KOMITE NASIONAL KESELAMATAN TRANSPORTASI
REPUBLIC OF INDONESIA

FINAL

KNKT.23.05.09.04

Aircraft Accident Investigation Report

Yayasan Pelayanan Penerbangan Tariku

PAC 750 XL; PK-TET

Duma Airstrip

Republic of Indonesia

31 May 2023

2024

This final report is published by the Komite Nasional KeselamatanTransportasi (KNKT), 3rd Floor Ministry of Transportation, Jalan Medan Merdeka Timur No. 5 Jakarta 10110, Indonesia.

The report is based upon the investigation carried out by the KNKT 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. 62/2013).

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Jakarta, 21 October 2024
KOMITE NASIONAL
KESELAMATAN TRANSPORTASI
CHAIRMAN

SOERJANTO TJAHJONO

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ABBREVIATIONS AND DEFINITIONS

ATC	:	Air Traffic Control
CASR	:	Civil Aviation Safety Regulation
C of A	:	Certificate of Airworthiness
C of R	:	Certificate of Registration
CPL	:	Commercial Pilot License
CVR	:	Cockpit Voice Recorder
DGCA	:	Directorate General of Civil Aviation
EFATO	:	Engine Failure After Takeoff
FDR	:	Flight Data Recorder
FOO	:	Flight Operation Officer
ft	:	feet
HF	:	High Frequency
HIRAM	:	Hazard Identification, Risk Assessment, and Mitigation
km	:	kilometer
KNKT	:	*Komite Nasional Keselamatan Transportasi*
LT	:	Local Time
MHz	:	Megahertz
MSN	:	Manufacturer's Serial Number
NM	:	Nautical Mile
OC	:	Operating Certificate
OM	:	Operation Manual
TIBA	:	Traffic Information Broadcast by Aircraft
UTC	:	Universal Time Coordinated
VHF	:	Very High Frequency
YPPT	:	Yayasan Pelayanan Penerbangan Tariku

SYNOPSIS

On 31 May 2023, a PAC 750 XSTOL aircraft registered PK-TET, operated by Yayasan Pelayanan Penerbangan Tariku (YPPT), was involved in an accident during a non-scheduled cargo flight from Mozes Kilangin Airport, Timika, to Duma Airstrip, Dumadama. The aircraft, carrying building materials, departed Timika at 0644 LT under improved weather conditions. As the aircraft approached Dumadama, the pilot initiated a landing on runway 08 but extended the touchdown due to muddy conditions.

During the landing, the left main landing gear struck a boar crossing the runway, causing the aircraft to veer off and sustain substantial damage, including the collapse and detachment of the left main landing gear. The pilot, the sole occupant, was uninjured and safely evacuated the aircraft. The investigation by KNKT identified that the airstrip's inadequate fencing allowed animals to enter the runway area, contributing to the accident.

This report outlines the factual information, analysis, conclusions, and safety actions taken following the occurrence. The KNKT's findings emphasize the need for improved airstrip management and the installation of effective barriers to prevent similar occurrence.

The KNKT acknowledged the corrective actions undertaken by YPPT based on the KNKT's recommendations. YPPT conducted outreach to the villagers in Dumadama, who committed to maintaining and preserving the Dumadama. The villagers also built fences around the airstrip to control and prevent wild animals from entering the area. These actions were deemed relevant for improving safety.

1 FACTUAL INFORMATION

1.1 History of the Flight

On 31 May 2023, a PAC 750 XSTOL aircraft, registered PK-TET, was operated by Yayasan Pelayanan Penerbangan Tariku (YPPT) on a non-scheduled cargo flight from Mozes Kilangin Airport (WAYY), Timika[1], to Duma Airstrip (WABE), Dumadama[2]. The flight was the first flight of the day.

At 0555 LT[3] (2055 UTC), the ground crew loaded 870 kg of building materials as cargo. By the time the loading process was completed, the weather around Timika remained cloudy. The pilot delayed the departure to wait for an improvement in weather conditions.

