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**NATIONAL
TRANSPORTATION
SAFETY
COMMITTEE**

Aircraft Serious Incident Investigation

**PT. Metro Batavia Airline
PK-YTU
Boeing Company 737-300
Depati Amir Airport, Pangkal Pinang
Republic of Indonesia**

7 January 2007



**NATIONAL TRANSPORTATION SAFETY COMMITTEE
MINISTRY OF TRANSPORTATION
REPUBLIC OF INDONESIA
2010**

This Final Report was produced by the National Transportation Safety Committee (NTSC), Karya Building 7th Floor Ministry of Transportation, Jalan Medan Merdeka Barat No. 8 Jakarta 10110, Indonesia.

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GLOSSARY OF ABBREVIATIONS

AFML	:	Aircraft Flight Maintenance Log
AOC	:	Air Operator Certificate
ATPL	:	Air Transport Pilot License
CASR	:	Civil Aviation Safety Regulation
CPL	:	Commercial Pilot License
CVR	:	Cockpit Voice Recorder
DGCA	:	Directorate General Civil Aviation
FDR	:	Flight Data Recorder
ITB	:	Institute of Technology, Bandung
NDT	:	Non-Destructive Test
KNKT / NTSC	:	Komite Nasional Keselamatan Transportasi / National Transportation Safety Committee
PIC	:	Pilot in Command
UTC	:	Universal Time Coordinate

INTRODUCTION

SYNOPSIS

On 7 January 2007, a Boeing Company 737-300 aircraft, operated by Metro Batavia Airline (Batavia Air), registered PK-YTU, was on a scheduled passenger service as flight number 7P-524 from Depati Amir Airport, Pangkal Pinang¹ with intended destination was Soekarno-Hatta Airport, Jakarta.

At 10:00, the aircraft was lining up by turning 180°, while the aircraft turn 90°, the pilot heard a sound, he assumed that its came from something that was braking. The pilot decided to return to apron for inspection to the source of the sound.

After inspection, it was found that right nose wheel axle shaft was broken and right nose wheel was missing.

The right nose wheel axle shaft and the nose wheel were found on runway shoulder approximately 3 meters from the runway.

The metallurgy laboratory of the ITB investigation report concluded that the initial crack of the lower of the right nose wheel axle shaft, it was indicated of overloaded forces, at ten time of landing before occurrence as indicated by beach mark.

During the investigation the Operator and DGCA took safety action:

- a. Conducting of inspection to all B737 fleet against the possibility similar damage with NDT methods.
- b. Quality Assurance Department had reviewed/evaluated and trained all ratings holders to improve their knowledge of the standard basic of aircraft maintenance.
- c. Department of Engineering had reviewed/evaluated to all AMM that used for maintenance on its validity and currency.

¹ Depati Amir Airport, Pangkal Pinang is referred as 'Pangkal Pinang' in this report.

1 FACTUAL INFORMATION

1.1 History of the Flight

On 7 January 2007, a Boeing Company 737-300 aircraft, operated by Metro Batavia Airline (Batavia Air), registered PK-YTU, was on a scheduled passenger service as flight number 7P-524 from Depati Amir Airport, Pangkal Pinang with intended destination was Soekarno-Hatta Airport, Jakarta. The flight carried 142 passengers including 3 infants, and 6 crewmembers consist of two pilots and four flight attendants. The pilot in command (PIC) was the handling pilot, and the co-pilot was the pilot monitoring.

The aircraft block off at 09:57 UTC (16:57 LT) and taxi to runway 16 for take-off.

At 10:00, the aircraft was lining up by turning 180°, while the aircraft turn 90°, the pilot heard a sound, he assumed that its came from something was braking. The pilot decided to return to apron for inspection to the source of the noise.

After inspection, it was found that right nose wheel axle shaft was broken and right nose wheel was missing.

The right nose wheel axle shaft and the nose wheel were found on runway shoulder approximately 3 meters from the runway.



Figure 1: The Boeing B737-300 aircraft Reg. PK-YTU after occurrence

1.2 Injuries to Persons

Injuries	Flight crew	Passengers	Total in Aircraft	Others
Fatal	-	-	-	-
Serious	-	-	-	-
Minor/None	6	142	148	-
TOTAL	6	142	148	-

1.3 Damage to Aircraft

The right nose wheel axle shaft broken.



Figure 2: Damaged on the right nose wheel axle shaft



Figure 3: The right nose wheel axle shaft and the right nose wheel

1.4 Other Damage

There was no other damage to property and/or the environment.

