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NATIONAL TRANSPORTATION SAFETY COMMITTEE

Aircraft Serious Incident Investigation Report

PT. Merpati Nusantara Airlines
De Havilland DHC 6-300 Twin Otter; PK-NUH
Dabra Airstrip, Papua
Republic of Indonesia

17 October 2011



**NATIONAL TRANSPORTATION SAFETY COMMITTEE
MINISTRY OF TRANSPORTATION
REPUBLIC OF INDONESIA
2013**

This Final Report was produced by the National Transportation Safety Committee (NTSC), Transportation Building 3rd Floor, Jalan Medan 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 Organization, the Indonesian Aviation Act (UU No.1/2009), and Government Regulation (PP No. 3/2001).

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GLOSSARY OF ABBREVIATIONS

AFIS	:	Aerodrome Flight Information Service
AOC	:	Air Operator Certificate
ATPL	:	Air Transport Pilot License
CPL	:	Commercial Pilot License
CSN	:	Cycles Since New
CVR	:	Cockpit Voice Recorder
DGCA	:	Directorate General of Civil Aviation
FO	:	First officer or Copilot
FWD	:	Forward
HF	:	High Frequency
ICAO	:	International Civil Aviation Organization
kg(s)	:	kilogram(s)
MHz	:	Mega Hertz
MTOW	:	Maximum Take-off Weight
KNKT / NTSC	:	<i>Komite Nasional Keselamatan Transportasi /</i> National Transportation Safety Committee
PF	:	Pilot Flying
PIC	:	Pilot in Command
P/N	:	Part Number
SBB	:	Single Sideband Radio
S/N	:	Serial Number
TBO	:	Time Between Overhaul
TSN	:	Time Since New
TSO	:	Time Since Overhaul
USA	:	United State of America
UTC	:	Universal Time Coordinate
VFR	:	Visual Flight Rules
VOR	:	VHF Omnidirectional Radio Range
WIT	:	<i>Waktu Indonesia Timur /</i> East Indonesian Standard Time

INTRODUCTION

SYNOPSIS

On 17 October 2011, a De Havilland DHC-6 Twin Otter aircraft registered PK-NUH operated by PT. Merpati Nusantara flight number MZ9782D. It was a scheduled flight from Sentani Airport (DJJ / WAJJ) Jayapura, to Dabra Airstrip (DRH / WAJC) Dabra Papua.

The flight departed from Sentani at 06.20 UTC (15.20 WIT)¹ to Dabra as the destination. The total of persons on board were 2 pilots, 1 company aircraft maintenance engineer and 13 passengers. This flight was the second flight for the same route and same crew. In this flight, the First Officer (FO) was as Pilot Flying (PF) and the Pilot in Command (PIC) as Pilot Monitoring (PM).

At about 07.10 UTC, the aircraft was approaching Dabra and flight crew was able to see the runway.

The aircraft touchdown at runway 24 and experienced bouncing about 175 metres than the aircraft veered to right side of runway 24. The aircraft was out in the right of runway about 120 metres and the aircraft right wing hit banana tress 6.5 metres in the right of runway. The flight crew of PK-NUH tried to correct the aircraft direction into the runway centerline.

After the aircraft entering the runway, the flight crew recovered by ground loop about 18.4 metres before the end of runway 24. The aircraft stopped 35.8 metres before the end of runway 24 and heading 35°.

All 16 occupants were no injured. The aircraft was damaged.

The investigation found several findings and concluded that this serious incident is typical of un-stabilized approach landing.

Following this investigation PT. Merpati Nusantara Airlines have performed several safety actions. The NTSC issued several safety recommendations to the Dabra Airstrip Authority and PT. Merpati Nusantara Airlines.

¹ The 24-hour clock in Coordinated Universal Time (UTC) is used in this report to describe the local time as specific events occurred. *Waktu Indonesia Timur* (WIT) is UTC +9 hours.

1 ACTUAL INFORMATION

1.1 HISTORY OF THE FLIGHT

On 17 October 2011, a De Havilland DHC-6 Twin Otter aircraft registered PK-NUH operated by PT. Merpati Nusantara flight number MZ9782D. It was a scheduled flight from Sentani Airport (DJJ / WAJJ) Jayapura, to Dabra Airstrip (DRH / WAJC) Dabra Papua.