At 0635 LT, the pilot decided to depart as weather conditions had improved, and the aircraft took off from Timika at 0644 LT, cruising at an altitude of 8,500 ft. The flight, with only the pilot onboard, was uneventful until the aircraft approached Dumadama.

Approximately 7 NM from Dumadama, the pilot visually identified the airstrip and began the approach for landing. The pilot noticed the sun's backlighting, which created a blind spot in the valley area. Therefore, the pilot performed the approach without an overhead low pass and directly joined right downwind to observe the airstrip conditions. Upon passing the key point, the pilot still saw that the runway was clear, with no boars present, and decided to continue with the landing. On the final approach, the pilot decided to delay the touchdown due to a muddy surface at the beginning of runway 08.

During landing, the pilot felt the aircraft vibrate and assumed it had hit a bumpy surface. Shortly after, the pilot observed a boar crossing from the left to the right side of the runway. The aircraft then began to veer to the left and exited the runway The lower part of the left wing contacted the ground, struck woodpiles and building materials near the runway, and came to a stop with the nose wheel resting in the airstrip's drainage ditch.

After evacuated the aircraft, the pilot observed a dead boar on the runway. No injuries were reported, and the aircraft was substantially damaged.

1 Mozes Kilangin Airport (WAYY), Timika, will be named as Timika for the purpose of this report.

2 Duma Airstrip (WABE), Dumadama, will be named as Dumadama for the purpose of this report.

3 The 24-hour clock in Local Time (LT) is used in this report to describe the local time as specific events occurred. Local time is Universal Time Coordinated (UTC) +9 hours.

Figure 1: The condition of the aircraft when it had stopped completely.

1.2 Pilot Information

The pilot was an Indonesian national who held a valid Commercial Pilot License (CPL) and was qualified as a single-engine land aircraft pilot. The pilot also held a valid Class I medical certificate with a visual limitation requiring corrective lenses. The pilot's last proficiency check was conducted on 21 October 2022.

The pilot had a total of 2,614 flight hours, including 2,357 hours on PAC 750 XL aircraft. In the 24 hours prior to the occurrence, the pilot had flown for 4 hours and 30 minutes, and on the occurrence flight, the pilot had flown for approximately 18 minutes.

The pilot had flown to Dumadama several times. The last time the pilot flew to Dumadama was the day before. On the previous flight to Dumadama, during unloading, the pilot also observed a boar on the runway and asked the local villagers to clear the runway before takeoff.

1.3 Aircraft Information

1.3.1 General

The PAC 750 XSTOL, with serial number XL-158, was manufactured by Pacific Aerospace Limited, a New Zealand aircraft company, in 2009. The aircraft was registered as PK-TET and had a valid Certificate of Airworthiness (C of A) and Certificate of Registration (C of R).

On the day of the occurrence, the aircraft was airworthy when dispatched for the flight and operated within the weight and balance envelope. During the flight, there were no records or reports of any aircraft system malfunctions.

The aircraft had a total of 5,289 hours since new and 8,579 cycles since new. The engine installed on the aircraft was a PT6A-34, manufactured by Pratt & Whitney Canada, with serial number PCE-RB0429. The total time and cycles since new for the engine were exactly the same as those for the aircraft.

1.3.2 Weight and Balance

According to the weight and balance sheet for the occurrence flight, the calculated takeoff weight was 2,951 kg, and the estimated landing weight was 2,897 kg. The aircraft was operated within the weight and balance envelope.

1.4 Meteorological Information

There was no meteorological information provider available at Dumadama. The pilot relied on visual observation. During the landing approach, the weather was clear, and the pilot was able to observe the runway visually.

1.5 Communications

The aircraft was equipped with high-frequency (HF) and very high-frequency (VHF) radio communication systems. The pilot used the VHF radios for routine communication with air traffic control (ATC) in Timika. On the day of the occurrence, the VHF radios were serviceable. There was no ground-to-air communication available at Dumadama.

