



**KOMITE NASIONAL KESELAMATAN TRANSPORTASI
REPUBLIC OF INDONESIA**

PRELIMINARY

KNKT.21.03.04.04

Aircraft Accident Investigation Report

Yayasan Mission Aviation Fellowship Indonesia

PK-MAD, Cessna 208B

Angguruk Airstrip, Papua

Republic of Indonesia

10 March 2021

2021

This Preliminary 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 initial investigation carried out by the KNKT 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. 62/2013).

The preliminary report consists of factual information collected until the preliminary report published. This report will not include analysis and conclusion.

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Jakarta, 27 April 2021
**KOMITE NASIONAL
KESELAMATAN TRANSPORTASI
CHAIRMAN**



SOERJANTO TJAHJONO

TABLE OF CONTENTS

TABLE OF CONTENTS	i
TABLE OF FIGURES	iii
ABBREVIATIONS AND DEFINITIONS	iv
SYNOPSIS	v
1 FACTUAL INFORMATION	1
1.1 History of the Flight.....	1
1.2 Injuries to Persons.....	2
1.3 Damage to Aircraft	2
1.4 Other Damage	2
1.5 Personnel Information	2
1.5.1 Pilot	2
1.6 Aircraft Information.....	2
1.6.1 General	2
1.6.2 Payload Extender.....	3
1.6.3 Global Positioning System	3
1.6.4 Weight and Balance.....	3
1.7 Meteorological Information.....	3
1.8 Aids to Navigation.....	4
1.9 Communications	5
1.10 Aerodrome Information	6
1.11 Flight Recorders.....	7
1.12 Wreckage and Impact Information	7
1.13 Medical and Pathological Information	9
1.14 Fire.....	9
1.15 Survival Aspects	9
1.16 Test and Research.....	10
1.17 Organizational and Management Information.....	10
1.17.1 Aircraft Operator	10
1.17.2 Landing Procedures	10
1.18 Additional Information	11
1.19 Useful or Effective Investigation Techniques	11

2	FINDINGS.....	12
3	SAFETY ACTION	14
3.1	Yayasan Mission Aviation Fellowship (MAF) Indonesia	14
4	SAFETY RECOMMENDATIONS	15
4.1	Yayasan Mission Aviation Fellowship (MAF) Indonesia	15

TABLE OF FIGURES

Figure 1: Airstrip information for Angguruk	5
Figure 2: The threshold markers and wind sock location.....	6
Figure 3: The runway illustration provided in the MAF Indonesia’s airstrip information of Angguruk	7
Figure 4: The damaged of the propeller blades	8
Figure 5: The aircraft condition after stop.....	9
Figure 6: The damaged of the propeller blades	9

ABBREVIATIONS AND DEFINITIONS

AIP	:	Aeronautical Information Publication
AMSL	:	above mean sea level
APE	:	Aircraft Payload Extender
C of A	:	Certificate of Airworthiness
C of R	:	Certificate of Registration
CPL	:	Commercial Pilot License
DGCA	:	Directorate General of Civil Aviation
FAA	:	Federal Aviation Administration
GPS	:	Global Positioning System
KNKT	:	<i>Komite Nasional Keselamatan Transportasi</i> (Indonesia Aircraft Accident Investigation Authority)
kts	:	knots
lbs	:	pounds
LDA	:	Landing Distance Available
LDR	:	Landing Distance Required
LT	:	Local Time
m	:	meter
MAF	:	Yayasan Mission Aviation Fellowship
OC	:	Operator Certificate
OM	:	Operation Manual
OM-B	:	Operations Manual Part B
SD	:	Secure Digital
STC	:	Supplemental Type Certificates
STOL	:	Short Takeoff and Landing
TC	:	Type Certificate
TDP	:	Touchdown Point
TDZ	:	Touchdown Zone
TIBA	:	Traffic Information Broadcasts by Aircraft
USA	:	United States of America
UTC	:	Universal Time Coordinated
VFR	:	Visual Flight Rule
VHF	:	Very High Frequency

SYNOPSIS

On 10 March 2020, a Cessna 208B aircraft, registered PK-MAD was being operated by Yayasan Mission Aviation Fellowship (MAF) Indonesia as unscheduled cargo flight from Wamena Airport (WAVV), Wamena, Papua to Angguruk Airstrip, Papua. The filed flight plan indicated that the flight would be conducted under the Visual Flight Rule (VFR).

