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**NATIONAL
TRANSPORTATION
SAFETY
COMMITTEE**

Aircraft Serious Incident Investigation

**PT. Merpati Nusantara Airline
PK-NUH
De Havilland DHC6-300 Twin Otter
Bintuni Airport, Bintuni, West Papua
Republic of Indonesia**

18 July 2010



**NATIONAL TRANSPORTATION SAFETY COMMITTEE
MINISTRY OF TRANSPORTATION
REPUBLIC OF INDONESIA
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This Final Report was produced by the National Transportation Safety Committee (NTSC), Ministry of Transportation Building 3rd Floor, Jalan Merdeka Timur No. 5 Jakarta 10110, Indonesia.

The report is based upon the investigation carried out by the NTSC in accordance with Annex 13 to the Convention on International Civil Aviation, the Indonesian Aviation Act (UU No. 1/2009) and Government Regulation (PP No. 3/2001).

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TABLE OF CONTENTS

TABLE OF CONTENTS	i
TABLE OF FIGURES	iii
GLOSSARY OF ABBREVIATIONS	iv
INTRODUCTION	1
1 FACTUAL INFORMATION	3
1.1 History of the Flight.....	3
1.2 Injuries to Persons.....	5
1.3 Damage to Aircraft	5
1.4 Other Damage	5
1.5 Personnel Information	6
1.5.1 Pilot in command.....	6
1.5.2 Co-pilot.....	6
1.6 Aircraft Information.....	7
1.6.1 General	7
1.6.2 Engines	7
1.6.3 Propeller Information	8
1.6.4 Landing Gear Information.....	8
1.6.5 Weight and Balance.....	8
1.7 Meteorological Information.....	8
1.8 Aids to Navigation.....	8
1.9 Communications	9
1.10 Aerodrome Information	9
1.11 Flight Recorders.....	9
1.12 Wreckage and Impact Information	9
1.13 Medical and Pathological Information	10
1.14 Fire.....	10
1.15 Survival Aspects	10
1.16 Tests and Research	10
1.17 Organisational and Management Information	10
1.18 Additional Information	11
1.18.1 Operation	11
1.18.2 Maintenance	11

1.19	Useful or Effective Investigation Techniques.....	11
2	ANALYSIS	13
2.1	Maintenance	13
2.2	Aborted Takeoff Decision.....	13
2.3	Aborted Takeoff Execution.....	13
2.4	Pilot Training	13
3	CONCLUSIONS	15
3.1	Findings.....	15
3.2	Causes	15
4	SAFETY ACTIONS AND RECOMMENDATIONS	17
4.1	Safety Actions	17
4.2	Recommendations	17

TABLE OF FIGURES

Figure 1: Sketch of serious incident (not for scale).....	4
Figure 2: The aircraft has minor damaged.....	5
Figure 3: Tire marks on the runway	10

GLOSSARY OF ABBREVIATIONS

ALA	:	Aerodrome Directory for Light Aircraft
AOC	:	Air Operator Certificate
ATC	:	Air Traffic Control
ATPL	:	Air Transport Pilot License
CPL	:	Commercial Pilot License
CRM	:	Cockpit Resources Management
CSN	:	Cycles Since New
CVR	:	Cockpit Voice Recorder
EGT	:	Exhaust Gas Temperature
FDR	:	Flight Data Recorder
ICAO	:	International Civil Aviation Organization
ILS	:	Instrument Landing System
Kg	:	Kilogram(s)
Km	:	Kilometer(s)
Kt	:	Knots (nm/hours)
LT	:	Local Time
Mm	:	Millimeter(s)
MTOW	:	Maximum Take-off Weight
KNKT / NTSC	:	Komite Nasional Keselamatan Transportasi / National Transportation Safety Committee
PIC	:	Pilot in Command
S/N	:	Serial Number
TSN	:	Time Since New
UTC	:	Universal Time Coordinate

INTRODUCTION

SYNOPSIS

On 18 July 2010 , a De Havilland DHC6-300 Twin Otter aircraft, registered PK-NUH, was being operated by PT. Merpati Nusantara Airline on a schedule flight from Bintuni Airport, Bintuni, West Papua (NTI/WASB)¹ at 11.19 LT (02.19 UTC) to Domine Eduard Osok Airport, Sorong, West Papua. There were nine persons on board consist of two pilots and seven passengers including engineer.

During take-off run on runway 31, about one second after call "Rotate" the Pilot Monitoring call "Fail - fail". The pilot flying decided to abort the takeoff by reduced power and followed by reverse engine thrust. The aircraft veered to right and came to a stopped, at the right shoulder at the end of runway 31.

The nose landing gear collapse and both of main landing gear tires were flat, and right foot step was bent.