1.6 Aerodrome Information

Dumadama was managed by local villagers, with no official operator assigned to the airstrip. The airstrip management was supervised and monitored by YPPT. According to the airfield chart developed by YPPT, the airstrip information is as follows:

Coordinate	: 04°04’19” S 136°42’49” E
Elevation	: 4,530 ft (above mean sea level)
Runway direction	: 08/26
Runway length	: 355 meters
Runway width	: 24 meters
Surface	: hard clay and rock
Slope	: 10%

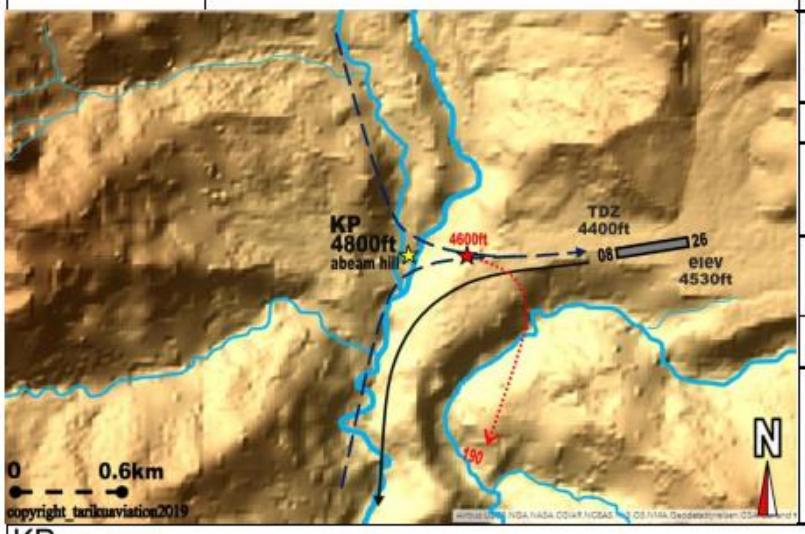
YPPT policy requires using runway 08 for landing and runway 26 for takeoff. The airfield chart mentioned several hazards or notes. Details of the chart can be seen in Figure 2.

After the occurrence, the pilot observed that the fences around the airstrip were present but in poor condition, with several gaps allowing animals to enter the runway area. Additionally, the grass on the airstrip had become overgrown.

Tariku Aviation

Radial : 158 TMK | Airfield Chart | Distance : 28 nm

Class: M2	**DUMA(DUM)**	**Elev: TDZ:** 4400 Ft
Wind: 1100		**Elev:** 4530 Ft
Freq: 122.4		**KP:** 4800 Ft



Length: 355 m
Width: 24 m

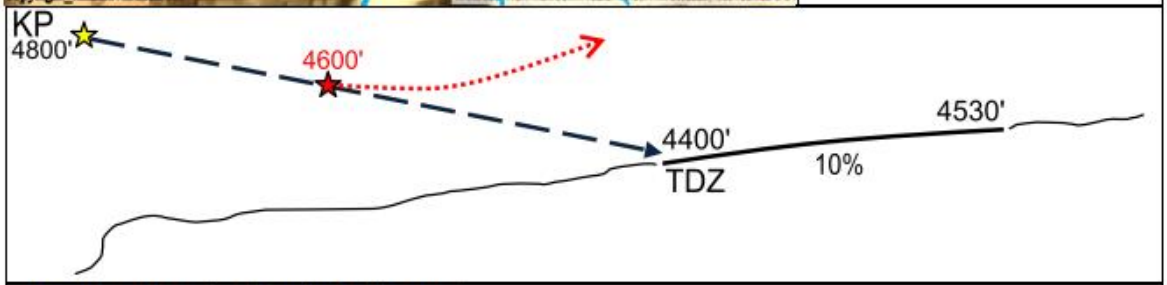
Slope: 10 % Up

Surface: Hard red clay and rock. Undulations.

Weight Limits(T/O): 500 kg

Finals: 75 KIAS

Runway:
T/O: 26
LDG: 08



Location/Terrain: Terrain to the west.

Weather Pattern: Follows weather pattern south of the ranges. Generally closes in early.

Aborted Approach: 0.5 NM at 4600' right turnout heading 190°. Swerve left if unable to stop.
Aborted Takeoff: 75 m into takeoff roll. Continue straight ahead.

EFATO Locations: Along the river.

