



**KOMITE NASIONAL KESELAMATAN TRANSPORTASI
REPUBLIC OF INDONESIA**

FINAL

KNKT.24.07.17.04

Aircraft Accident Investigation Report

PT Whitesky Aviation

Bell 505; PK-WSP

Near Sulubun Beach, Bali

Republic of Indonesia

19 July 2024

2025

This Final Report is published by the Komite Nasional Keselamatan Transportasi (KNKT), located on the 3rd floor of the Transportation Building, Jalan Medan Merdeka Timur No. 5, Jakarta 10110, Indonesia.

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Jakarta, 28 November 2025

**KOMITE NASIONAL
KESELAMATAN TRANSPORTASI
CHAIRMAN**



SOERJANTO TJAHJONO

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ABBREVIATIONS AND DEFINITIONS

AMSL	:	Above Mean Sea Level
ATS	:	Air Traffic Services
BMKG	:	Badan Meteorologi Klimatologi dan Geofisika (Bureau of Meteorology, Climatology, and Geophysics)
CPL	:	Commercial Pilot License
CVR	:	Cockpit Voice Recorder
DGCA	:	Directorate General of Civil Aviation of Indonesia
GWK	:	Garuda Wisnu Kencana
HIRA	:	Hazard Identification and Risk Assessment
IAS	:	Indicated Air Speed
km	:	Kilometers
KNKT	:	Komite Nasional Keselamatan Transportasi
LT	:	Local Time
MFD	:	Multi-Function Display
MHz	:	Mega Hertz
Nm	:	Nautical Mile
NR	:	The Main Rotor Speed
PIC	:	Pilot in Command
RPM	:	Revolution per Minute
RTB	:	Return to Base
SD Card	:	Secure Digital Card
UTC	:	Universal Time Coordinated
VFR	:	Visual Flight Rules
VOR	:	Very high Omni Range
WSPS	:	Wire Strike Protection System

SYNOPSIS

On 19 July 2024, a helicopter Bell 505 registration PK-WSP operated by PT Whitesky Aviation conducted a non-scheduled commercial sightseeing flight from the Garuda Wisnu Kencana (GWK) Helipad, Bali to several areas. Based on the filed flight plan, the helicopter would fly over Uluwatu – Nyang Nyang – Melasti and return to GWK Helipad at a cruising altitude of 1,000 feet, following Visual Flight Rule (VFR). On board this flight were one pilot and four passengers.

Prior to the departure, the pilot was advised by GWK Helipad radio operator that another helicopter was conducting a sightseeing flight and that several kites had been observed near the PK-WSP flight plan route.

At 0633 UTC (1433 LT), the pilot contacted the I Gusti Ngurah Rai International Airport Tower controller (tower controller) and advised that the helicopter was airborne from GWK Helipad. After departure, the pilot and passengers noticed several kites at and below the helicopter's altitude.

About one minute after the helicopter reached cruising altitude, a sound similar to helicopter striking a kite string was recorded in the video taken by the passenger. A few seconds later, the fuel flow started to drop followed by decreasing altitude parameters. In this state, it is suspected that the kite string became entangled around the main rotor and tail rotor pitch link assemblies. The pilot immediately observed the area, identified an open area surrounded by cliffs, and decided to make an emergency landing there. The helicopter impacted the tops of several trees on the cliff before finally coming to rest in the field.

The helicopter was found between man-made cliffs at coordinates 8°49'13.62"S; 115°5'36.89"E or about 4.5 Nm on radial 260° from the GWK Helipad, with the kite string wrapped around both the main and tail rotor masts.

The notification was sent to relevant parties, including DGCA Indonesia, ICAO, Transport Safety Board of Canada and National Transportation Safety Board of United States of America as the State of Manufacture. The TSB and NTSB were assigned untraveled Accredited Representative to assist the investigation.

The investigation did not find any issue related to aircraft system malfunction or the weather. The analysis discusses pilot awareness, flying kite regulated zone and safety management system implementation. KNKT concluded the contributing factors as follows:

- A kite flying higher than helicopter's altitude, with transparent and thin string, made the pilot and the passengers unaware of its location, preventing pilot from making avoidance maneuver.
- The kite string became entangled in the main and tail rotors, which are part of the helicopter's flight control system, resulting in difficulty controlling the helicopter.

Komite Nasional Keselamatan Transportasi (KNKT) acknowledged that the safety actions taken by the Directorate General of Civil Aviation and considered relevant to improve safety. However, there are safety issues that remain to be considered, therefore KNKT issued safety recommendations to address the safety issues identified in this report.