At 0008 UTC (0908 LT), on daylight condition, the aircraft departed from Wamena. The pilot was the only person on board the aircraft and this flight was the second flight of the day for the pilot and the aircraft. Prior to the departure, there was no record or report of aircraft system malfunction.

Considering that the aircraft altitude was higher than normal for the landing approach to Runway 09 at Angguruk and attempted to avoid clouds, the pilot made several maneuvers over Angguruk. During that maneuver, the pilot noticed that the grass on the runway, about 50 meters from beginning of the Runway 09 included the grass about 30 meters before the threshold of Runway 09 had brighter color than the other grass. The pilot thought that the brighter color-grass was the grass that had been cut.

On the maneuver while proceeding to the final Runway 09, when on final, the pilot noticed that the runway threshold markers were visible. The pilot recalled that the markers were not stand out as usual due to the color were less contrast with the brighter color-grass. The pilot also recalled that the area about 30 meters before the threshold Runway 09 looked usable for landing, as the color was no different with the 50 meters of the beginning runway. The pilot planned to make touchdown in the very beginning of Runway 09 as he did not want to use more braking to decelerate the aircraft.

The aircraft then touched down about 22 meters before the runway threshold, then veered to the left and stopped about 112 meters from the beginning Runway 09 on heading 182°.

No one injured in this occurrence and the aircraft was substantially damaged.

At the time of issuing this report, the Komite Nasional Keselamatan Transportasi (KNKT) had been informed of safety actions taken by the MAF Indonesia resulting from this occurrence. The KNKT acknowledged the safety actions taken by Yayasan Mission Aviation Fellowship (MAF) Indonesia and considered that the safety actions were relevant to improve safety, however there still safety issues remain to be considered. Therefore, the KNKT issued safety recommendations to address safety issues identified in this report.

1 FACTUAL INFORMATION

1.1 History of the Flight

On 10 March 2020, a Cessna 208B aircraft, registered PK-MAD was being operated by Yayasan Mission Aviation Fellowship (MAF) Indonesia as unscheduled cargo flight from Wamena Airport (WAVV), Wamena, Papua¹ to Angguruk Airstrip, Papua². The filed flight plan indicated that the flight would be conducted under the Visual Flight Rule (VFR).

At 0008 UTC (0908 LT³), on daylight condition, the aircraft departed from Wamena. The pilot was the only person on board the aircraft and this flight was the second flight of the day for the pilot and the aircraft. Prior to the departure, there was no record or report of aircraft system malfunction.

Due to the weather condition and anticipation that the flight would avoid several clouds to maintain visual, the pilot decided to climb to a higher altitude and flew manually without the autopilot. The aircraft's Global Positioning System (GPS) recorded that at 0928 LT, the aircraft passed altitude of 14,000 feet above mean sea level (AMSL).

The pilot used the supplementary oxygen system in the aircraft before the aircraft passed 14,000 feet AMSL. The pilot continued the climbing up to 14,900 feet and then gradually descended. At 0936 UTC, the GPS recorded the aircraft was descending and passed altitude of 14,000 feet AMSL, and then the pilot stopped the usage of the supplementary oxygen.

Considering that the aircraft altitude was higher than normal for the landing approach to Runway 09⁴ at Angguruk and attempted to avoid clouds, the pilot made several maneuvers over Angguruk. During that maneuver, the pilot noticed that the grass on the runway, about 50 meters from beginning of the Runway 09 included the grass about 30 meters before the threshold of Runway 09 had brighter color than the other grass. The pilot thought that the brighter color-grass was the grass that had been cut.

On the maneuver while proceeding to the final Runway 09, when the aircraft was about over the Keypoint⁵, the GPS recorded the altitude was about 5,100 feet AMSL. When on final, the pilot noticed that the runway threshold markers⁶ were visible. The pilot recalled that the markers were not stand out as usual due to the color were less contrast with the brighter color-grass. The pilot also recalled that the area about 30 meters before the threshold Runway 09 looked usable for landing, as the color was no different with the 50 meters of the beginning runway. The pilot planned to make touchdown in the very beginning of Runway 09 as he did not want to use more braking to decelerate the aircraft.

1 Wamena Airport (WAVV), Wamena, Papua will be named as Wamena for the purpose of this report.

2 Angguruk Airstrip, Papua will be named as Angguruk for the purpose of this report.

3 The 24-hours clock in Local Time (LT) is used in this report. Local time is Universal Time Coordinated (UTC) +9 hours.

4 Runway at Angguruk was grass-surfaced runway.

5 Keypoint is a visual checkpoint area determined by the MAF Indonesia for landing approach at Angguruk.

6 Runway threshold marker was a half-cut drum painted with white color that was placed at the left and right beginning of Runway 09.