Hazards / Notes: Illusion causes favoring of left side when rolling out due to more crowns on right side. No level turns around and area may be soft. No radio. CAUTION: Slippery when wet; no fence, incursion possible. Side slope parking area.

Figure 2: Airfield Chart of Dumadama

1.7 Flight Recorders

The aircraft was not fitted with a flight data recorder (FDR) or a cockpit voice recorder (CVR), as neither was required by current Indonesian aviation regulations for this type of aircraft.

1.8 Wreckage and Impact Information

The aircraft was substantially damaged, as illustrated in Figures 3 to 7. Both wings and the left horizontal stabilizer were damaged, the nose landing gear was deformed, and the left main landing gear was detached.

Figure 3: Aircraft condition from the front view

Figure 4: Damaged left wing (view looking inboard)

Figure 5: Damaged right wing (view looking forward)

Figure 6: Damaged leading edge of left horizontal stabilizers

Figure 7: Broken nose landing gear torque link

The wreckage of the detached left main landing gear (illustrated in Figure 8) was found approximately 165 meters from the suspected touchdown position and about 60 meters from the position of the aircraft stopped. Additionally, a dead boar was found on the runway, approximately 40 meters from the suspected touchdown position.

Figure 8: The detached left main landing gear

1.9 Organizational and Management Information

The aircraft was operated by Yayasan Pelayanan Penerbangan Tariku (YPPT), which held a valid operator certificate with Operating Certificate (OC) number 91-007. Yayasan Pelayanan Penerbangan Tariku operates two PAC 750XL aircraft.

Operation manual (OM) issued by The YPPT mentions the landing procedures on the airstrip as follows:

10.12.2. Airstrip Considerations

Consider and examine the following airstrip conditions before each landing. Pay particular attention when strip conditions are unknown or haven't been reported recently.

a. *Grass height. If grass is tall enough to hide small animals or other dangers the strip should be temporarily closed until the grass is COMPLETELY cut.*

b. *Surface condition. Check for standing water, mud holes, soft ground, runway color, pig damage to the strip, if runway is reported recently wet after rain, do not conduct flights until reliable dry runway condition information is available.*

c. *Make a low pass to evaluate the actual condition if at all in doubt.*

YPPT established a Safety Management System (SMS) in 2019 and developed an SMS manual that contains safety policies and procedures. The policies regarding safety reporting are mentioned in Chapter 8 as follows:

A. SAFETY CULTURE

YPPT and its owners, Directors, officers and managers are committed to creating and fostering a non-threatening environment whereby personnel can voluntarily report safety issues, concerns, errors, mishaps, and even violations, without fear of repercussions from YPPT management and/or the DGCA. If an incident or potential violation occurs, appropriate managers will:

1. *Assist employees in their submission of reports;*
2. *Share the results of risk analysis and mitigation with appropriate persons in a manner that protects confidential information; and*
3. *Improve YPPT systems and processes in order to preclude reoccurrence of the event.*

To assure this outcome, personnel who report hazards, irregularities, errors, oversights, violations and other concerns to the Safety Officer and/or their manager are advised that no disciplinary action will be taken against any employee or person who reports an incident or occurrence involving human error, and who openly participates in the investigation and subsequent development of error prevention strategies.

B. NON-PUNITIVE REPORTING

Non-punitive reporting systems are based on confidentiality. Before employees will freely report incidents, they must receive a commitment from the regulatory, authority or from top management that reported information would not be used punitively against them.

The person reporting the incident (or unsafe condition) must be confident that anything said will be kept in confidence. In some States, "Access to Information" laws make it increasingly difficult to guarantee confidentiality. Where this happens, reported information will tend to be reduced to the minimum to meet mandatory reporting requirements.

The investigation could not find any documented hazard report regarding the animal hazard.

