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**NATIONAL
TRANSPORTATION
SAFETY
COMMITTEE**

Aircraft Accident Investigation Report

PT. Merpati Nusantara Airlines

PK – MBP

Boeing B737-300

Mopah Airport, Merauke

PAPUA

Republic of Indonesia

28 January 2008



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

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GLOSSARY OF ABBREVIATIONS

AD	:	Airworthiness Directive
AFM	:	Airplane Flight Manual
AGL	:	Above Ground Level
ALAR	:	Approach-and-landing Accident Reduction
AMSL	:	Above Mean Sea Level
AOC	:	Air Operator Certificate
ATC	:	Air Traffic Control
ATPL	:	Air Transport Pilot License
ATS	:	Air Traffic Service
ATSB	:	Australian Transport Safety Bureau
Avsec	:	Aviation Security
BMG	:	Badan Meterologi dan Geofisika
BOM	:	Basic Operation Manual
°C	:	Degrees Celsius
CAMP	:	Continuous Airworthiness Maintenance Program
CASO	:	Civil Aviation Safety Officer
CASR	:	Civil Aviation Safety Regulation
CPL	:	Commercial Pilot License
COM	:	Company Operation Manual
CRM	:	Cockpit Recourses Management
CSN	:	Cycles Since New
CVR	:	Cockpit Voice Recorder
DFDAU	:	Digital Flight Data Acquisition Unit
DGCA	:	Directorate General of Civil Aviation
DME	:	Distance Measuring Equipment
EEPROM	:	Electrically Erasable Programmable Read Only Memory
EFIS	:	Electronic Flight Instrument System
EGT	:	Exhaust Gas Temperature
EIS	:	Engine Indicating System
FL	:	Flight Level
F/O	:	First officer or Copilot
FDR	:	Flight Data Recorder
FOQA	:	Flight Operation Quality Assurance
GPWS	:	Ground Proximity Warning System
hPa	:	Hectopascals
ICAO	:	International Civil Aviation Organization

IFR	:	Instrument Flight Rules
IIC	:	Investigator in Charge
ILS	:	Instrument Landing System
Kg	:	Kilogram(s)
Km	:	Kilometer(s)
Kt	:	Knots (NM/hour)
Mm	:	Millimeter(s)
MTOW	:	Maximum Take-off Weight
NM	:	Nautical mile(s)
KNKT / NTSC	:	Komite Nasional Keselamatan Transportasi / National Transportation Safety Committee
PIC	:	Pilot in Command
QFE	:	Height above aerodrome elevation (or runway threshold elevation) based on local station pressure
QNH	:	Altitude above mean sea level based on local station pressure
RESA	:	Runway End Safety Area
RPM	:	Revolution Per Minute
SCT	:	Scattered
S/N	:	Serial Number
SSCVR	:	Solid State Cockpit Voice Recorder
SSFDR	:	Solid State Flight Data Recorder
TS/RA	:	Thunderstorm and rain
TAF	:	Terminal Aerodrome Forecast
TSN	:	Time Since New
TT/TD	:	Ambient Temperature/Dew Point
TTIS	:	Total Time in Service
UTC	:	Coordinated Universal Time
VFR	:	Visual Flight Rules
VMC	:	Visual Meteorological Conditions

INTRODUCTION

SYNOPSIS

On 28 January 2008, a Boeing B737-300 aircraft, registered PK-MBP, operated by PT. Merpati Nusantara Airline, departed from Sentani Airport, Jayapura, Papua, to Mopah Airport Merauke.

The Merauke air traffic controller reported that when the aircraft was on final approach there were no obstructions on the runway, so he cleared the aircraft to land on runway 16.

During the landing roll, the pilot observed that a cow had entered the active runway and was running across the runway in front of the aircraft. When the aircraft was about 1,000 meters from the runway 16 threshold, the left engine struck the cow. The pilots stopped the aircraft on the runway and shut down the left engine. The cabin crew informed the pilots that left engine cowling was damaged.

The aircraft's occupants were not injured, and disembarked from the aircraft unaided, using air stairs at the apron.

The investigation found that the airport did not meet the requirements of ICAO Annex 14, Volume 1, Paragraph 9.10.2, Standard, or the intent of Civil Aviation Safety Regulation (CASR) 139 Subparts 4.2 and 4.12.

The airport perimeter was not fenced, and there was no other appropriate means of preventing animals, large enough to be a hazard to aircraft from entering the aircraft movement area of the airport.

The cockpit voice recorder was unserviceable and no useful information was recorded during the accident flight.

