KOMITE NASIONAL KESELAMATAN TRANSPORTASI
REPUBLIC OF INDONESIA

FINAL

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Aircraft Serious Incident Investigation Report

PT Asi Pudjiastuti Aviation (Susi Air)

Pilatus PC-6/B2-H4; PK-VVU

Long Layu Airstrip, North Kalimantan

Republic of Indonesia

12 July 2023

2024

This Final Report was published by the Komite Nasional Keselamatan Transportasi (KNKT), Transportation Building, 3rd Floor, 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, 9 December 2024

KOMITE NASIONAL
KESELAMATAN TRANSPORTASI
CHAIRMAN

SOERJANTO TJAHJONO

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ABBREVIATIONS AND DEFINITIONS

ACL	:	Authorization, Condition and Limitations
AIP	:	Aeronautical Information Publication
ALA	:	Aerodrome for Light Aircraft
AOC	:	Air Operator Certificate
ARB	:	Area Reference Booklets
ATC	:	Air Traffic Control
CASR	:	Civil Aviation Safety Regulation
C of A	:	Certificate of Airworthiness
C of R	:	Certificate of Registration
COM	:	Communication
CPL	:	Commercial Pilot License
CVR	:	Cockpit Voice Recorder
DGCA	:	Directorate General of Civil Aviation
FDR	:	Flight Data Recorder
FOO	:	Flight Operation Officer
ft	:	feet
HF	:	High Frequency
HIRA	:	Hazard Identification and Risk Assessment
km	:	kilometer
KNKT	:	*Komite Nasional Keselamatan Transportasi*. An Independent Investigation Authority of Indonesia, also known as the National Transportation Safety Committee/NTSC)
LT	:	Local Time
MHz	:	Megahertz
MSN	:	Manufacturer's Serial Number
NAV	:	Navigation
NM	:	Nautical Mile
OLS	:	Obstacle Limitation Surfaces
OM	:	Operation Manual
RH	:	Right-hand
SMS	:	Safety Management System
UTC	:	Universal Time Coordinated
VFR	:	Visual Flight Rules
VHF	:	Very High Frequency
VMC	:	Visual Meteorological Condition

SYNOPSIS

On 12 July 2023, a Pilatus PC-6/B2-H4 aircraft, registered as PK-VVU and operated by PT Asi Pudjiastuti Aviation (Susi Air), was involved in a serious incident during a flight from Juwata International Airport (WAQQ), Tarakan, to Long Layu Airstrip (WAQU) in North Kalimantan, Indonesia. The flight carried cargo with only the pilot on board.

While conducting the approach to Runway 19 at Long Layu Airstrip, the pilot deviated from the typical approach path to avoid potentially hazardous conditions on a wet runway. During the final approach, the aircraft's right wing struck tree branches. The pilot managed to land the aircraft safely without injury, but minor damage to the aircraft was reported.

The investigation revealed several contributing factors, including the presence of unmitigated hazards (trees) near the airstrip and the absence of detailed approach procedures in the Area Reference Booklet (ARB) provided to the pilot.

As a result, the Komite Nasional Keselamatan Transportasi (KNKT) issued safety recommendations for Susi Air to improve operational safety, including the development of detailed approach procedures and close collaboration with the airstrip operator to regularly assess and mitigate risks, ensuring safe flight operations.

1 FACTUAL INFORMATION

1.1 History of the Flight

On 12 July 2023, a Pilatus PC-6/B2-H4 aircraft, registered PK-VVU, was operated by PT Asi Pudjiastuti Aviation (Susi Air) for flights in the North Kalimantan area, Indonesia. This was the first flight of the day, with a planned route that included Juwata International Airport (WAQQ), Tarakan[1] – Long Layu[2] Airstrip (WAQU) – Nunukan Airport (WAQA) – Long Layu – Robert Atty Bessing Airport (WAQM), Malinau – Long Layu – Tarakan.

At about 0715 LT[3], the pilot was picked up from the Susi Air accommodation facilities and transported to Tarakan Airport. Upon arrival, the pilot conducted body temperature and blood pressure checks, which revealed normal health conditions.