1 FACTUAL INFORMATION

1.1 History of the Flight

On 19 July 2024, a helicopter Bell 505 registration PK-WSP operated by PT Whitesky Aviation conducted a non-scheduled commercial sightseeing flight from the Garuda Wisnu Kencana (GWK) Helipad¹, Bali to several areas. Based on the filed flight plan, the helicopter would fly over Uluwatu² – Nyang Nyang³ – Melasti⁴ and return to GWK Helipad at a cruising altitude of 1,000 feet, following Visual Flight Rule (VFR). On board this flight were one pilot and four passengers.



Figure 1: The PK-WSP flight plan and actual flight

Prior to the departure, the pilot was advised by GWK Helipad radio operator that another helicopter was conducting a sightseeing flight and that several kites had been observed near the PK-WSP flight plan route.

At 0633 UTC⁵ (1433 LT), the pilot contacted the I Gusti Ngurah Rai International Airport Tower controller (tower controller) and advised that the helicopter was airborne from GWK Helipad. The tower controller then advised the pilot to report over

¹ The details of GWK Helipad information including its location are described in the [Subchapter 1.10](#).

² Uluwatu was located at coordinate of 8°49'45.5" S; 115°5'4.4" E or about 6.6 Nm on radial 224° from I Gusti Ngurah Rai International Airport or about 3 Nm on radial 263° from GWK.

³ Nyang Nyang was located at coordinate of 8°50'20.8" S; 115°5'36.2" E or about 6.7 Nm on radial 218° from I Gusti Ngurah Rai International Airport.

⁴ Melasti was located at coordinate of 8°50'54.6" S; 115°9'38.6" E or about 5.9 Nm on radial 181° from I Gusti Ngurah Rai International Airport or about 2.3 Nm on radial 190° from GWK.

⁵ The 24-hours clock in Universal Time Coordinated (UTC) is used in this report to describe the local time as specific events occurred. The Local Time (LT) is UTC+8 hours.

Pecatu⁶. The pilot did not ask the tower controller whether there were any reports of kites in the airspace. After departure, the pilot and passengers noticed several kites at and below the helicopter's altitude.

At 1435 LT, the helicopter reached a barometric altitude of about 800 feet and maintained that altitude. During cruising from Pecatu to Uluwatu, the pilot saw another kite flying high above the helicopter. The pilot and passengers did not see any kites or strings ahead of the helicopter's flight path.

At 1436 LT, a sound similar to a helicopter contacting a kite string was heard, and the helicopter started to lose altitude. The pilot saw that the main rotor speed (NR) indicator was increasing, followed by an abnormal engine sound. The pilot attempted to regain altitude, but the helicopter continued to descend. The pilot immediately observed the area, identified an open area surrounded by cliffs, and decided to make an emergency landing there. The helicopter impacted the tops of several trees on the cliff before finally coming to rest in the field.

At 1443 LT, the pilot asked whether anyone could hear his transmission on the tower controller frequency with the intention of requesting assistance. The tower controller responded to the pilot, however, the response was not received by the pilot.

The helicopter was found between man-made cliffs at coordinates 8°49'13.62"S; 115°5'36.89"E, about 5.8 Nm on radial 224° from I Gusti Ngurah Rai Airport, or about 4.5 Nm on radial 260° from the GWK Helipad, with the kite string wrapped around both the main and tail rotor masts.

⁶ Pecatu was located at coordinate of 8°48'12.70" S; 115°7'38.77" E or about 3.8 Nm on radial 213° from I Gusti Ngurah Rai Airport or about 2.4 Nm on radial 284° from GWK.