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All 16 occupants were no injured. The aircraft was damaged.

The flight crew of PK-NUH stay overnight in Dabra.



Figure 1. De Havilland DHC-6 “Twin Otter” aircraft registration PK-NUH

1.2 INJURIES TO PERSONS

Injuries	Flight crew	Passengers	Total in Aircraft	Others
Fatal	-	-	-	-
Serious	-	-	-	-
Minor	-	-	-	Not applicable
Nil Injuries	2	14	16	Not applicable
TOTAL	2	14	16	-

1.3 DAMAGE TO AIRCRAFT

The aircraft was damaged as follows:

- Lower forward fuselage Station 60 twisted,
- Right wing leading edge damage,
- Right main landing burst,
- Left compressor block upper and lower broken,
- Left main gear shifted rearward.



Figure 2. PK-NUH Station 60 (Lower Fuselage) Section



Figure 3. PK-NUH Right Main Gear

1.4 OTHER DAMAGE

There was some banana trees damage mostly due to hit by aircraft's right wing.

1.5 PERSONNEL INFORMATION

1.5.1 Pilot in Command

Gender	:	Male
Nationality	:	Indonesian
Date of joining company	:	2 January 1993
License	:	ATPL
Aircraft type rating	:	Fokker 28, DHC-6
Valid to	:	31 March 2012
Instrument Rating	:	Valid until 30 September 2012
Medical certificate	:	First Class, with limitation holder shall wear corrective lenses.
Last medical examination	:	05 October 2011
Valid to	:	05 April 2012
Last line check	:	13 July 2011
Last proficiency check	:	16 September 2011
Total hours	:	8.917 hours 30 minutes
Total on type	:	<i>not provided by operator</i>
Last 90 days	:	111 hours 26 minutes
Last 30 days	:	20 hours 20 minutes
This flight	:	50 minutes (approximately)

1.5.2 First Officer

Gender	:	Male
Nationality	:	Indonesian
Date of joining company	:	13 March 2007
License	:	CPL
Aircraft type rating	:	DHC-6
Valid to	:	31 November 2011
Instrument Rating	:	Valid until 30 November 2011
Medical certificate	:	First Class
Last medical examination	:	11 May 2011
Valid to	:	11 November 2012

Last line check	:	05 May 2011
Last proficiency check	:	23 September 2011
Total hours	:	2.272 hours 06 minutes
Total on type	:	2.272 hours 06 minutes
Last 90 days	:	154 hours 20 minutes
Last 30 days	:	30 hours 12 minutes
This flight	:	50 minutes (approximately)

1.6 AIRCRAFT INFORMATION

1.6.1 General

Aircraft manufacturer	:	De Havilland, USA
Aircraft model/type	:	DHC 6-300 Twin Otter
Serial number	:	383
Year of manufacture	:	1971
Aircraft registration	:	PK-NUH
Certificate of Registration	:	577
Valid to	:	03 December 2012
Certificate of Airworthiness	:	577
Valid to	:	31 December 2011
Time Since New	:	37,239 Hours (as per 15 October 2011)
Cycles Since New	:	45,364 Cycles (as per 15 October 2011)
MTOW	:	5,400 kgs
Actual Take Off Weight	:	5,399 kgs
Estimated Landing Weight	:	5,099 kgs
Last Minor Inspection	:	C - 24 inspection at 37.156 flight hours

1.6.2 Engines

Engine type	:	Turboprop
Manufacturer	:	Pratt & Whitney Canada
Model	:	PT6A-27
Serial Number Engine #1	:	PCE 41306
Time Since New	:	23,817 Hours (as per 15 October 2011)
Cycles Since New	:	30,657 Cycles (as per 15 October 2011)
Time Since Overhaul	:	2,816 Hours (as per 15 October 2011)