The pilot recalled that the aircraft power was reduced earlier than usual and the pilot also realized that the aircraft seemed lower than expected. The pilot then flared the aircraft for ensuring the aircraft was able to touchdown.

The aircraft then touched down about 22 meters before the runway threshold, then veered to the left and stopped about 112 meters from the beginning Runway 09 on heading 182°.

1.2 Injuries to Persons

No one injured in this occurrence.

1.3 Damage to Aircraft

The aircraft was substantially damaged.

1.4 Other Damage

No other damage to property and/or the environment.

1.5 Personnel Information

1.5.1 Pilot

The pilot was 52 years old, United States of America citizen, who had valid Commercial Pilot License (CPL) with qualification as Single Engine Land aircraft and Single Engine Sea pilot, included Cessna 208B aircraft. The pilot had valid first-class medical certificate with limitation to wear glasses that correct for near and distant vision.

The pilot joined the MAF Indonesia since June 1990 and has been flying on Papua about 30 years. The pilot was qualified as a flight instructor at MAF Indonesia.

The last proficiency check and the last line check for the pilot was conducted on 18 November 2020 and the results were satisfactory.

According to the information provided by MAF Indonesia, the pilot had accumulated total flying hours of 16,053.2 hours, including 1,375 hours on Cessna 208B aircraft. In the last 24 hours, the pilot had flown for 3.7 hours and for the occurrence flight had flown about 38 minutes.

Since November 2020 until the day of the occurrence, the pilot had flown to Angguruk for six times including the occurrence flight. All those flights were single pilot operation except flight on 23 November 2020, the pilot seated on the right seat as flight instructor. Three of six flights to Angguruk used PK-MAD aircraft.

1.6 Aircraft Information

1.6.1 General

The Cessna 208B registered PK-MAD was manufactured by Textron Aviation Inc. in 2000 with serial number of 208B0852. The aircraft had valid Certificate of Airworthiness (C of A) and Certificate of Registration (C of R).

The total time since new of the aircraft was 11,388.8 hours and the total cycle since new was 21,114 cycles.

1.6.2 Payload Extender⁷

The aircraft was installed with Aircraft Payload Extender (APE) II, III, and Short Takeoff and Landing (STOL) system developed by AeroAcoustics Aircraft System Inc. in the United States of America (USA).

The APE II is aerodynamic device consisting of two 16-inch-long stall fences/strakes attached to the wing leading edge, just outboard of the landing light. The device could increase Maximum Takeoff Weight from 8,807 to 9,062 lbs. This APE II is approved by Federal Aviation Administration of USA (FAA) with Supplemental Type Certificates (STC)⁸ number SA00392SE.

The APE III modification primarily consists of replacing the existing, life-limited, main landing gear axle with an improved, high cycle axle. The modification could increase Maximum Landing Weight from 8,500 to 9,000 lbs. This APE III is approved by FAA with STC number SA01213SE.

The APE STOL is a unique aerodynamic device attached to the trailing edge flaps, which can reduce takeoff and landing field length performance up to 20%. The APE STOL is approved by FAA with STC number SA01805SE.

1.6.3 Global Positioning System

The aircraft was equipped with Garmin G600 Global Positioning System (GPS), which has capability of flight data logging. The Garmin G600 was able store several data on a Secure Digital (SD) data card. After the occurrence, the data of the SD data card installed on the Garmin G600 was successfully retrieved. The recorded file of the occurrence flight recorded 41 minutes of aircraft movement. The detail of the data recorded on the Garmin G600 will be included in the final report.

1.6.4 Weight and Balance

The weight and balance form of the occurrence flight provided by the MAF Indonesia contained the relevant information as follows:

ramp weight ⁹	: 9,049 lbs (maximum 9,097 lbs)
takeoff weight ¹⁰	: 9,034 lbs (maximum 9,062 lbs)
landing weight ¹¹	: 8,919 lbs (maximum 9,000 lbs)

The aircraft was operated within the weight and balance limitation.

1.7 Meteorological Information

There was no meteorological information provider at Angguruk. The pilot recalled that the weather over Angguruk Airstrip was cloudy, however on the final area of Runway 09 was clear and the visibility was good.

⁷ Accessed on 26 January 2021, the detail explanation of APE system can be found in the following link:

<http://aeroacoustics.com/files/208bproducts.htm>

⁸ STC is a Type Certificate (TC) issued when an applicant has received FAA approval to modify an aeronautical product from its original design.