The aircraft was airworthy prior to departure. The right engine torque indicator fuse was melt may cause the torque indicator drop to zero. Similar problem was occurred two weeks before this serious incident.

The result of the proficiency check of both pilots was standard. Both pilots were conducted recurrent Crew Resources Management (CRM) after the serious incident.

¹ Bintuni Airport, Bintuni, West Papua (NTI/WASB) is referred to as 'Bintuni' in this report.

1 FACTUAL INFORMATION

1.1 History of the Flight

On 18 July 2010, a De Havilland DHC6-300 Twin Otter aircraft, registered PK-NUH, was being operated by PT. Merpati Nusantara Airline on a schedule flight from Bintuni Airport, Bintuni, (NTI/WASB) to Domine Eduard Osok Airport, Sorong, West Papua. There were nine persons on board consist of two pilots and seven passengers including engineer.

The aircraft started rolling takeoff at runway 31 at 11.19 LT (02.19 UTC). The co-pilot acted as pilot flying. During the takeoff run, the pilot monitoring (PM) call “Rotate”. One second later the PM call “Fail, fail” as he saw one of the engine torque indicator drop to zero. The pilot flying (PF) then aborted the takeoff by reduced the power lever and continued to reverse.

The aircraft veered to right of the centreline and stopped at the right shoulder at the end of runway 31.

There was no one injured in this serious incident.

The nose landing gear collapse and both of main landing gear tires were flat, and right foot step was bent. There was no other damaged reported.