Chapter 9 of the SMS Manual mentions about Hazard Identification and Risk Assessment, as follows:

OVERVIEW

A. THE ICAO SAFETY MANAGEMENT SYSTEM MODEL

This Risk Management Program is based on an ICAO model called the Safety Management System Risk Control Process. In this process, data is collected from research & planning, various reports, audit findings and other sources. This data is used to identify Latent (unrecognized) Unsafe Conditions. The Safety Officer and one or more pertinent managers promptly analyze this data for sufficient information, as well as validity and applicability. If the information is sufficient and the data is valid, appropriate managers then

identify hazards and determine root causes. Managers further evaluate likelihood and potential severity of the hazard (or safety concern), in order to establish a quantified level of risk, if a safety concern can be eliminated, the matter is closed. If the level of risk is low, the risk is normally accepted. All other identified safety concerns are then prioritized and managed.

B. SAFETY MANAGEMENT SYSTEM RISK CONTROL PROCESS MODEL

Utilizing one or more risk controls or corrective actions as recorded and prioritized, responsibilities are assigned and strategies implemented. Each strategy is monitored, follow-up audits are conducted and results documented in order to determine if the strategies were successful. Additional data is collected, and if necessary, the process is repeated. Although not specifically shown in the model above, this program also incorporates Hazard and Risk Control/Corrective Action Plan Communication (RC/CAPC) procedures whereby safety concerns and mitigating strategies are communicated to personnel and vendors, thereby further promoting a process of continuous improvement.

SOURCES OF DATA

A. INTERNAL DATA

This data driven approach to effective identification of hazards and management of risk requires the application of internal data generated through the company's CONFIDENTIAL REPORTING SYSTEM, which generates Hazard Reports, Irregularity Reports, Injury Reports and others.

Data is also obtained from Audit Finding Reports when the Safety Officer (or his delegate) performs vendor audits of contract fueling, maintenance, training and other vendors.

The company's INTERNAL EVALUATION PROGRAM generates Audit Finding Reports from Departmental Audits whereby each department (e.g., operations & maintenance) performs its own quality assurance.

…

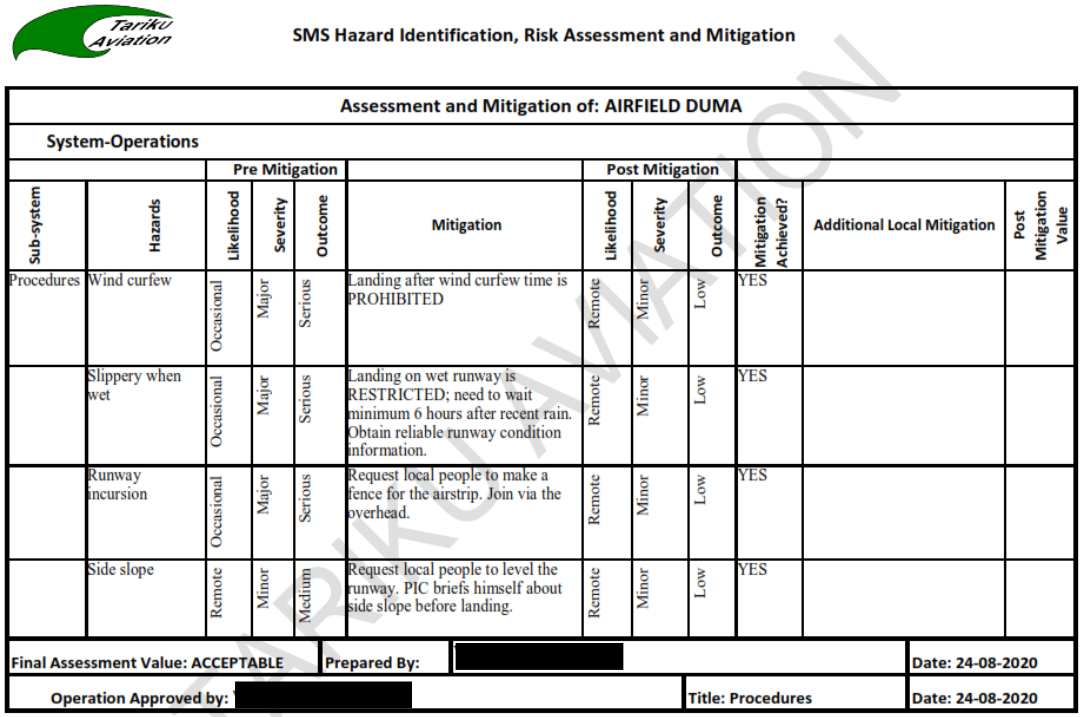
C. PROACTIVE RISK MANAGEMENT

Proactive risk management occurs through the use of Operational Risk Management during planning and systems design, and through aggressively solicited information from hazard reports, irregularities, occurrences, flight and maintenance records (trend monitoring), audit findings, safety inspections and other observations.