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 pilot was informed that it had rained at Long Layu the previous night and decided to delay the departure by approximately two hours, intending to wait until the runway became drier and less slippery by the time of arrival.

At 1026 LT, under daylight conditions, the aircraft took off from Tarakan and cruised at an altitude of 10,500 ft. The pilot was the only person on board, and the flight carried a cargo load of 566 kg. The flight was uneventful until the aircraft commenced its approach to Long Layu.

During the approach, at an altitude of about 1,000 ft, the pilot flew over the runway then joined a circuit pattern to assess runway condition more clearly. Typically, when on final approach to Runway 19, the pilot would offset by 15° to avoid trees on the short final before aligning the aircraft with the runway. However, on the day of the incident, the pilot chose to offset by less than 15° to align with the runway earlier. This action was intended to prevent difficulty in maintaining directional control and to achieve a longer landing distance on a potentially slippery wet runway.

During the final approach, the pilot felt an impact on the aircraft’s right wing. As the aircraft's speed and attitude remained normal, the pilot decided to continue with the landing, which was completed successfully.

After the aircraft came to a complete stop, the pilot performed a walk-around inspection with an engineer and discovered a dent on the leading edge of the right wing. The dent indicated that the aircraft’s right wing striking tree branches. No injuries were reported, and the aircraft sustained minor damage.

1 Tarakan in this report is referred to as Juwata International Airport (WAQQ), Tarakan.

2 Long Layu in this report is referred to as Long Layu Airstrip (WAQU), Long Layu.

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) +8 hours.

1.2 Pilot Information

The pilot, a South African, 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 no limitations. The last proficiency check for the pilot was conducted on 9 April 2023.

The pilot had a total of 2,517.2 flight hours, including 254.6 hours on the Pilatus PC-6/B2-H4 aircraft. In the last 90 days, the pilot had flown 118.9 hours, and in the last 30 days, 24.8 hours. On the day of the occurrence, the pilot had flown for 66 minutes.

The pilot had flown to Long Layu many times, with the last flight to Long Layu occurring a week before the incident.

1.3 Aircraft Information

The Pilatus PC-6/B2-H4, serial number 967, was manufactured in 2009 by Pilatus Aircraft Company, a Swiss aircraft manufacturer. The aircraft was registered as PK-VVU and had a valid Certificate of Airworthiness (C of A) and Certificate of Registration (C of R).

The aircraft had accumulated a total of 8,161.1 flight hours and 11,853 cycles since new. The engine installed on the aircraft was a PT6A-27, manufactured by Pratt & Whitney Canada, with serial number PCE-PG0355. The engine had logged 8,214.1 hours since new.

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.

1.4 Meteorological Information

Based on the pilot recollection, when the aircraft approached the airstrip, the weather was clear and the visibility was good. The weather condition met the requirement of Visual Meteorological Condition (VMC).

1.5 Communications

The pilot used VHF radios for routine communication with air traffic control (ATC). On the day of the occurrence, the VHF radios were serviceable.

The airspace is classified as Class-G, meaning the pilot is fully responsible for the flight. When flying in uncontrolled airspace, the pilot broadcasts messages to other aircraft on the frequency of 122.9 MHz.

1.6 Aerodrome Information

Long Layu was managed by the Local Government of Nunukan Regency, which did not have an Airport Registration document issued by Directorate General of Civil Aviation (DGCA). According to the information listed in the Aeronautical Information Publication (AIP) Volume IV – Aerodrome for Light Aircraft (ALA), issued by the DGCA Indonesia, and the Area Reference Booklet (ARB) provided by

Susi Air, the airstrip details are as follows:

Coordinate	: 03°53’ N, 116°28’ E
Elevation	: 2,800 ft (above mean sea level)
Runway direction	: 01/19
Runway length	: 900 meters
Runway width	: 26 meters
Surface	: clay and grass

There is a hill with some vegetation on the short final path of Runway 19, presenting hazards for the approach to Runway 19.

Figure 1: The hill with vegetation on the short final path of Runway 19.