The National Transportation Safety Committee made recommendations to the Directorate General of Civil Aviation to require airport operators to control access and prevent unauthorised entry of persons, vehicles, equipment or animals, or other things that may endanger aircraft safety, onto the movement area of all Indonesian airports.

The National Transportation Safety Committee also made recommendations to PT. Merpati Nusantra Airline:

- to review the procedures used by its maintenance organization for ensuring that flight data and cockpit voice recorders installed in its aircraft meet the relevant manufacturers' specifications in accordance with in accordance with CASR 121.343 and ICAO Annex 6, Part I. 3. 4., Table D-1; and
- to review its aerodrome briefing material used by flight crew to ensure that there is a clear caution notice on the chart when an airport does not have an appropriate and adequate means of controlling access and preventing unauthorized entry of persons, vehicles, equipment or animals, or other things that may endanger aircraft safety, onto the movement area of airports.

1 FACTUAL DATA

1.1 History of the Flight

On 28 January 2008, a Boeing B737-300 aircraft, registered PK-MBP, operated by PT. Merpati Nusantara Airline, departed from Sentani Airport, Jayapura, Papua, to Mopah Airport, Merauke as flight number MZ774. There were 147 persons on board; 124 adult passengers, 10 children, 7 infants and a crew of six comprised of two pilots and four cabin crew.

During the descent to Merauke, air traffic control cleared the crew to make a visual approach to land on runway 16 and reported that the scattered cloud base at Merauke was 1,800 feet and visibility was 10 km. The air traffic controller reported that when the aircraft was on final approach there were no obstructions on the runway, so he cleared the aircraft to land on runway 16.

During the landing roll, the pilot observed that a cow had entered the active runway and was running across the runway in front of the aircraft. When the aircraft was about 1,000 meters from the runway 16 threshold, the left engine struck the cow.

The pilots stopped the aircraft on the runway and shut down the left engine. The cabin crew informed the pilots that left engine cowling was damaged.

The controller asked the pilots if they could taxi aircraft to the apron. The pilot in command (PIC) reported that he evaluated the aircraft's condition and subsequently informed the controller that he would taxi to the apron on one engine.

The aircraft's occupants were not injured, and disembarked from the aircraft unaided, using air stairs at the apron.

1.2 Injuries to Persons

Table 1 : Injuries to Persons

Injuries	Flight crew	Passengers	Total in Aircraft	Others
Fatal	-	-	-	-
Serious	-	-	-	-
Minor	-	-	-	Not applicable
Nil Injuries	6	141	147	Not applicable
TOTAL	6	141	147	-

The occupants were Indonesian citizens.

1.3 Damage to Aircraft

The left engine nose cowling, inner and outer cowling, and generator cowling substantially damaged. The left wing leading-edge kruger flap link was also

substantially damaged. The left inboard main wheel tire had a deep cut about 20 centimeters long.



Figure 2: Number One (left) engine damage

1.4 Other Damage

There was no other damage reported.

1.5 Personnel Information

1.5.1 Pilot in Command

Age	: 52 years
Gender	: Male
Type of licence	: Airline Transport Pilot License
Valid to	: 30 April 2008
Rating	: Boeing B737-300/400/500
Total flying time	: 16,098 hours 11 minutes
Total on this type	: 2,389 hours 2 minutes
Total last 90 days	: 294 hours 14 minutes
Total on type last 90 days	: 294 hours 14 minutes
Total on type last 7 days	: 25 hours 13 minutes
Total on the type last 24 hours	: 1 hour 5 minutes
Medical	: Class one
Last medical examination	: 3 October 2007
Valid to	: 3 April 2008
Medical limitation	: Required to wear corrective lenses

1.5.2 Co-pilot

Age	: 34 years
Gender	: Male
Type of licence	: Airline Transport Pilot License
Valid to	: 30 April 2008
Rating	: Boeing B737-300/400/500

Total flying time	: 3,647 hours 27 minutes
Total on this type	: 459 hours 38 minutes
Total last 90 days	: 189 hours 17 minutes
Total on type last 90 days	: 189 hours 17 minutes
Total on type last 7 days	: 27 hours 23 minutes
Total on the type last 24 hours	: 1 hour 5 minutes
Last proficiency check	: 4 December 2007
Medical	: Class one
Last medical examination	: 2 October 2007
Valid to	: 2 April 2008
Medical limitation	: Required to wear corrective lenses

1.6 Aircraft Information

The aircraft was certified as being airworthy when dispatched for the flight.

There was no evidence of any defect or malfunction in the aircraft that could have contributed to the accident.