⁹ Ramp weight is weight during ground maneuver. Consisting aircraft empty weight, usable fuel, total occupants and cargo on board weight.

¹⁰ Takeoff weight is weight during the start of the takeoff roll. Calculating from ramp weight minus the fuel burned for taxi and start-up engine.

¹¹ Landing weight is weight during touchdown. Calculating from takeoff weight minus the fuel burned for enroute.

1.8 Aids to Navigation

A ground-based navigation aid was not available at Angguruk.

The aircraft was fitted with GPS Garmin G600 which can provide navigation data. The G600 allows the pilot to create, edit and store up several flight plans with and waypoints on each flight plan. The G600 can use direct point-to-point navigation to provide guidance from a certain point or position to another point on the flight plan.

The MAF Indonesia developed airstrip information for internal use that also provided landing guidance to Angguruk, as follow:

VHF 121.0	Class 3	ANGGURUK	ANG		
Wind 10:00	For departure as well; Mid-morning up-valley winds cause turbulence on final and create strong tail winds on departure. Caravan ops in calm or light breeze conditions only.				
Length / Width	490 / 22 m	90% ↗	Elev 4500 ft Slope 5 %		
Surface	Hard smooth surface of grass with gravel base; some undulations; very slippery when wet; can have soft spots. Well scalped surface reqd for C208.				
Obstacles	None.				
Abort Ldg	Short final, left turn out; if unable to stop, veer left at upper end.				
Abort TO	At bottom of steep hill; if unable to stop, swerve into right ditch; DO NOT go off the end.				
<p>The map shows the Angguruk river flowing through a valley. To the west, the terrain rises sharply, marked as 'rapidly rising terrain'. A 'Ninia Pass 11,000' is indicated to the southwest. A ridge line is shown with a 'KP 5000' level with last hut on ridge'. The airstrip is located on a 'plateau' to the east of the river. A 'hospital' is marked near the airstrip. A 'tight right turn after takeoff' is indicated with an arrow. An 'abort' point is also marked. A north arrow is present in the top right corner.</p>					
Inspection Due	Takeoff Restrictions (Kg)	KODI	C208	C208B	Tq Limit
04-Feb-22		250	500	800	
<p>The profile view shows the elevation of the airstrip starting at 4500' and ending at 4560'. The slopes are 6% TDZ, 3%, -1%, and 24% turn around. A dashed line indicates the 'KP 5000' level with last hut on ridge'.</p>					
Weather Patterns	Normally open from early morning till mid-day. Caution-watch for clouds closing in down valley blocking departure.				
Hazards / Remarks	Dangerous sun/shadow on appch 6:15 to 7:30; Do not attempt approach if sun is an issue. End strip not aligned with the rest of the strip. T/o requires immed steep rt turn after passing windsock. Strip must be scalped for C208				

For MAF Internal Use Only. Any Unauthorized Use Prohibited.

Coordinates: S 04° 12.03' Dist / Brg From: WAVV: 29 nm; 098°
E 139° 25.97' 06 Jul 2020 WAJJ: 117 nm; 210°

Figure 1: Airstrip information for Angguruk

1.9 Communications

The pilot used two-way Very High Frequency (VHF) radio communication to communicate with Wamena air traffic controller and when made broadcast on the Traffic Information Broadcasts by Aircraft (TIBA) frequency. There was no communication issue in this accident.

1.10 Aerodrome Information

Angguruk was located on mountainous area and the airspace over the airstrip was classified as Class G airspace. The airstrip was equipped with a windsock located on the left side of Runway 09. There were runway threshold markers painted with white paint on the beginning Runway 09. According to the local resident at Angguruk, the grass in the beginning of the airstrip was cut on 9 March 2021 or one day before the occurrence.