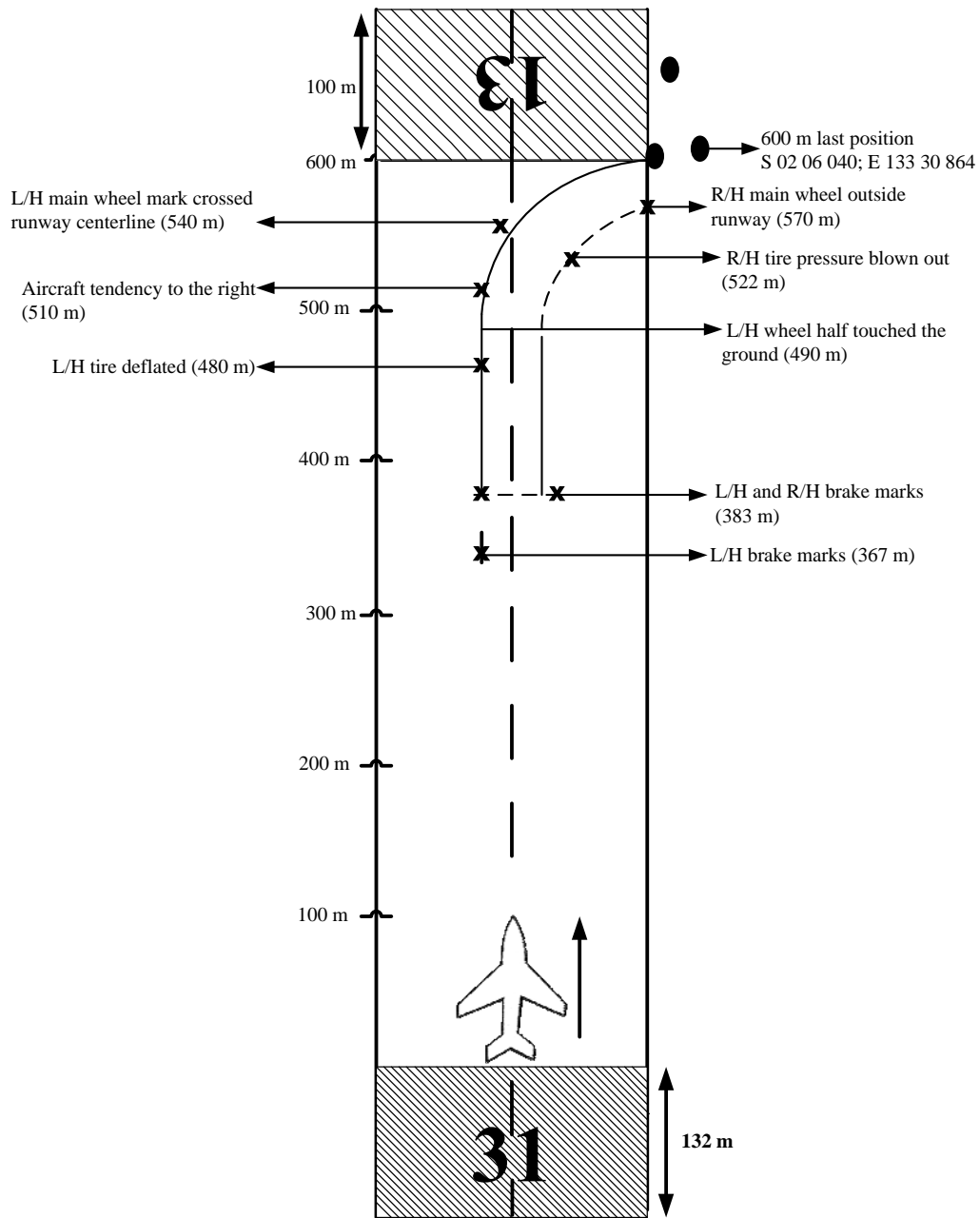


Figure 1: Sketch of serious incident (not for scale)

1.2 Injuries to Persons

Injuries	Flight crew	Passengers	Total in Aircraft	Others
Fatal	-	-	-	-
Serious	-	-	-	-
Minor	-	-	-	-
None	2	7	9	-
TOTAL	2	7	9	-

1.3 Damage to Aircraft

The aircraft has minor damaged. The nose landing gear was collapsed, both main landing gear tires were flat and right foot step was bent.



Figure 2: The aircraft has minor damaged

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

Gender : Male
Date of birth : 06 March 1972
Nationality : Indonesia
License : ATPL
Date of issue : 20 October 1997
Valid to : 7 October 2010
Aircraft type rating : CN 235, DHC 6
Medical certificate : Class I
Date of medical : 7 April 2010
Valid to : 7 October 2010
Last proficiency check : 24 March 2010
Total hours : 8,468 hours
This make and model : 5,286 hours
Last 90 days : 98 hours
Last 24 hours : 2 hours 30 minutes
This flight : 0 hours

1.5.2 Co-pilot

Gender : Male
Date of birth : 21 May 1978
Nationality : Indonesia
License : CPL
Valid to : 07 December 2010
Aircraft type rating : DHC 6 Twin Otter
Medical certificate : Class I
Date of medical : 07 Juny 2010
Valid to : 07 December 2010
Last proficiency check : 29 June 2010
Total hours : 2,534 hours
This make and model : 1,949 hours
Last 90 days : 1,817 hours

Last 7 days : 38 hours
Last 24 hours : 2 hours 30 minutes
This flight : 0 hours

1.6 Aircraft Information

1.6.1 General

Aircraft Registration : PK-NUH
Country of Manufacturer : Canada
Manufacturer : Dehavilland Canada
Type/ Model : DHC-6 Series 300
Serial Number : 383
Year of Manufacture : 1970
Certificate of Airworthiness valid to : 10 August 2010
Certificate of Registration valid to : 3 December 2010
Total flying hours since manufacture : 35,691 hours
Total flying hours since last inspection : 35,762 hours 33 minutes
Total cycle since new : 43,306 cycles

1.6.2 Engines

Engine type : Turbo propeller
Manufacturer : Pratt & Whitney, Canada
Model : PT6A-27

L/H Engine

Serial Number : 41306
Time Since New (TSN) : 22,347 hours
Time Since Overhaul (TSO) : 1,334 hours
Cycle since new : 28,563 cycles
Time between overhaul : 5,000 hours

R/H Engine

Serial Number : 40577
Time Since New (TSN) : 29,261 hours 26 minutes
Time Since Overhaul (TSO) : 1,997 hours
Cycle since new : 35,403 cycles
Time between overhaul : 5,000 hours

1.6.3 Propeller Information

Propeller type : Hartzell HC-B3TN-3DY

L/H propeller

Serial number : BUA-23839

Time Since New : 9,031 hours

Time Since Overhaul : 125 hours

Time between Overhaul : 3,000 hours

R/H propeller

Serial number : BUA-23388

Time Since New : 10,545 hours

Time Since Overhaul : 2,490 hours

Time between Overhaul : 3,000 hours

1.6.4 Landing Gear Information

Nose Landing Gear

Part number : 71300-15

Serial number : H163

L/H Main Landing Gear

Part number : C6U1103

Serial number : 1672

L/H Main Landing Gear

Part number : C6U1103

Serial number : 389

1.6.5 Weight and Balance

The aircraft was within weight and balance limitations.

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 AFIS and the crew were normal and no communication difficulty.

1.10 Aerodrome Information

Based on Aerodrome directory for light aircraft (ALA) Amendment 04 dated 01 September 2009.

Airport Name	:	Bintuni Airport, Papua.
Airport Identification	:	WASB
Elevation	:	10 meters
Airport Operator	:	DGCA
Runway Directions	:	13 / 31
Runway Length	:	650 meters
Runway Width	:	18 meters
Strip Length	:	650 meters
Strip Width	:	40 meters
Surface	:	Asphalt

1.11 Flight Recorders

The aircraft was installed a cockpit voice recorder (CVR). The CVR was downloaded in the NTSC facility for the purposed of this investigation.