1.6.1 General

Aircraft manufacturer	: Boeing Company
Model	: B737-300
Serial number	: 23632
Year of manufacture	: 1987
Nationality and registration mark	: Indonesia, PK-MBP
Name of the owner	: PT. Merpati Nusantara
Name of the operator	: PT. Merpati Nusantara
Certificate of Airworthiness Issued	: 1 December 2007
Valid to	: 30 December 2008
Certificate of Registration Issued	: 14 July 2008
Valid to	: 13 July 2011
Total flying hours since manufacture	: 73,048 hours 45 minutes

1.6.2 Engine Data

Manufacturer	: CFM International
Type/Model	: CFM 56-3B1
Engine number one (Left)	
Serial Number	: 725232
Engine number two (Right)	
Serial Number	: 721637

The engine data was not relevant to this accident.

1.6.3 Weight and Balance

Not relevant to this accident.

1.7 Meteorological information

The Merauke automatic terminal information service broadcast the following airport weather information at the time PK-MBP was approaching Merauke:

Wind	: 100 degrees / 3 knots
Visibility	: 12 Km
Weather	: Nil
Cloud	: Scattered cloud, base 1800 feet
Air temperature	: 32 C
QNH	: 1009 hPa
QFE	: 1008 hPa

During the landing approach, the controller informed the pilots that the wind was from 150 and speed 6 knots.

1.8 Aids to Navigation

Ground-based navigation aids, onboard navigation aids, aerodrome visual ground aids, and their serviceability were not a factor in this accident.

1.9 Communications

All communications between ATS and the crew were recorded by ground based automatic voice recording equipment for the duration of the flight. The quality of the aircraft's recorded transmissions was good.

1.10 Aerodrome Information

Airport Name	:	Mopah
Airport Identification	:	MKQ
Elevation	:	10 feet
Airport Operator	:	Directorate General of Civil Aviation
Runway Direction	:	16 / 34 (azimuth 156/336)
Runway Length	:	1,850 meters
Runway Width	:	30 meters
Surface	:	Asphalt and concrete

The airport perimeter was not fenced, and there was no other appropriate means of preventing animals, large enough to be a hazard to aircraft from entering the aircraft movement area of the airport.



Figure 3: View towards runway showing no perimeter fence

1.11 Flight Recorders

1.11.1 Digital Flight Data Recorder (DFDR)

Part Number : 980-4700-003

Serial Number : SSFDR - 11674

The DFDR was recovered from the aircraft undamaged. However, the investigation did not conduct a replay and analysis of the recorded data as it was not relevant to this accident.

1.11.2 Cockpit Voice Recorder (CVR)

Manufacturer : A 100 Fairchild

Part Number : 93A100-80

Serial Number : 58367

The cockpit voice recorder tape was badly deformed resulting in the investigation being unable to recover any useful data.

1.12 Wreckage and Impact Information

The substantially damaged left engine cowling was detached from the aircraft during the impact with the cow. The pilots reported that the impact with the cow was unavoidable.

1.13 Medical and Pathological Information

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

1.14 Fire

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

1.15 Survival Aspects

The aircraft's occupants were not injured in the accident and disembarked from the aircraft unaided, using air stairs at the apron.

1.16 Tests and Research

No tests or research were required to be conducted as a result of this accident.

1.17 Organisation 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 172
Republic Indonesia

Air Operator Certificate Number: AOC/121-002

The Directorate General of Civil Aviation was the airport administrator responsible for the operation, safety, security, and services of the airport, in accordance with Civil Aviation Safety Regulations and ICAO Annex 14 Standards and Recommended Practices.

Civil Aviation Safety Regulation (CASR) 139 states:

4.2 Access To The Aerodrome Movement Area

Particulars of the procedures that have been developed and are to be followed, in coordination with other responsible agencies, to control access and prevent unauthorized entry of persons, vehicles, equipment or animals, or other things that may endanger aircraft safety, onto the movement area, including details of the following:

- a. the roles and responsibilities of the aerodrome operator, aircraft operators, security organizations the DGCA and other government departments, as appropriate; and
- b. the names and roles of the persons who are responsible for controlling access to the movement area and the telephone numbers for contacting them during and after working hours.

4.12 Wildlife Hazard Management

Particulars of the procedures to deal with danger to aircraft operations caused by the presence of birds or animals on or near the aerodrome, including details of the following:

- a. the arrangements for assessing any bird or animal hazard;
- b. implementing arrangements for the control or removal of any bird or animal hazard; and
- c. the names and roles of the persons responsible for dealing with bird or animal hazards, and the telephone numbers for contacting them during and after working hours.