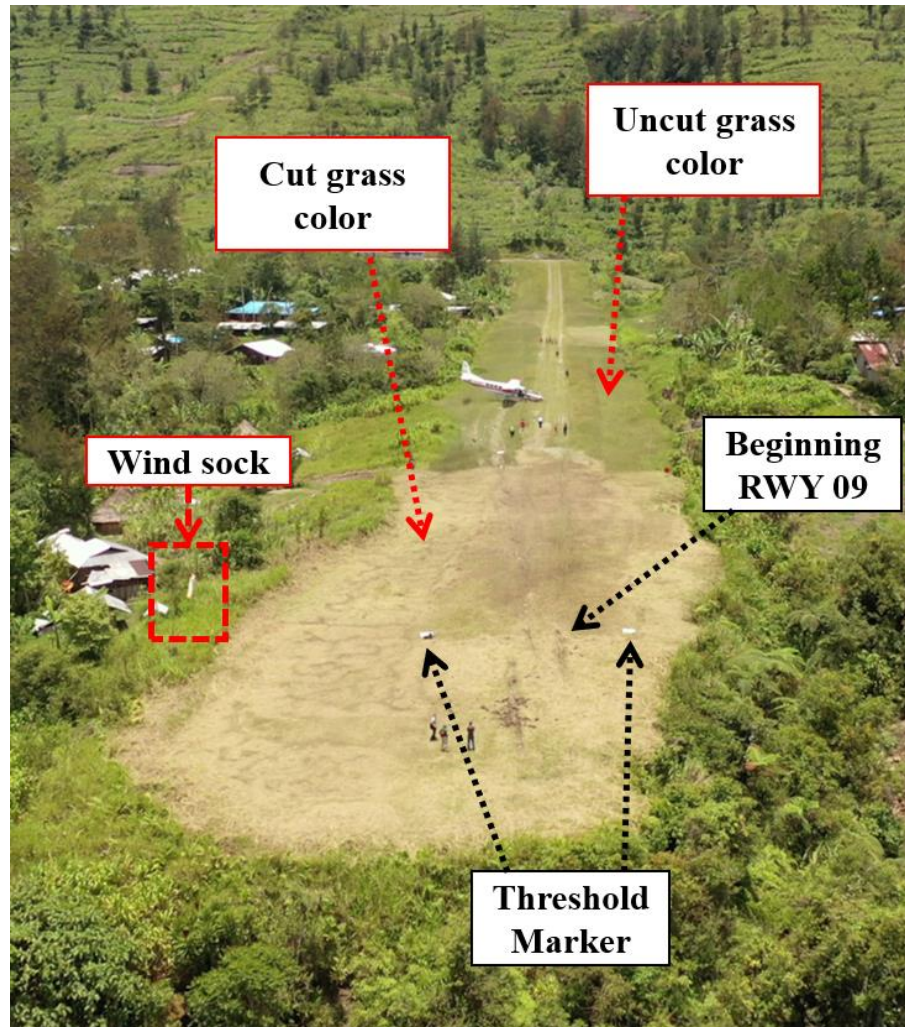


Figure 2: The threshold markers and wind sock location

The Aeronautical Information Publication (AIP) Volume IV page PAPUA ANGGURUK dated 22 December 2005 published by the Directorate General of Civil Aviation (DGCA) provided aerodrome information of Angguruk. In this document described the airstrip elevation was 4,609.81 feet. The runway information of Angguruk provided in the AIP Volume IV was as follow:

direction	: 09 – 27
length	: 500 meters
width	: 27 meters
slope	: 10% average
surface	: Grass

The airstrip information developed by MAF Indonesia for internal use, described the airstrip elevation was 4,500 feet, and included runway information as follow:

direction : 09 – 27
length : 490 meters
width : 22 meters
slope : 5%
surface : Grass

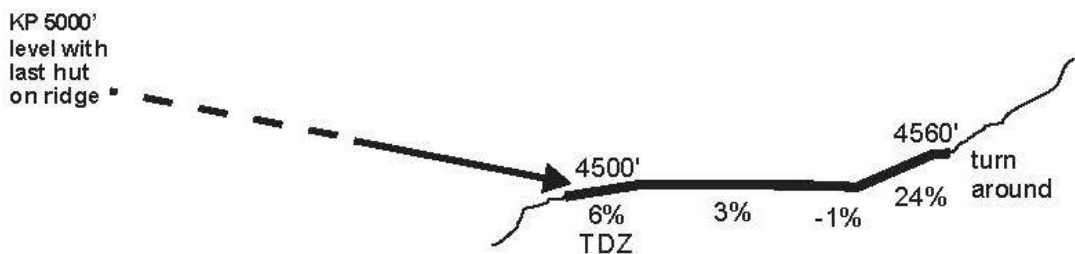


Figure 3: The runway illustration provided in the MAF Indonesia's airstrip information of Angguruk

The MAF Indonesia's airstrip information for Angguruk also described the possibility of wind curfew after 1000 LT, with additional information:

For departure as well; Mid-morning up-valley winds cause turbulence on final and create strong tail winds on departure. Caravan ops in calm or light breeze conditions only.

1.11 Flight Recorders

The aircraft was not fitted with flight data recorder nor cockpit voice recorder. Neither recorder was required by current Indonesian aviation regulations.