Time Between Overhaul	:	5,000 Hours
Serial Number Engine #2	:	PCE 40577
Time Since New	:	30,731 Hours (as per 15 October 2011)
Cycles Since New	:	37,497 Cycles (as per 15 October 2011)
Time Since Overhaul	:	3,478 Hours (as per 15 October 2011)
Time Between Overhaul	:	5,000 Hours

1.6.3 Propellers

Propeller type	:	Variable Pitch
Manufacturer	:	Hartzell
Model	:	HC-B3TN-3DY
Serial Number Engine #1	:	BUA 23839
Time Since New	:	10,499 Hours (as per 15 October 2011)
Time Since Overhaul	:	1,593 Hours (as per 15 October 2011)
Time Between Overhaul	:	3,000 Hours
Serial Number Engine #2	:	BUA 23395
Time Since New	:	9,932 Hours (as per 15 October 2011)
Time Since Overhaul	:	990 Hours (as per 15 October 2011)
Time Between Overhaul	:	3,000 Hours

1.7 METEOROLOGICAL INFORMATION

Dabra Airstrip does not provide weather information. There is a radio station in Dabra uses by company local agent but only active every day, about 06.00 until 08.00 AM. LT.

In the morning of the date of occurrence, the Merpati's Sentani flight operation got information from local agent on Dabra District that informed weather clear and wind 5-7 knots..

There is a common practice that local agent in Dabra informed operator using a HF radio about the weather and other issues related to Dabra Airstrip

Day light condition prevailed at the time of the serious incident. No other weather data provided.

1.8 AIDS TO NAVIGATION

There were no navigation aids for the approach and landing at Dabra. Approach and landing must be conducted under the VFR.

1.9 COMMUNICATIONS

No communication between Dabra Airstrip to aircrafts, to maintain the operation safety they communicate among the aircrafts used 122.2 VHF, prior entry or leaving Dabra.

1.10 AERODROME INFORMATION

Airport Name	:	Dabra Airstrip
Airport Code	:	DBR / WAJC
Airport Address	:	Dabra District, Papua
Airport Authority	:	Directorate General of Civil Aviation
Airport Service	:	AFIS
Type of Traffic Permitted	:	VFR
Coordinates	:	03° 16' 19" S, 138° 36' 49" E
Elevation	:	210 feet
Runway Length	:	600 meters
Runway Width	:	18 meters
Azimuth	:	06 – 24
Runway Surface	:	Asphalt

1.11 FLIGHT RECORDERS

The aircraft was equipped with a Cockpit Voice Recorder (CVR).

Cockpit Voice Recorder (CVR)

Manufacturer	:	Sundstrand, USA
Type	:	Model AV557C
P / N	:	980 – 6005 - 076
S / N	:	12641



Figure 4. PK-NUH Cockpit Voice Recorder

The CVR was successfully downloaded at NTSC facility.

The investigation could not find significant information related to PK-NUH occurrence, due to the relevant recorded data was overridden by the un-related conversation after the occurrence.

1.12 WRECKAGE AND IMPACT INFORMATION

The first tire marks indicated aircraft touchdown was one main wheel found on runway surface about 200 metres from the beginning of Runway 24.

The second tire found about 375 metres from the beginning of Runway 24. The tire marks shown the aircraft was veered to the right side of runway. There was an impact indication on the banana trees mostly due to impact the right wing.

About 18,4 metres from the end of runway 24, there was an scoured mark on asphalt of the runway surface that indicate the aircraft conducted a quick and steep turning (ground loop) on right main wheel. This action caused the right main wheel deflated, the left main gear shifted rearward and lower forward fuselage station 60 twisted.