Figure 2: Predicted impact location (highlighted in yellow). The picture was taken on a different flight after the occurrence, before the tree was cut down.

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 outer surface of the right wing leading edge was dented, as shown in Figure 3.

Figure 3: Dent on the leading edge of right wing (red-highlighted). View from right hand side of the aircraft (looking inboard).

The predicted impact location was the trees on final approach, approximately 160 meters from the beginning of Runway 19, as shown in Figure 4.

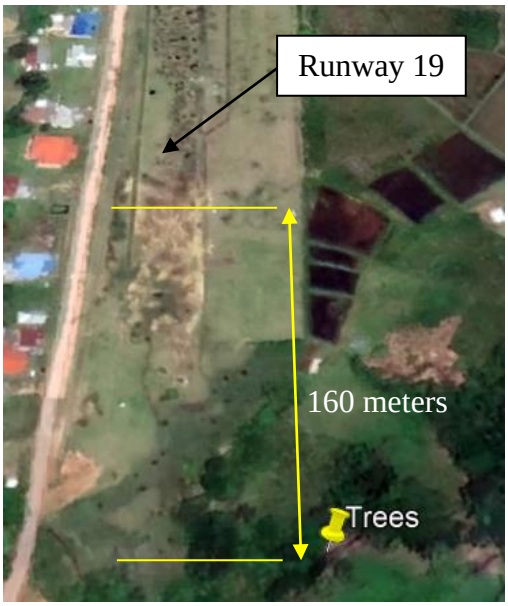

Figure 4: Predicted location of the tree relative to the beginning of Runway 19

1.9 Organizational and Management Information

The aircraft was operated by PT Asi Pudjiastuti Aviation (Susi Air), which held a valid operator certificate with Air Operator Certificate (AOC) number 135-028. Susi Air had seven Pilatus PC-6/B2-H4 aircraft. Susi Air was authorized to conduct air transportation, carrying passengers and cargo in scheduled and non-scheduled operations within and outside Indonesia, for aircraft operations under Civil Aviation Safety Regulation (CASR) Part 135.

Susi Air developed operation manuals (OMs) containing policies and procedures approved by the Directorate General of Civil Aviation (DGCA).

1.9.1 Airport Aeronautical Data Provided to Pilot

The Operation Manual Part C (OM-C), which provides area, route, and aerodrome information, describes that Susi Air primarily uses Area Reference Booklets (ARBs) issued by the company. The ARB provided the pilot with information about the local areas of flight, including references to airport details and any other relevant information deemed useful or suitable for flight operations.

The information for Tarakan - Long Layu route in the ARB is shown in Figure 5. There was no detailed explanation of the approach procedure at Long Layu in this particular ARB.

TARAKAN - LONG LAYU

AIRPORT INFO:

TARAKAN (WAQQ)		LONG LAYU (WAQU)	
Airport Elevation	80'	Airport Elevation	2800'
Runway Direction	06-24	Runway Direction	01-19
Runway Length	2000m	Runway Length	900m
Juata Tower	118.1	Area Frequency	122.9
Tarakan Approach	125.5		

FLIGHT PLANNING:

Distance:	113 nm
Flight Time:	1.0 hours
Minimum Fuel (Return to Origin)	130 U.S Gallons
Minimum Terrain Clearance:	6000'
Recommended Cruise:	Any standard VFR altitude

FLIGHTPLAN:

WAQQ		LAY
N 03° 19.60'	⟷	N 03° 36.65'
E 117° 34.17'		E 115° 41.94'

PILOT NOTES:

WAQU: Trees on short final

All Information contained within this document is for reference only. Not to be relied on as the sole means of navigation

Figure 5: ARB of Tarakan - Long Layu route

1.9.2 Hazard Identification and Risk Assessment (HIRA)

The Operations Manual Part A (OM-A), issued by Susi Air, mentions Hazard Identification Maps, which explain the potential hazards that could affect the operational area and navigation, as follows:

> ***14.7 Hazard Identification Maps***
>
> *The Company shall maintain a hazard identification map for each contract operational area. The map shall depict hazards such as power lines, high-tension cables and towers, lighted and especially – unlighted obstructions, and other dangers to navigation. The map shall also show restricted or danger areas such as military training zones, mountainous terrain, swamplands, and other hazards to flight safety. Maps will be updated whenever a previously unknown or un-plotted hazard is located or reported.*

The investigation revealed that there was no record of HIRA documentation for the Tarakan-Long Layu route or for the Long Layu Airstrip itself.