1.5 Personnel Information

1.5.1 Pilot in command

Date of birth : 23 May 1973
Gender : Male
Nationality : Indonesia
Licence : ATPL
Valid To : 30 April 2007
Type Rating : B737-200/300/400/500
Date of Medical : 30 October 2006

The pilots held valid licenses and ratings for the operation of the aircraft.
This section covering flight crew is not relevant to this serious incident.

1.5.2 Co-pilot

Date of birth : 7 May 1979
Gender : Male
Nationality : Indonesia
Licence : CPL
Valid To : 30 April 2007
Type Rating : B737-300/400/500
Date of Medical : 16 October 2006

The pilots held valid licenses and ratings for the operation of the aircraft.
This section covering flight crew is not relevant to this serious incident.

1.6 Aircraft Information

1.6.1 General

Aircraft Registration : PK-YTU
Country of Manufacturer : United State of America
Manufacturer : Boeing Company
Type/ Model : B737-300
Serial Number : 25604
Year of Manufacture : 1992
Certificate of Airworthiness Valid to : 2 April 2007
Time Since New : 36,154 hours (1 January 2007)
Cycles Since New : 25,873 cycles (1 January 2007)
Last minor check A11 : 35,996 hours /11 December 2006

At the time of the serious incident, the aircraft was certified as being airworthy.

1.6.2 Nose Landing Gear Information

Part number : 65-73762-21
Serial number : T5050P2339
Last overhaul : 15 July 2002 (FAA No. XYJY995L)
Time between overhaul : 12,903 hours (1 January 2007)

1.6.3 Maintenance Data

Last installation of the nose wheel was on 25 December 2006 (ref. AFML No. 04154).

The right nose wheel axle shaft broken was a part of inner cylinder assembly part number 65-46215-21 serial number CPT2934ET, reaming to life limit was 49,661 cycles and 12,903 hours for overhaul.

1.7 Meteorological Information

Not relevant to this serious incident.

1.8 Aids to Navigation

Not relevant to this serious incident.

1.9 Communications

Communications between the ATC and the crew were normal and no communication difficulty.

1.10 Aerodrome Information

Aerodrome Code : PGK / WIPK
Airport Name : DEPATI AMIR
Airport Address : Jl. Soekarno Hatta / Jl. Koba Km.7
Pangkalan Baru - Pangkal Pinang
Airport Class : II
Airport Authority : Directorate General of Civil Aviation
Airport Service : Domestic
Coordinates : 02° 09' 45" S, 106° 08' 17" E
Elevation : 109 feet
Runway Length : 2,000 meters
Runway Width : 30 meters

1.11 Flight Recorders

The aircraft was equipped with Digital Flight Data Recorder (DFDR) and a Cockpit Voice Recorder (CVR).

The flight recorders were quarantined by the National Transportation Safety Committee investigators. The Cockpit Voice Recorder data was downloaded for the investigation. FDR and CVR data were considered not required for the investigation.

1.12 Wreckage and Impact Information

Not relevant to this serious incident.

1.13 Medical and Pathological Information

Not relevant to this serious incident.

1.14 Fire

There was no pre or post impact fire.

1.15 Survival Aspects

The pilot and passengers were not injured.

1.16 Tests and Research

Not relevant to this serious incident.

1.17 Organisational and Management Information

Aircraft Owner : AerCo Limited
22 Greenville Street, St. Helier, Jersey, JE48PX,
Channel Island

Aircraft Operator : PT. Metro Batavia Airline (Batavia Air)
Jl. Ir. H. Juanda No. 15 Jakarta Pusat, Republic
Indonesia

Air Operator Certificate Number: AOC/121-007

1.18 Additional Information

1.18.1 Laboratory Examination

A metallurgical laboratory examination was performed on the broken axle at the laboratory of metallurgical engineering of the Institute of Technology, Bandung (ITB) under supervision National Transportation Safety Committee (NTSC) investigators. This examination was to determine the cause of the failure of the axle.

The examination concluded that the initial crack of the lower part of the right nose wheel axle shaft was indication of overloaded forces which initiated ten landings before occurrence as indicated by the beach marks.