Figure 5. PK-NUH Final Position after the Occurrence

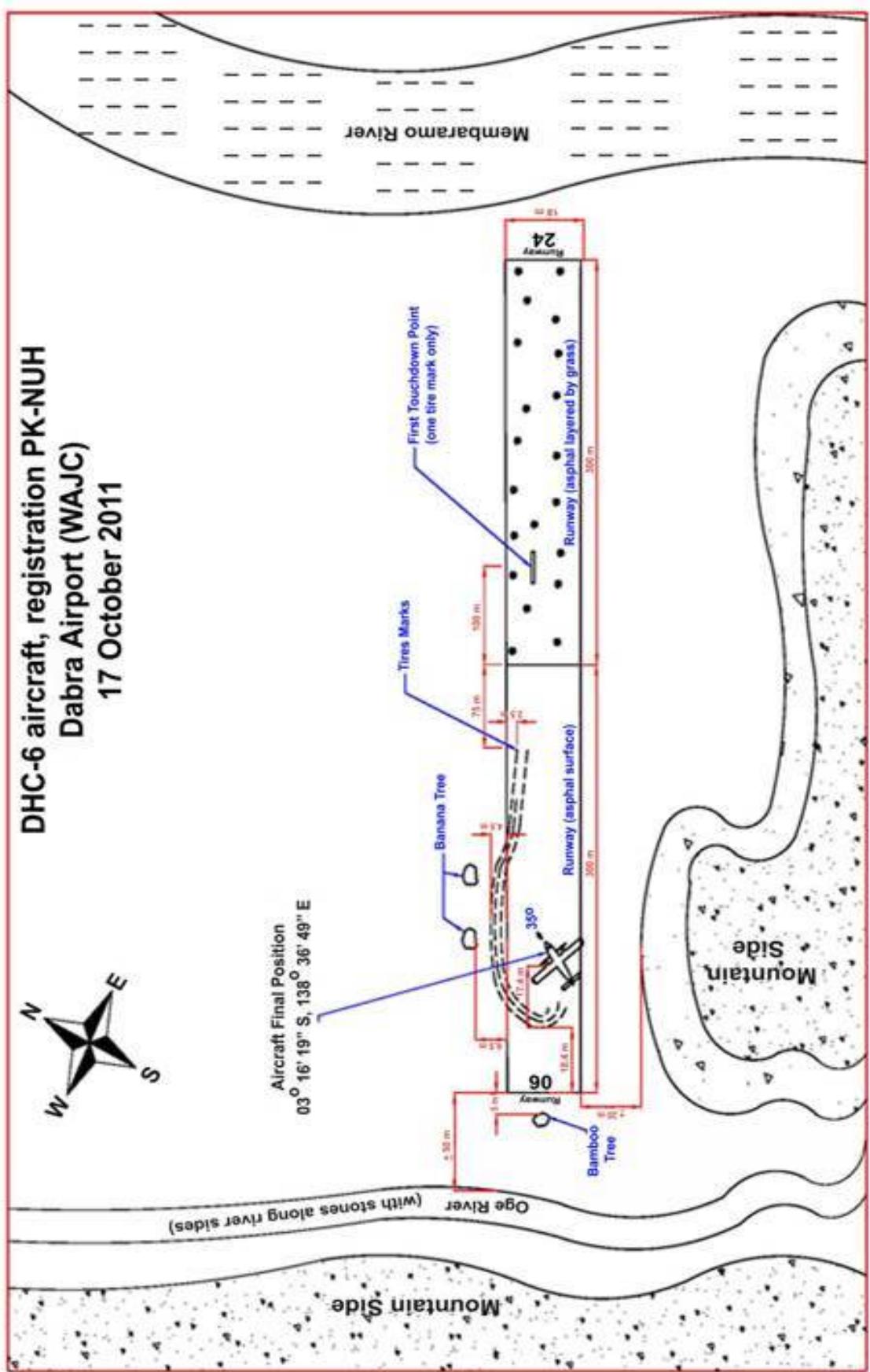


Figure 6. The Sketch of PK-NUH Final Position

1.13 MEDICAL AND PATHOLOGICAL INFORMATION

Not relevance to this serious incident.

1.14 FIRE

There was no evidence of fire in flight or after the aircraft impact.

1.15 SURVIVAL ASPECTS

It was a survivable occurrence.

1.16 TESTS AND RESEARCH

Test and research will be considered as additional factual data indicate the requirement.

1.17 ORGANISATIONAL AND MANAGEMENT INFORMATION

Aircraft Owner	:	PT. Merpati Nusantara Airlines
Address	:	Jl. Angkasa Blok B-15 Kav 2-3
		Kemayoran, Jakarta Pusat 10720
AOC Number	:	AOC 121/002

1.18 ADDITIONAL INFORMATION

1.18.1 Dabra Airstrip

In the morning of occurrence, the Merpati's Sentani flight operation got information from local agent on Dabra District that informed weather clear and wind 5-7 knots in the morning.