1.9.3 Criteria for Determining the Usability of Aerodromes

The OM-C issued by Susi Air mentions the hazards that are included in the briefing when arriving at or departing from a particular aerodrome under Visual Flight Rules (VFR).

> ***4.1.3 VFR Operations and Briefing***
>
> *When arrival at/departure from a particular aerodrome is intended to be carried out under Visual Flight Rules, minimum operating visibilities and cloud ceilings are to be clearly stated in the commander's flight brief as part of the CTWO+. It is not acceptable for the brief simply to state 'VFR'. Any particular hazards such as gliding activities at the aerodrome, or 'free lane' entries to an aerodrome surrounded by controlled airspace, are to be included in the brief.*

The investigation revealed that there was no record of a briefing specifically mentioning hazards for Long Layu Airstrip.

1.9.4 Reporting Procedures and Culture

The Safety Management System (SMS) Manual issued by Susi Air mentions the Reporting Procedures and Culture as follows:

> ***4.5 Reporting Procedures***
>
> *Susi Air shall maintain the integrity of a "Just Culture" and encourage the reporting system's utilization for its intended purpose. The Reporting System is in place to identify and reduce the hazards associated with the aviation industry. Everyone is responsible for reporting hazards, occurrences, or incidents that may become an accident.*
>
> ...

Susi Air implemented, in addition to the DGCA Reporting system in accordance with the CASR 830, an internal reporting system of any relevant risk or hazard information that brings awareness to promote learning from reactive and proactive information, which supports the organization for a predictive approach to preventing pertinent safety incidents of the future with continuous learning and continuous improvements.

The Reporting System is in place to identify and reduce the hazards associated with the aviation industry. Everyone from Executives to all levels of staff is responsible for reporting hazards, occurrences, or incidents that may lead to an unsafe outcome and become an accident.

The Reporting System has two types of reporting forms and three reporting methods. These are explained in Paragraph 3.3 below.

4.5.2 Reporting Forms and Procedures

This section details the procedures to be followed whenever an accident or incident occurs or when working conditions that are potentially hazardous to persons or equipment are observed (Potentially Unsafe Conditions).

Accidents, Incidents, and Potentially Unsafe Conditions are all classified as "Occurrences" within the Safety Management System.

The event must be reported to supervisory personnel if an accident, incident, or potentially unsafe condition occurs. This initial report may be made verbally; however, all occurrence reports must be followed-up utilizing the reporting format as detailed below.

Susi Air utilizes a Safety Management System database (eSMS-S) to record accidents, incidents, and potentially unsafe conditions. As previously described, these events are defined as occurrences, and personnel may submit occurrence reports in the following formats:

- *Trip Report (Form No SA-001). See Appendix A.*
- *Hazard / Occurrence report in eSMS-S System, see Appendix B.*
- *Safety Hazard Observation Report (Form No SA-004). See Appendix C.*
- *Service Difficulty Report (SDR). See Appendix D.*

Access to the eSMS-S System is granted based on the employee's level of responsibility. However, not all staff may submit reports via the eSMS-S System. Any staff who does not have access to the eSMS-S System may contact the Safety Department and request access, which will be evaluated based on the same criteria. Printed forms may be presented in hard copy format (Trip Report and SHOR) for lodgment with the Safety & Quality Manager. Copies of the forms are provided in the appendices in the final part of this manual and may be requested by the Safety Department or Base Safety & Quality Officer. All employees who are granted access to eSMS-S shall receive familiarization training about the eSMS-S utilization.