1.12 Wreckage and Impact Information

Ground marks from the main and the nose wheels was found about 22 meters before the Runway 09 threshold. The first mark was identified as mark of the left main wheel followed by the mark of the right main wheel and the mark of the nose wheel. The depth of the left main wheel mark was about 30 cm.

About 3 meters after the Runway 09 threshold, the first propeller strike mark was found and about 14 meters after, it was found composite debris and ground scratch mark of the cargo pod. The aircraft stopped on the left runway shoulder about 112 meters after the Runway 09 threshold on heading 182°.

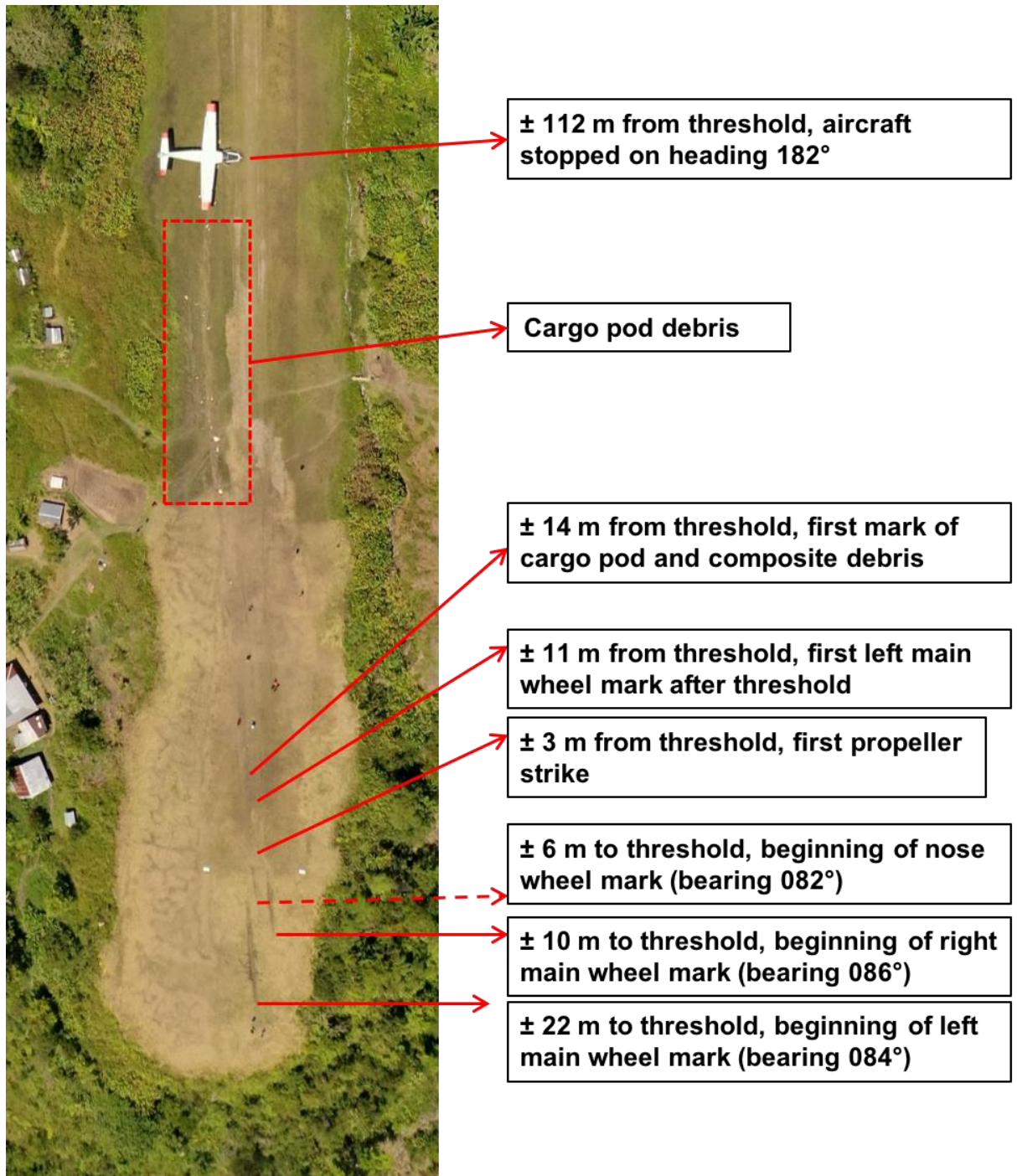


Figure 4: The damaged of the propeller blades

The damage of the aircraft was as follow:

- Left main gear spring bent aft ward.
- Nose gear drag link spring failed in two locations.
- Nose landing gear strut assembly and nose wheel damaged, found folded aft ward underneath the aircraft. The drag link spring attachment failed.
- Steer bungee/shimmy damper damaged.
- Engine truss frame bent.