This is a common practice that local agent in Dabra informed operator using a HF radio about the weather and other issues related to Dabra Airstrip. The local agent's responsibilities are selling passenger ticket, receiving and weighing any cargo.

At the day of occurrence and during the NTSC conducted on-site investigation, there was no one of Dabra Airstrip authority personnel on location.

There was no wind direction or windsock available in the airstrip

1.18.2 Witness information

The information from the PF informed that the aircraft was a bit higher than usual sensed a tail wind, the PF decided to closed the power lever more back ward, and the aircraft sink more faster and bounced during touchdown, veer to the right, then the PIC recovered to control the aircraft.

1.19 USEFUL OR EFFECTIVE INVESTIGATION TECHNIQUES

The investigation was conducted in accordance with 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 Airstrip Condition

Dabra airstrip is a 600 meters asphalt surface runway. The actual condition of runway surface was grassed about 300 meters from the beginning of runway 24, and the next 300 meters was asphalt.

The runway surface condition makes the pilot decided to touchdown the aircraft not from the beginning of runway 24, but takes about 200 meters from the beginning of Runway 24. There was no wind direction or windsock available in the airstrip.

2.2 Landing Ground Mark

The first main wheel tire mark was one main wheel on the runway about 200 metres and the second marks were about 375 metres from the beginning of the Runway 24, it indicated that the aircraft experienced bouncing during touchdown.

The following wheel mark indicated the aircraft veered to right of runway 24. The aircraft was out of the runway 24 and rolling on the right shoulder about 120 metres and the aircraft right wing hit banana trees 6.5 metres in the right of runway, and the PIC recovered the aircraft directed the aircraft entering into the runway and conducted a quick steep turning to the right and stop on the runway in the opposite direction.

It most likely that the aircraft was on un-stabilized approach during approach and landing

3 CONCLUSIONS

3.1 Findings

- The aircraft was airworthy prior to the departure;
- The first main wheel tire mark on the runway was only one;
- The second were two main wheel tires mark on the runway;
- The aircraft experienced rolling on the runway threshold the right wing hit the trees;
- The aircraft experienced in a quick steep turning;
- The right main wheel tire deflated;
- The left main gear shifted rearward and lower forward fuselage station 60 wrinkles;
- The aircraft stop in the opposite direction;
- There was no wind direction or windsock available in the airstrip.

3.2 Factors²

The aircraft was most likely on un-stabilized approach and bounced during landing, veered to the right and recovered by directing a rolling on the shoulder and entering to the runway then stopped by a quick steep turning on the runway.

² “Factors” is defined as events that might cause the occurrence. In the case that the event did not occur then the serious incident might not happen or result in a less severe occurrence.

4 SAFETY ACTIONS

At the time of issuing this report, the National Transportation Safety Committee had been informed of safety actions resulting from this serious incident as follows:

4.1. PT. Merpati Nusantara Airlines

PT. Merpati Nusantara Airlines issued a safety notice No. DS/X/2011/N-033 with subject "PIC as a PILOT Flying".

In a specific condition or situation the PIC should act as Pilot Flying, such specific condition or situation is as follow:

- a. A limited runway length distance available;
- b. A slippery runway condition when wet, no windsock available;
- c. A unique approach such as single entry with high terrain;
- d. Significant typical quick weather change.

5 SAFETY RECOMMENDATIONS

According to investigation conducted, the National Transportation Safety Committee issued safety recommendations to address safety issues identified, as follows:

5.1. PT. Merpati Nusantara Airlines

The National Transportation Safety Committee recommends that PT. Merpati Nusantara Airlines to emphasize in performing stabilized approach.

5.2. Dabra Airstrip Authority

The National Transportation Safety Committee recommends that Dabra Airstrip Authority should:

- a. Provide the wind direction device, such as windsock;
- b. Provide ground to air radio communication;
- c. Provide airstrip officer on duty available when in any flight departed and arrival from the airstrip.