ICAO Annex 14, Volume 1, Paragraph 9.10.2, Standard states:

As of 23 November 2006, a fence or other suitable barrier shall be provided on an aerodrome to prevent the entrance to the movement area of animals large enough to be a hazard to aircraft.

At the time of the accident only 30% of the Mopah Airport perimeter was fenced.

1.18 Additional information

There was no other factual information that was relevant to the circumstances leading up to the accident.

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

During the landing roll, the pilot observed that a cow had entered the active runway and was running across the runway in front of the aircraft. The collision with the cow was unavoidable.

The investigation found that the airport did not meet the requirements of ICAO Annex 14, Volume 1, Paragraph 9.10.2, Standard, or the intent of Civil Aviation Safety Regulation (CASR) 139 Subparts 4.2 and 4.12.

The airport perimeter was not fenced, and there was no other appropriate means of preventing animals, large enough to be a hazard to aircraft from entering the aircraft movement area of the airport.

3 CONCLUSIONS

3.1 Findings

The aircraft was certified, equipped and maintained in accordance with existing regulations and approved procedures.

The aircraft was certified as being airworthy when dispatched for the flight.

There was no evidence of any defect or malfunction in the aircraft that could have contributed to the accident.

Both pilots were licensed and qualified for the flight in accordance with existing regulations.

The flight crew carried out normal radio communications with the relevant ATC units.

The cockpit voice recorder tape was badly deformed resulting in the investigation being unable to recover any useful data.

The airport perimeter was not fenced, and there was no other appropriate means of preventing animals, large enough to be a hazard to aircraft from entering the aircraft movement area of the airport.

During the landing roll the aircraft collided with a cow that entered the active runway.

The Directorate General of Civil Aviation's safety oversight programme had not ensured that the airport complied with ICAO Annex 14, Volume 1, Paragraph 9.10.2, Standard, or Civil Aviation Safety Regulation (CASR) 139 Subparts 4.2 and 4.12 requiring a fence or other suitable means to be provided on the aerodrome to prevent the entrance to the movement area of animals large enough to be a hazard to aircraft.

4 SAFETY ACTIONS AND RECOMMENDATIONS

4.1 Safety Actions

Following the accident, the airport operator conducted a program of work to fence the perimeter of the airport. A subsequent inspection by National Transportation Safety Committee investigators confirmed that the work was in progress.

4.2 Safety Recommendations

As a result of the investigation into this accident, the National Transportation Safety Committee made the following recommendations.

4.2.1 Recommendation to the Directorate General of Civil Aviation (DGCA)

The National Transportation Safety Committee recommends that the Directorate General of Civil Aviation take immediate action to control access and prevent unauthorized entry of persons, vehicles, equipment or animals, or other things that may endanger aircraft safety, onto the movement area of all its airports.

Specific attention should be given to complying with ICAO Annex 14, Volume 1, Paragraph 9.10.2, Standard, and Civil Aviation Safety Regulation (CASR) 139 Subparts 4.2 and 4.12.

4.2.2 Recommendation to the Directorate General of Civil Aviation (DGCA)

The National Transportation Safety Committee recommends that the Directorate General of Civil Aviation ensure that Indonesian airport operators take immediate action to control access and prevent unauthorized entry of persons, vehicles, equipment or animals, or other things that may endanger aircraft safety, onto the movement area of all Indonesian airports.

Specific attention should be given to complying with ICAO Annex 14, Volume 1, Paragraph 9.10.2, Standard, and Civil Aviation Safety Regulation (CASR) 139 Subparts 4.2 and 4.12.

4.2.3 Recommendation to PT. Merpati Nusantara

The National Transportation Safety Committee recommends that PT. Merpati Nusantara Airline review the procedures used by its maintenance organization for ensuring that flight data and cockpit voice recorders installed in its aircraft meet the relevant manufacturers' specifications.

The annual inspection procedures for flight recorders, including functional checks, should also be reviewed to ensure that all parameters are being recorded in accordance with CASR 121.343 and ICAO Annex 6, Part I. 3. 4., Table D-1. The method of inspection should follow the manufacturer's specification.

4.2.4 Recommendation to PT. Merpati Nusantara

The National Transportation Safety Committee recommends that PT. Merpati Nusantara Airline review its aerodrome briefing material used by flight crew to ensure that there is a clear caution notice on the chart when an airport does not have an appropriate and adequate means of controlling access and preventing unauthorized entry of persons, vehicles, equipment or animals, or other things that may endanger aircraft safety, onto the movement area of airports.