D. REACTIVE RISK MANAGEMENT

Although emphasis is placed on a forward-thinking, proactive approach to risk management, YPPT overall risk management process is also reactive, by nature. Reactive risk management occurs out of necessity when external data or reports (such as an Airworthiness Directive, or other safety alert, Hazard Report or Irregularity Report) indicate an area of high risk, or when an incident occurs that requires immediate corrective action or intervention.

The YPPT conducted a Hazard Identification, Risk Assessment, and Mitigation (HIRAM) of flight operations to Dumadama on 24 August 2020. The process identified several hazards, including wind curfew, runway slipperiness when wet, runway incursion, and side slope.



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SMS Hazard Identification, Risk Assessment and Mitigation

Assessment and Mitigation of: AIRFIELD DUMA												
System-Operations												
		Pre Mitigation				Post Mitigation						
Sub-system	Hazards	Likelihood	Severity	Outcome	Mitigation	Likelihood	Severity	Outcome	Mitigation Achieved?	Additional Local Mitigation	Post Mitigation Value	
Procedures	Wind curfew	Occasional	Major	Serious	Landing after wind curfew time is PROHIBITED	Remote	Minor	Low	YES			
	Slippery when wet	Occasional	Major	Serious	Landing on wet runway is RESTRICTED; need to wait minimum 6 hours after recent rain. Obtain reliable runway condition information.	Remote	Minor	Low	YES			
	Runway incursion	Occasional	Major	Serious	Request local people to make a fence for the airstrip. Join via the overhead.	Remote	Minor	Low	YES			
	Side slope	Remote	Minor	Medium	Request local people to level the runway. PIC briefs himself about side slope before landing.	Remote	Minor	Low	YES			
Final Assessment Value: ACCEPTABLE			Prepared By: [redacted]								Date: 24-08-2020	
Operation Approved by: [redacted]								Title: Procedures			Date: 24-08-2020	

Figure 9: Last HIRAM related to Duma airstrip issued by YPPT on 24 August 2020

Chapter 10 of the SMS Manual, regarding Safety Performance Monitoring and Measurement, mentions the Hazard Report as follows:

> …
> *If a Hazard Report is submitted to a manager and the identified hazard is not assessed or a corrective course of action is not implemented, and an incident occurs as a result of the hazard, a process has failed (the risk management process).*
> *If such events occur repeatedly, the system needs correction or improvement. Improvements may include revised procedures, added control measures or additional training. To make these improvements, process measurements must produce useful data. Data must be collected and properly interpreted for effective solutions to be implemented. The reporting forms in this Safety Management Manual produce useful data that measures various Safety Management System processes.*

The investigation revealed that there was no documented hazard report related to presence of animals on the runway.

1.10 Useful or Effective Investigation Techniques

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

2 ANALYSIS

The investigation revealed no issues related to aircraft system malfunctions or the health of the pilot were reported prior to the occurrence. The weather was clear with good visibility. Therefore, the analysis will not address aircraft systems, medical concerns, or weather conditions. Instead, it will focus on safety issues related to the implementation of Safety Management System (SMS) of the YPPT.

According to OM, the pilots are required to perform a low flyover to observe runway condition. Based on pilot's experience, both overhead and low flyovers were enabled in notifying local villagers that the aircraft is approaching. However, during this occurrence flight, due to visual challenges caused by sunlight backlighting that created a blind spot in the valley area, the pilot did not perform this procedure. Before the approach, the pilot conducted an observation while flying downwind over the runway and saw that it was clear, so he proceeded with the approach and configured the aircraft for landing. Upon passing the key point, the pilot still saw that the runway was clear with no boars present and decided to continue with the landing.