The 30 minute recording on the cockpit voice recorder contained fair quality data.

About 1 second after called "Rotate" the pilot monitoring called "Fail-fail", 1.5 seconds later a sound similar to engine deceleration was heard and 2 seconds later following sound similar to engine reverse.

No evident of asymmetric of engine sound until the end of recording.

1.12 Wreckage and Impact Information

There were marks of tire on the runway that showed the aircraft veered to right during aborted takeoff.



Figure 3: Tire marks on the runway

1.13 Medical and Pathological Information

No medical or pathological investigations were conducted as a result of this occurrence, nor were they required.

There was no evidence that physiological factors or incapacitation of the pilots affected their performance.

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 for this investigation.

1.17 Organisational and Management Information

Aircraft Owner : PT. Merpati Nusantara Airlines
Aircraft Operator : PT. Merpati Nusantara Airlines
Jalan Angkasa Blok B 15, Kavling 2-3
Kemayoran Jakarta 17210, Republic Indonesia
Air Operator Certificate Number: AOC/121-002

1.18 Additional Information

1.18.1 Operation

Proficiency check of the Pilots were “Standard”, indicated that both pilots were qualified in their function.

Pilot proficiency check performed in real aircraft, and the syllabus was not include aborted takeoff exercise.

During the interview the pilots could not described the engine torque system. The pilots could not identify the possibility that might cause the malfunction.

1.18.2 Maintenance

Two weeks before this serious incident an engine torque indicator drop to zero was occurred and found that the fuse was melt. In this serious incident the fuse was found melt also.

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 Maintenance

Two weeks before this serious incident an engine torque indicator drop to zero was occurred and found that the fuse was melt. In this serious incident the fuse was found melt also.

After the serious incident, the melting fuse was replaced. During the ground run torque indicator worked normally.

2.2 Aborted Takeoff Decision

During the takeoff run, the pilot monitoring (PM) call “Rotate”. One second later the PM call “Fail, fail” as he saw one of the engine torque indicator drop to zero. The pilot flying (PF) then aborted the takeoff by reduced the power lever and continued to reverse.

Call out “Rotate” was given when the aircraft speed on rotation speed (VR). In the DHC 6 Twin Otter VR is equal to V1. V1 is maximum decision speed to continue or abort the takeoff. An aborted takeoff should not be performed after pass V1 speed.

2.3 Aborted Takeoff Execution

During the aborted takeoff pilot select the power levers to reverse and applied brake. Mark on the runway showed that heavy breaking was occurred, also indicated in the tire that were flat. These showed that the pilot has applied maximum brake.

Marks on the runway indicated that right main wheel tire was flat prior to the aircraft veered off the right. A flat tire on the right main wheel created drag and might cause the aircraft veered off to the right.

2.4 Pilot Training

Result of the proficiency check for both pilots were “Standard”, indicated that both pilots were qualified in their function.

Pilot proficiency check performed in real aircraft, and the syllabus was not including aborted takeoff exercise.

During the interview the pilots could not described the engine torque system. The pilots could not identify the possibility that might cause the malfunction.

The statement of pilot during the interview showed that the pilot did not have adequate knowledge and skill related to aircraft system and flight procedures. This can be concluded that the pilot training was not sufficient for standard qualification.

3 CONCLUSIONS

3.1 Findings

- Engine torque indicator drop to zero was caused by the melting fuse.
- The aborted takeoff was initiated after speed passed V1.
- There was a heavy braking during the execution of aborted takeoff.
- The right main landing gear tire flat and caused the aircraft veered off to the right.
- The aircraft stopped out of runway with the nose landing gear was collapsed, both main landing gear tires were flat and right foot step was bent.
- Pilots have inadequate knowledge and skill related to aircraft system and flight procedures.

3.2 Causes

- Engine torque indicator drop to zero was caused by the melting fuse.
- The aircraft veered off to the right after right main wheel tire flat as result of heavy braking.
- The recurrence and the proficiency check of the pilots were not effective.

4 SAFETY ACTIONS AND RECOMMENDATIONS

4.1 Safety Actions

At the time of issuing this Final Report, the National Transportation Safety Committee had not been informed of any safety actions resulting from this serious incident.

4.2 Recommendations

During investigation process the NTSC found an important finding item that required attention and to prevent similar occurrence in the future.

The NTSC recommended to the PT Merpati Nusantara Airline, to improve recurrent training sufficient for the pilot to understand aircraft system and proficiency check to include aborted takeoff exercise.