***Note 1**: Any report may be submitted with anonymous nature. If the anonymous option is selected, every attempt must be made not to identify the reporter's name.*

***Note 2**: A hard copy format of the Safety Hazard Observation Report may be available upon request to any member of the Safety Department.*

….

4.5.3 Managing Reports

The safety management system requires a method of collecting information on safety related items within the organization. Susi Air maintains a just reporting policy and encourages the use of the reporting system for its intended purpose. Everyone is responsible for reporting hazards, occurrences, or incidents that may become an accident. All relevant Senior and non-Senior personnel shall receive a notification of every report submitted.

All reporters receive a notification on behalf of the Safety and Quality Department; this notification aims to ensure that the Safety & Quality Manager and the Safety Department Representatives have received and validated the report.

Upon every step of the investigation process, the reporter may receive a notification with appropriate feedback from the investigator.

The SMS Manual also mentions the Voluntary Occurrence Report and Anonymous Report as follows:

4.5.4.2 Voluntary Occurrence Report

A voluntary occurrence report is a report that is reported by aviation personnel voluntarily on actual or potential safety deficiencies in their areas that would otherwise not be reported through other channels to enhance aviation safety. The voluntary reporting system is a voluntary, non-punitive, Anonymous Reporting system. Reporters are encouraged to use eSMS-S or other methods in Susi Air where applicable.

The voluntary occurrence report system established by the DGCA is detailed in Staff Instruction 19-02. In addition, the form of the Voluntary Occurrence Report form can be found in Appendix F of this Manual.

4.5.4.3 Anonymous Report

Anonymous Reporting systems aim to protect the identity of the reporter. This method is one way of ensuring that voluntary reporting systems are non-punitive. Confidentiality is usually achieved by de-identification, often by not recording any identifying information of the occurrence. Instead, the method returns the user the identifying part of the reporting form, and no record is kept of these details. Confidential incident reporting systems facilitate the disclosure of human errors without fear of retribution or embarrassment and enable others to learn from previous mistakes.

Information derived from occurrence reports shall be used only for the purpose for which it has been collected. Susi Air does not make available or use the information on occurrences:

1. To attribute blame or liability.

2. For any purpose other than the maintenance or improvement of aviation safety.

If disciplinary or administrative proceedings are instituted under national law, the information contained in occurrence reports shall not be used against:

a. The reporters; or

b. The persons mentioned in occurrence reports.

Susi Air employees and contracted personnel who report or are mentioned in occurrence reports collected will not be subject to any prejudice by their employer. The services are provided based on the information supplied by the reporter.

The protection of this Anonymous Report shall not apply to any of the following situations:

a. In cases of negligence, willful violations, and destructive acts;

b. There has been a manifest, severe disregard for an obvious risk and profound failure of professional responsibility to take such care as is required in the circumstances, causing foreseeable damage to a person or property or seriously compromising aviation safety.

The investigation revealed that the tree on the final approach path to Runway 19 of Long Layu had never been reported to the company until the time of the incident.

1.10 Useful or Effective Investigation Techniques

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

2 ANALYSIS

Based on the factual information gathered during the investigation, 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, as confirmed by the pilot. Therefore, the analysis will not address aircraft systems, medical concerns, or weather conditions. Instead, it will focus on pilot's action and hazard reporting.

The pilot performed an overhead flying maneuver before making an approach to Long Layu. Typically, the pilot would approach with a 15° offset to the runway to avoid trees on short final. However, during this occurrence flight, the pilot used a smaller offset (less than 15°) when approaching the runway, with intension to prevent difficulty in maintaining directional control and get longer landing distance of a possible slippery wet runway. Flying with smaller offset resulted in the right wing of the aircraft striking the tree branches.

The aircraft operator issued the ARB containing procedures including landing at airstrips served by their flights. However, for flights to Long Layu, detailed approach procedures were not documented, despite there was a tree on the short final of the Runway 19 of Long Layu. The absence of detailed procedures led the pilot to make an approach based on his own initiative, which may not have guaranteed safety.

The absence of the detailed approach procedures for Runway 19 of Long Layu had never been reported as hazard by pilots, led the aircraft operator to consider that the detailed approach procedures were not necessary.