The pilot intentionally extended the touchdown due to the muddy surface conditions at the beginning of the runway. This decision required the pilot to maintain a higher pitch attitude, which resulted the pilot being unable to observe the objects ahead on the runway. During the landing roll, the pilot felt that the aircraft had hit a boar, which was initially assumed to be a bumpy surface. Shortly after, the pilot saw a boar crossing in front of the aircraft from left to right. The boar had not been visible to the pilot earlier, possibly because it moved from left to right while the pilot was focused ahead and the aircraft was at a higher pitch attitude.

The fences around the airstrip were present but not in a good condition, with several gaps that allowed the boar to enter the runway. The HIRAM issued by YPPT in 2020 highlighted several hazards, including runway incursion with the mitigation of requesting the local people to make the fences surrounding the airstrip. However, this mitigation was not well implemented.

The absence of a hazard report to the company about the presence of animals on the runway led to the mitigation measures never being implemented.

3 CONCLUSIONS

3.1 Findings

The findings are statements of all significant conditions, events or circumstances in the accident sequence. The findings are significant steps in the accident sequence, but they are not always causal, or indicate deficiencies. Some findings point out the conditions that pre-existed the accident sequence, but they are usually essential to the understanding of the occurrence, usually in chronological order.

In this occurrence, the KNKT identified several findings as follows:

1. The aircraft had a valid Certificate of Airworthiness (C of A) and Certificate of Registration (C of R).
2. The pilot held valid licenses and medical certificates.
3. Prior to the event, there were no records or reports of aircraft system malfunctions.
4. During the occurrence flight, the aircraft was operated within the weight and balance envelope.
5. The aircraft was not fitted with a flight data recorder (FDR) or cockpit voice recorder (CVR).
6. The Duma airstrip was managed by local villagers and supervised by YPPT.
7. According to OM, the pilots are required to perform a low flyover to observe runway condition. Based on pilot's experience, both overhead and low flyovers were enabled in notifying local villagers that the aircraft is approaching.
8. During occurrence flight, the pilot did not perform overhead and low flyovers due to visual challenges caused by sunlight backlighting that created a blind spot in the valley area.
9. Before the approach, the pilot performed an observation while flying downwind over the runway and confirmed it was clear, then proceeded with the approach and configured the aircraft for landing. Upon passing the key point, the pilot again confirmed that the runway was clear, with no boars present, and decided to continue with the landing.
10. The pilot extended the touchdown to avoid the muddy surface at the start of the runway, required a higher pitch attitude and limiting visibility of objects ahead.
11. During the landing roll, the pilot felt that the aircraft had hit a boar, which was initially assumed to be a bumpy surface. Shortly after, the pilot saw a boar crossing in front of the aircraft from left to right.
12. The boar had not been visible to the pilot earlier, possibly because it moved from left to right while the pilot was focused ahead and the aircraft was at a higher pitch attitude.
13. The fences around the airstrip were present but in poor condition, with several gaps that allowed the boar to enter the runway.
14. The HIRAM issued by YPPT in 2020 highlighted several hazards, including runway incursion with the mitigation of requesting the local people to make the fences surrounding the airstrip which was not well implemented. The HIRAM did not address wildlife/animal hazards.

15. The absence of a hazard report to the company about the presence of animals on the runway led to the mitigation measures never being implemented

3.2 Contributing Factors

Contributing factors are defined as actions, omissions, events, conditions, or a combination thereof which, if eliminated, avoided, or absent, would have reduced the probability of the accident or incident occurring or mitigated the severity of its consequences.

The identification of contributing factors does not imply the assignment of fault or the determination of administrative, civil, or criminal liability. The presentation of contributing factors is based on chronological order and does not indicate the degree of contribution.

The KNKT concluded the contributing factors as follows:

The fences at Dumadama were not in a good condition, with several gaps that allowed animals, including the boar involved in the accident, to access the runway area.