- Bottom engine cowling including the engine exhaust damaged.
- Propeller blades bent.



Figure 5: The aircraft condition after stop



Figure 6: The damaged of the propeller blades

1.13 Medical and Pathological Information

This information was not available at the time of the issuance of this report. Should any medical and/or pathological information be obtained in the course of this investigation that is of relevance to this investigation, it will be included in the final report.

1.14 Fire

There was no evidence of in-flight and post-flight fire.

1.15 Survival Aspects

After the aircraft stopped, the pilot self-evacuated from the aircraft.

1.16 Test and Research

This information was not available at the time of the issuance of this report. Should any test and research be obtained in the course of this investigation that is of relevance to this investigation, it will be included in the final report.

1.17 Organizational and Management Information

1.17.1 Aircraft Operator

The aircraft was operated by Yayasan Mission Aviation Fellowship (MAF) Indonesia which had valid Operator Certificate (OC) number 91-004. The MAF Indonesia is authorized to conduct non-commercial general aviation flight operations within Indonesia.

The MAF Indonesia developed Operation Manuals (OM)s which contains policy and procedure approved by the Directorate General of Civil Aviation.

1.17.2 Landing Procedures

According to the MAF Indonesia Operations Manual Part B (OM-B) subchapter 7.6 described landing factors for Cessna 208B installed with APE STOL as follows:

Before landing, the PIC shall:

- a. *Calculate the Landing Distance Available (LDA) from the planned touchdown point to the end of the rollable surface.*
- b. *The planned touchdown point shall be at least 100'/30m from the beginning of the rollable surface.*
- c. *Determine the Landing Distance Required (LDR) from demonstrated figures or the POH data adjusted for slope. (See Operations Manual Part C, Section 7)*
- d. *Adjust the LDR for the following factors:*
 - i. *Airstrip Slope:*
 - *Downhill - increase roll by 10% per 2% down slope*
 - *Uphill - decrease roll by 10% per 4% up slope*
 - ii. *Tailwind - increase roll by 10% for each 2.5 kts*
 - iii. *Headwind - decrease roll by 10% for each 10 kts*
 - iv. *Airstrip surface soft or scattered puddles - add up to 50%*
 - v. *Short grass - add 10%*
 - vi. *Tall grass - add 30%*
 - vii. *Wet grass – add up to 100% due to poor braking*
 - viii. *Airstrip surface undulations or roughness - add 10%*
 - ix. *Contaminated runway with snow or ice – add up to 100%*
- e. *Consider adjusting the LDR for the following factors:*
 - i. *Density Altitude*
 - ii. *Turbulence, crosswind*
 - iii. *Airstrip side slope*
 - iv. *Pilot's previous experience at this airstrip*

v. *Aircraft powerplant and airframe condition or installed STOL equipment*

The OM-B subchapter 7.7 also described landing requirements for Cessna 208B installed with APE STOL included:

c. *Minimum approach profile is 5 feet above threshold with touchdown point (TDP) 100 feet beyond the threshold. For airstrips with a displaced threshold, touchdown may be at that point.*

1.18 Additional Information

The data collection in the occurrence site was limited due to the travel limitation during the Corona virus (COVID-19) pandemic. The investigation is continuing, should any further relevant safety issues emerge during the course of the investigation, KNKT will immediately bring the issues to the attention of the relevant parties and publish as required.

1.19 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 FINDINGS

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.

According to factual information during the investigation, the Komite Nasional Keselamatan Transportasi (KNKT) identified initial findings as follows:

1. The aircraft had valid Certificate of Airworthiness (C of A) and Certificate of Registration (C of R).
2. The aircraft was installed with Aircraft Payload Extender (APE) II, III, and Short Takeoff and Landing (STOL) system which increased takeoff and landing weight limitations, and reduced takeoff and landing field length performance.
3. The aircraft was equipped with Garmin G600 Global Positioning System (GPS), which has capability of flight data logging which recorded 41 minutes of flight data.
4. The weight and balance form of the occurrence provided by the MAF indicated that the aircraft was operated within the weight and balance limitation.
5. The pilot had valid Commercial Pilot License which qualified as Single Engine Land aircraft and Single Engine Sea pilot. The pilot also had valid first-class medical certificates.
6. The pilot was a qualified flight instructor at MAF and has been flying on Papua for about 30 years. Since November 2020 until the day of the occurrence, the pilot had flown to Angguruk for six times including the occurrence flight. All those flights were single pilot operation except flight on 23 November 2020, the pilot seated on the right seat as flight instructor. Three of six flights to Angguruk used PK-MAD aircraft.
7. The occurrence flight was the second flight of the day for the pilot and the aircraft. Prior to the departure, there was no record or report of aircraft system malfunction.
8. The filed flight plan indicated that the flight would be conducted under the Visual Flight Rule (VFR).
9. Due to the weather condition and anticipation that the flight would avoid several clouds to maintain visual, the pilot decided to climb to a higher altitude and flew manually without the autopilot.
10. The flight continued to climb up to 14,900 feet due to weather condition. The pilot used the supplementary oxygen system in the aircraft during climb before the aircraft passed altitude of 14,000 feet and stopped the usage of the supplementary oxygen during descend after passed altitude of 14,000 feet.

11. During maneuver over Angguruk, the pilot noticed that the grass on the runway had brighter color, from about 30 meters before the threshold of Runway 09 until about 50 meters from beginning of the Runway 09. The pilot thought that the brighter color-grass was the grass that had been cut.
12. When the aircraft was on final, the pilot noticed that the runway threshold markers were visible. The pilot recalled that the markers were not stand out as usual due to the color were less contrast with the brighter color-grass.
13. The MAF Indonesia Operations Manual Part B (OM-B) required pilot to plan touchdown point at least 100 feet or 30 m from the beginning of the roll able surface or beyond the runway threshold.
14. The pilot recalled that the area about 30 meters before the threshold Runway 09 looked usable for landing, as the color was no different with the 50 meters of the beginning runway.
15. The pilot planned to make touchdown in the very beginning of Runway 09 with intention not to use more braking to decelerate the aircraft.
16. The pilot recalled that the aircraft power was reduced earlier than usual and the pilot also realized that the aircraft seemed lower than expected.
17. The aircraft touched down about 22 meters before the runway threshold, then veered to the left and stopped about 112 meters from the beginning Runway 09 on heading 182°.
18. There was no meteorological information provider in the Angguruk Airstrip. The pilot recalled that the weather over Angguruk Airstrip was cloudy, however on the final area of Runway 09 was clear and the visibility was good.
19. According to the local resident at Angguruk, the grass in the beginning of the airstrip was cut one day before the occurrence.

3 SAFETY ACTION

At the time of issuing this report, the Komite Nasional Keselamatan Transportasi (KNKT) had been informed of safety actions taken by the MAF Indonesia resulting from this occurrence.

3.1 Yayasan Mission Aviation Fellowship (MAF) Indonesia

The MAF Indonesia had conducted internal safety investigation following the occurrence and conducted several safety actions as follows:

- Created training plan for the pilot which included to emphasize landing with touchdown point (TDP) 100 feet beyond the threshold as required by the MAF Indonesia Operations Manual Part B (OM-B).
- Moved the runway threshold markers at Angguruk to be perpendicular to centerline and equidistance to centerline.
- Purchased Precision Approach Path Indicator (PAPI) system and planned to install at Angguruk.

4 SAFETY RECOMMENDATIONS

The KNKT acknowledged the safety actions taken by Yayasan Mission Aviation Fellowship (MAF) Indonesia and considered that the safety actions were relevant to improve safety, however there still safety issues remain to be considered. Therefore, the KNKT issued safety recommendations to address safety issues identified in this report.

4.1 Yayasan Mission Aviation Fellowship (MAF) Indonesia

- **04.O-2021-04.1**

The MAF Indonesia Operations Manual Part B (OM-B) required pilot to plan touchdown point at least 100 feet or 30 m from the beginning of the roll able surface or beyond the runway threshold. During the occurrence flight, the pilot recalled that the area about 30 meters before the threshold Runway 09 looked usable for landing, as the color was no different with the 50 meters of the beginning runway. The pilot then planned to make touchdown in the very beginning of Runway 09 as he did not want to use more braking to decelerate the aircraft.

The MAF Indonesia had created training plan for the occurrence flight's pilot which included emphasizing a landing with touchdown point 100 feet beyond the threshold as required by the MAF Indonesia Operations Manual Part B (OM-B).

Therefore, KNKT recommends the MAF Indonesia to emphasize all pilots to implement the landing requirements as described in the OM-B.

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