to which an ATSB recommendation is directed (for example the relevant regulator in consultation with industry) to assess the costs and benefits of any particular means of addressing a safety issue.

FACTUAL INFORMATION

A Boeing Company 737-76N aircraft, registered VH-VBN, was on a scheduled flight from Cairns to Brisbane, QLD, when the flight crew felt several rudder 'kicks' in the pilot in command's (PIC's) rudder pedals accompanied by a noise. The crew later reported that the rudder kicks were felt and the noise heard, during descent at 198 kts indicated airspeed with a flap 5 setting, and while the aircraft was on being taxied on the ground.

The aircraft model had a history of safety related advisories involving uncommanded rudder inputs. Following the event, the flight data recorder was removed and the data downloaded. The data was sent to both the US National Transportation Safety Board and the aircraft manufacturer for analysis. No anomalies of the rudder control system were identified.

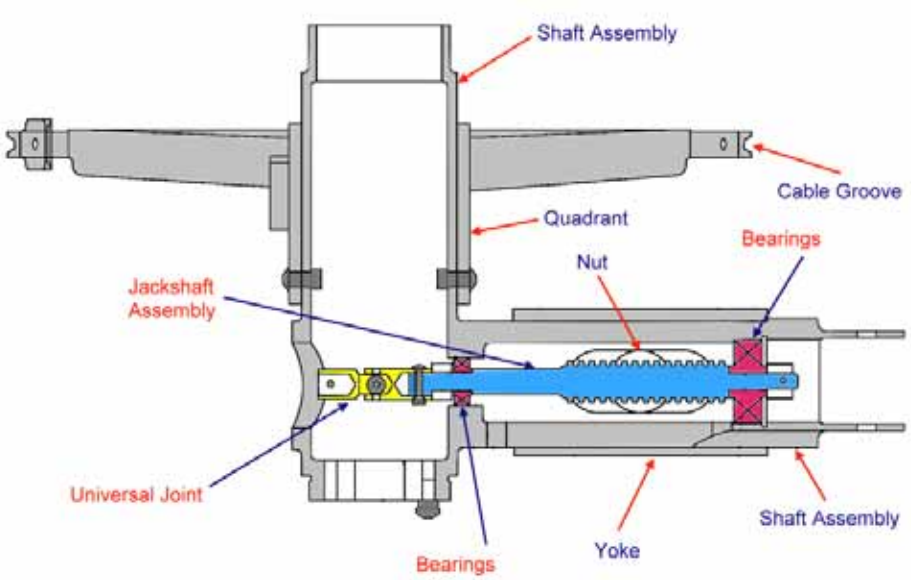
Operator maintenance personnel examined the aircraft, including the rudder assembly and control system. No anomalies of the system were found, but it was identified that the PIC's rudder pedal adjustment mechanism slipped to the locked position when in the mid to retracted position (shorter leg extension position). The operator concluded that the rudder kicks reported by the flight crew may have been related to this problem. The PIC's rudder pedal adjustment mechanism was replaced and the aircraft returned to service with no further problems reported.

The removed rudder pedal adjustment mechanism was sent to the aircraft manufacturer for further technical examination. That mechanism included a jackshaft assembly, which enabled the adjustment of the rudder pedals by a PIC, relative to the PIC's seat.

The aircraft manufacturer and the operator had previously issued advisories to the pilots of the aircraft model that cautioned against 'loading' the rudder pedals with any force while adjusting the pedal position as this had a detrimental effect on the mechanism.

Further detailed examination of the jackshaft assembly by the component manufacturer indicated that the bearings and the universal joint of the shaft assembly were worn excessively (figure 1). The bearings and universal joint were replaced and the jackshaft returned to service.

Figure 1: Jack shaft assembly cross-section



At the time of the occurrence, the aircraft had accumulated 16,838 hours and 9,211 cycles since new. The total time of the pilot's rudder pedal jackshaft assembly was unknown.

ANALYSIS

The flight recorder data confirmed that there were no uncommanded inputs to the rudder control system during the flight.

The anomaly with the rudder control system as reported by the flight crew was the result of excessive wear of the bearings and universal joint of the jackshaft assembly.

With the knowledge of past rudder safety related advisories involving uncommanded inputs on this model of aircraft, the rudder anomaly may have led the flight crew to believe that there was a problem with the rudder control system. The wear of the components of the jackshaft assembly, although not desirable, was not an immediate safety of flight concern for the operation of the aircraft.

SAFETY ACTION

As a result of the occurrence, the aircraft operator has issued a flight crew operations notice to caution their pilots on applying force to the rudder pedals while adjusting the pedal length. They have also issued an engineering notice highlighting this occurrence.