4 SAFETY ACTION

On 2 February 2024, YPPT informed the KNKT that it had taken the following corrective actions to address safety recommendation 04.O-2023-9.01. The actions were:

1. YPPT conducted outreach to the villagers in Dumadama, who committed to maintaining and preserving the Duma airstrip.
2. The villagers constructed fences around the airstrip to control and prevent animals from entering the runway area (shown in Figure 10).

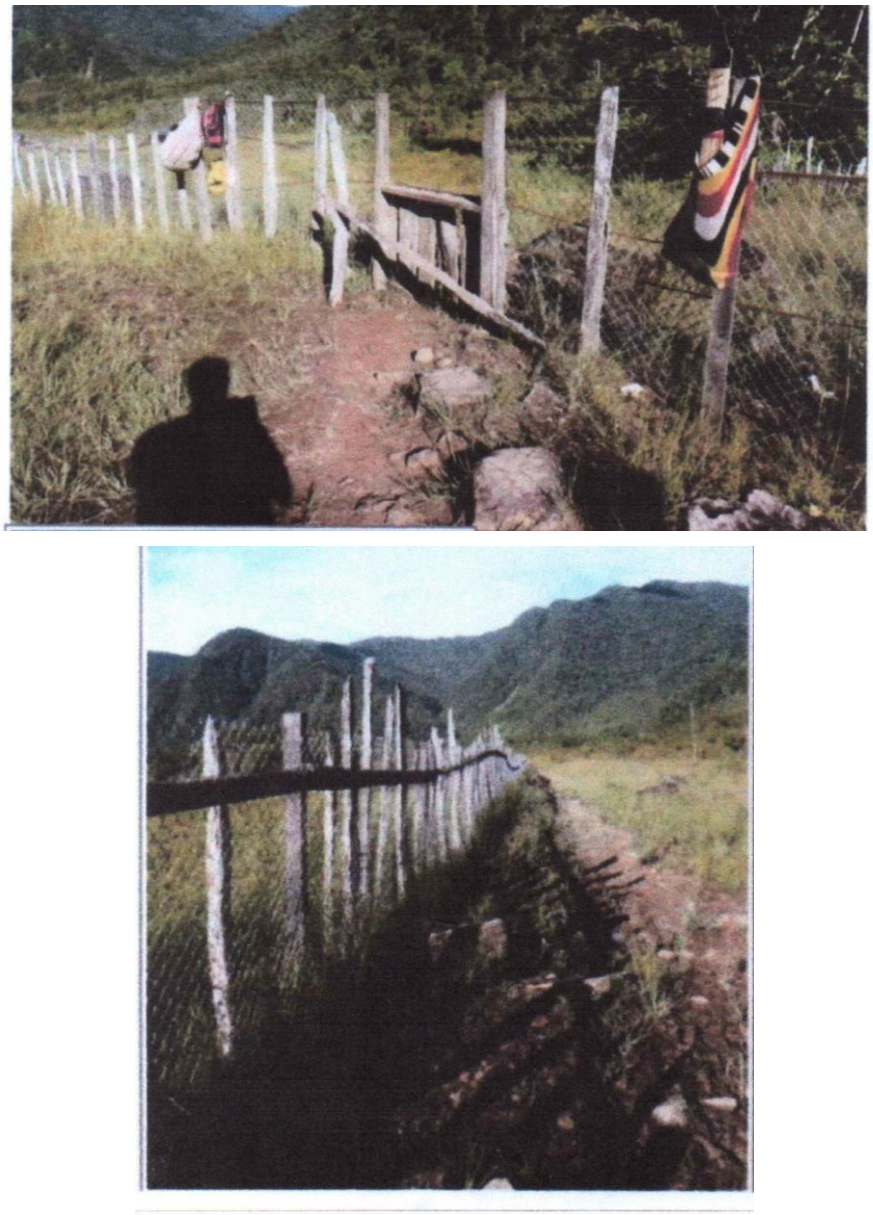

Figure 10: The fences that have been built surrounding Dumadama

5 SAFETY RECOMMENDATIONS

The KNKT acknowledges the corrective actions taken by YPPT and considers them relevant for improving safety based on the safety recommendations issued by the KNKT to address the issues identified in this report. Therefore, the KNKT will not issue any additional safety recommendations.

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