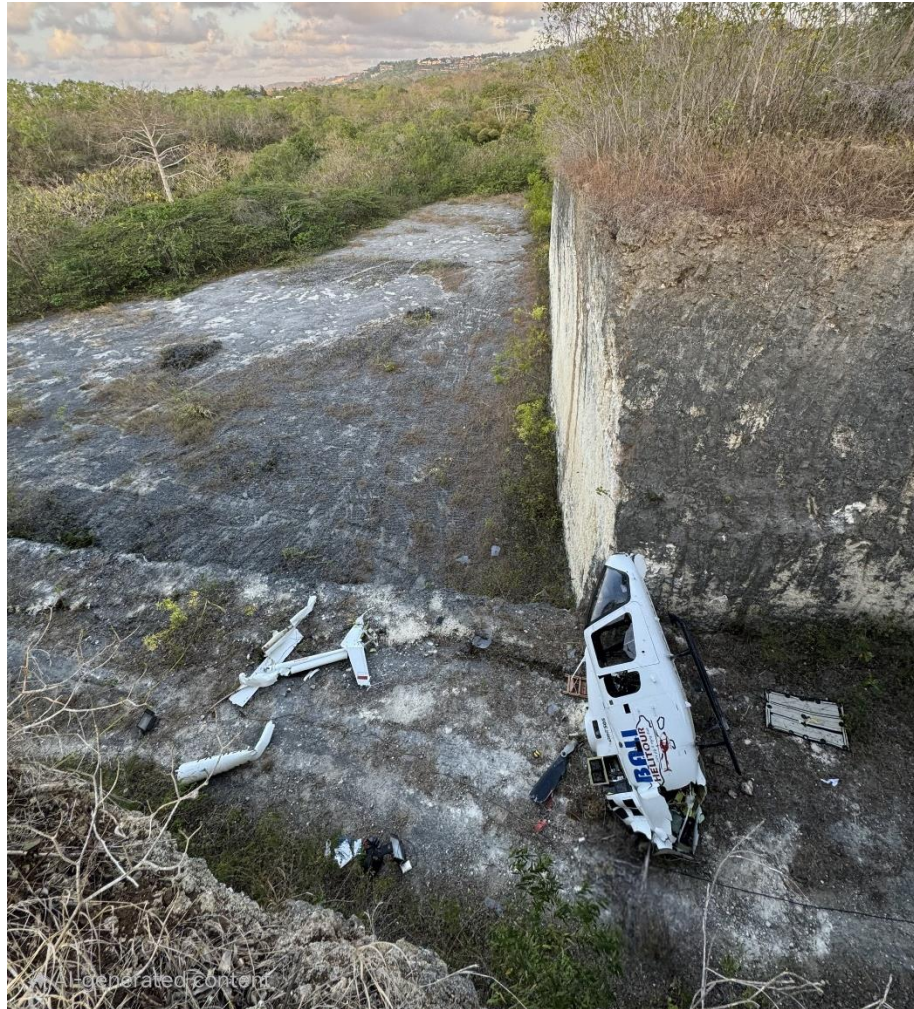


Figure 2: The wreckage situation

1.2 Injuries to Persons

Injuries	Flight crew	Passengers	Total in Aircraft	Others
Fatal	-	-	-	-
Serious	-	2	2	-
Minor	1	2	3	-
None	-	-	-	-
TOTAL	1	4	5	-

Two seriously injured passengers were Indonesian and Australian.

1.3 Damage to the Helicopter

The helicopter was destroyed by the impact force.

1.4 Other Damage

There was no other damage to property and/or the environment.

1.5 Personnel Information

Gender : Male
Age : 30 years
Nationality : Indonesia
Date of joining the company : 25 August 2022
License : Commercial Pilot License (CPL)
 Date of issue : 10 November 2017
 Aircraft type rating : Bell 505
Medical certificate : Class 1
 Last of the medical : 8 Mei 2024
 Validity : 8 November 2024
 Medical limitation : None
Last line check : 24 January 2023
Last proficiency check : 26 June 2024

Flying experience

Total hours : 837.11 hours
Total on type : 210.54 hours
Last 90 days : -
Last 30 days : 10.31 hours
Last 7 days : 1.07 hours
Last 24 hours : 7 minutes (including this flight)

1.6 Aircraft Information

1.6.1 General

Registration Mark : PK-WSP
Manufacturer : Bell Helicopter Textron
Country of Manufacturer : United States of America
Type/Model : Bell – 505
Serial Number : 65044
 Year of Manufacture : 2018

Certificate of Airworthiness

Date of issue : 24 June 2024
Validity : 23 June 2025
Category : Normal

Limitation : None

Certificate of Registration

Number : 4432

Date of issue : 18 October 2022

Validity : 17 October 2025

Time Since New : 320 hours (as per 17 July 2024)

Cycles Since New : 889 cycles (as per 17 July 2024)

Last Major Check

Type of Inspection : 6-Year Inspection

Prior to and during flight, there was no report or record of helicopter system malfunction.

1.6.2 Engines

Manufacturer : Safran Helicopter Engine

Type/Model : Arrius 2R

Serial Number engine : 50035

Time Since New : 320 hours (as per 17 July 2024)

Cycle Since New : 662 cycles (as per 17 July 2024)

1.6.3 Main Rotor System

The main rotor provides the lift force, which moves the helicopter vertically, forward, backward, and sideways. It provides the mechanical means to attach the main rotor to the rest of the helicopter mechanical structure at the top of the mast.

When viewed from the top of the helicopter, the rotor blades rotate counterclockwise. The main rotor system is composed of the following components:

- rotor blades
- rotor hub
- rotating controls
- main rotor indicating system

The rotor blades are lifting surfaces and structures attached to the main rotor hub assembly. When the main rotor hub rotates, the interaction of the rotor blades with the air causes a lifting force that is transferred from the rotor blades to the main rotor hub.

The rotor hub is composed of the main rotor hub assembly and the flap restraint assembly. The rotor hub provides attachments for the rotor blades and attaches to the main rotor shaft. The main rotor transmission drives the main rotor shaft.