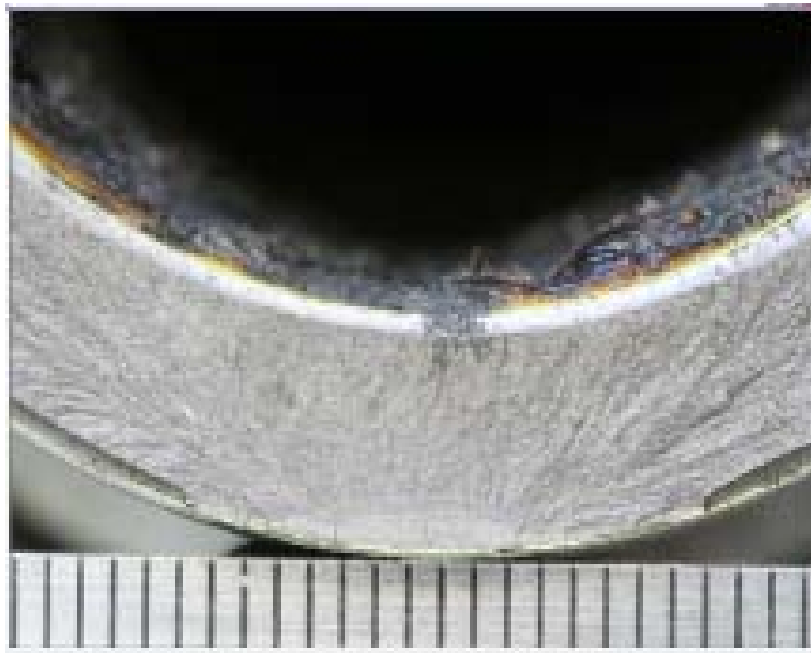


Figure 4: Overload forces indicated by beach marks

1.18.2 Line Maintenance Finding

During the course of investigation, it was found the replacement of the broken axle, the replacement was referring to the Aircraft Maintenance Manual that was not applicable to the specific aircraft.

There was a torque meter available without a valid calibration. However, the installation of torque link did not used the torque meter. The engineer assumed that an installation torque link bolt and nut combine with split pin was not required torque value.

1.19 Useful or Effective Investigation Techniques

The investigation is being conducted in accordance with the NTSC approved policies and procedures, and in accordance with the standards and recommended practices of Annex 13 to the Chicago Convention.

2 ANALYSIS

2.1 Failure Analysis

On the nose wheel axle and inner cylinder assembly found an indication of a vertical fracture and there was no sign of scratches on the broken nose wheel axle, meanwhile there was no indication of damage on the right nose wheel bearings.

The metallurgy examination found that the failure was due to high load impact indicated by beach mark that was initiated about ten landings prior to occurrence.

The last nose wheel replacement (right and left) was performed on 25 December 2006 and for the last three months there was no complaint related to the nose wheel.

The cylinder assembly has 49,661 cycles and 12,903 hrs for the next scheduled overhaul.

2.2 Maintenance Practice

During the course of investigation, it was found the replacement of the broken axle was referring to the Aircraft Maintenance Manual that was not applicable to the specific aircraft. This might lead to incorrect sequence of task, torque value, etc.

There was a torque meter available without a valid calibration. However, the installation of torque link did not use the torque meter. The engineer assumed that an installation torque link bolt and nut combine with split pin was not required torque value.

Installation of torque link without measuring torque value of bolt and nut might cause the torque link too stiff if the torque value is exceeded the correct value and may cause an excessive gap on the torque link and may cause nose wheel vibration.

3 CONCLUSIONS

3.1 Findings

On the nose wheel axle and inner cylinder assembly found an indication of a vertical fracture and there was no sign of scratches on the broken nose wheel axle, meanwhile there was no indication of damage on the right nose wheel bearings.

The metallurgy examination found that the failure was due to high load impact indicated by beach mark that was initiated about ten landings prior to occurrence.

3.2 Causes

The metallurgy examination found that the failure was due to high load impact indicated by beach mark that was initiated about ten landings prior to occurrence.

4 SAFETY ACTIONS AND RECOMMENDATIONS

4.1 Safety Actions

On 10 January 2007, the DGCA issued safety actions for Metro Batavia Airline as follows:

- a. Conducted inspection to all Boeing 737 fleet for the possibility of similar damage with Non-Destructive Test (NDT) methods.
- b. Quality Assurance Department of Metro Batavia Airline has reviewed, evaluated and trained all aircraft maintenance license hold Boeing 737 rating to improve the knowledge and the standard basic of aircraft maintenance.
- c. Engineering Department of Metro Batavia Airline has reviewed and evaluated validity and currency of Aircraft Maintenance Manual (AMM).

4.2 Recommendations

During investigation process the NTSC found important findings that required attention to prevent similar occurrence in the future.

The NTSC recommended to the PT. Metro Batavia Airline should:

- a. Conduct inspection to all Boeing 737 fleet for the possibility of similar damage with Non-Destructive Test (NDT) methods.
- b. Evaluate and train all aircraft maintenance license hold Boeing 737 rating to improve the knowledge and the standard basic of aircraft maintenance.
- c. Review and evaluate validity and currency of Aircraft Maintenance Manual (AMM).