The aircraft operator had never received any documented report regarding the tree as a hazard since it has been included in the ARB. It was only after the incident, the tree was subsequently cut down as requested by the aircraft operator. This indicates that the airstrip operator was unaware of the tree posing a hazard to flight operations.

3 CONCLUSIONS

3.1 Findings

The findings are statements of all significant conditions, events, or circumstances in the accident sequence. The findings represent significant steps in the accident sequence but are not always causal or indicative of deficiencies. Some findings highlight conditions that pre-existed the accident sequence, though they are usually essential for understanding the occurrence and are typically presented 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 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 weather was clear with good visibility.
7. Long Layu was managed by the Local Government of Nunukan Regency, which did not have an Airport Registration document issued by DGCA.
8. Typically, when on final approach of Runway 19, the pilot would offset by 15° to avoid trees on the short final before aligning the aircraft with the runway.
9. On the day of the incident, the pilot chose to offset by less than 15° to align with the runway earlier. This action led to the right wing of the aircraft striking the branches of the trees during landing.
10. The absence of detailed approach procedures for Long Layu Airstrip in the ARB may have influenced the pilot's decision to offset by less than 15°.
11. The presence of trees near the airstrip, which was not adequately mitigated, created a significant risk during approach.
12. The aircraft operator had never received any documented report regarding the tree as a hazard since it was included in the ARB.
13. The airstrip operator was unaware of the tree posing a hazard to flight operations. Only after the incident was the tree cut down as requested by the aircraft operator.

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 presence of trees near the airstrip, which was not adequately mitigated, created a significant risk during approach.
- The absence of detailed approach procedures for Long Layu Airstrip in the ARB may have influenced the pilot's decision to offset by less than 15°, leading to the right wing striking tree branches.

4 SAFETY ACTION

At the time of issuing this draft Final Report, the KNKT had been informed of the safety actions taken by the Susi Air in response to this occurrence.

Susi Air implemented the following safety actions:

- Conducted refreshment training for the pilot, as outlined in the Susi Air Operations Manual Part D (OM-D). The Operations Department will reassess the pilot's status based on the results of the training once they become available. The training program will cover the following minimum subjects:
    - Performance
    - System review
    - Actual airplane flight lessons
    - Safety awareness
    - Specific classes on human factors, focusing on any contributing factors identified during the occurrence investigation.
- Requested the ground staff of the airstrip operator to trim the branches of the trees located adjacent to the runway.
- Safety Department is increasing the amount of Safety Promotion activities to encourage pilots to report more hazards.

5 SAFETY RECOMMENDATIONS

KNKT acknowledged the safety actions taken by Susi Air and considers them relevant for improving safety. However, there are still safety issues that need to be addressed. Therefore, the KNKT issued safety recommendations to address safety issues identified in this report for Susi Air. The safety recommendations in this investigation report are intended to prevent accidents or incidents and are not meant to create a presumption of blame or liability for an occurrence. The safety recommendations are as follow:

5.1 PT Asi Pudjiastuti Aviation (Susi Air)

- **04.O-2023-12.01**

  The ARB for Long Layu Airstrip contains information of hazard trees on final. However, no detailed approach procedures were provided. The absence of detailed procedures led the pilot to make an approach based on his own initiative, which may not have guaranteed safety.

  Therefore, KNKT recommends that Susi Air develop and implement detailed approach procedures that address obstacle avoidance for Runway 19 of Long Layu Airstrip.

- **04.O-2023-12.02**

  The aircraft operator had never received any documented report regarding the tree as a hazard since it was included in the ARB. The tree was cut down as requested by the aircraft operator. This indicates that the airstrip operator was unaware of the tree posing a hazard to flight operations.

  Long Layu Airstrip did not have an Airport Registration document issued by DGCA, which means the airstrip operator was not required to implement hazard identification as part of safety management system and therefore relied on advice from the aircraft operator.

  Therefore, KNKT recommends that Susi Air work closely with airstrip operator to regularly assess and mitigate the risk of all hazards to ensure safe flight operations.

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