The rotating controls convert non-rotating flight control inputs from the rotor flight control system into rotating control inputs to the rotor hub. These controls cause the resultant lifting force vector to tilt away from the main rotor shaft axis, which moves

the helicopter in the direction of the resulting force. It is composed of the following components:

- Swashplate and support assembly
- Pitch link assemblies
- Drive lever assembly
- Idler link assembly
- Collar set swashplate drive assembly

The pitch link assemblies connect the rotating outer ring of the swashplate assembly to the pitch horns of the main rotor hub. It consists of the parts that follow:

- Aluminum alloy tube
- Corrosion-resistant steel bonded inserts
- Corrosion-resistant steel clevises

There are two pitch links per helicopter.

The main rotor indicating system provides an electrical signal that indicates the angular speed of the main rotor shaft. This signal is used by other systems in the helicopter to determine NR and RPM warnings, which are presented to the pilot.

The main rotor pitch link assembly is the part of the primary flight control that allows the pilot to fly the helicopter in any direction of travel: forward, rearward, left, and right. Any disturbance of the pitch link assembly in-flight required the pilot to land as soon as possible, as the pilot would not be able to control the helicopter.

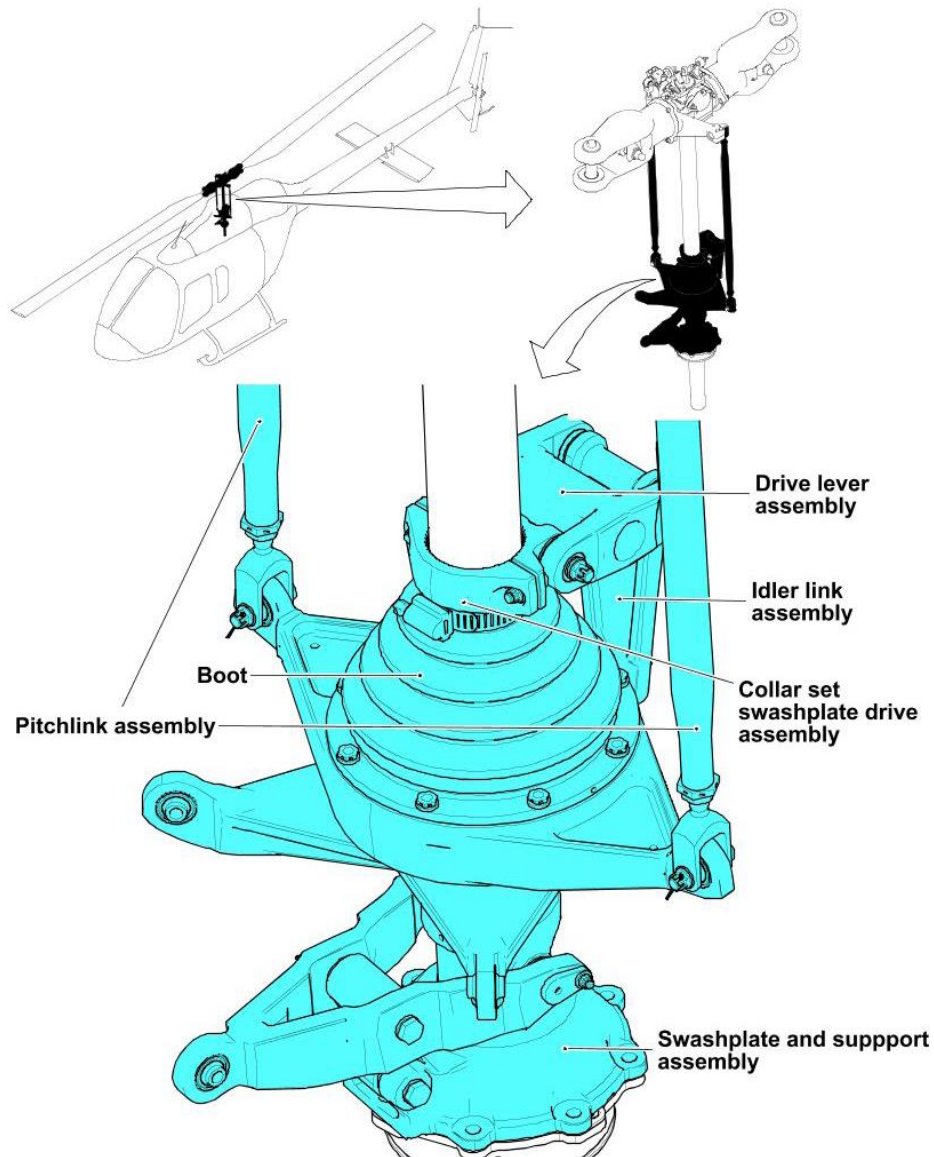


Figure 3: The Pitch link assembly

1.6.4 Tail Rotor System

The tail rotor system provides lateral thrust to compensate for the torque of the main rotor that is applied to the helicopter. It is also used to control the movement of the helicopter around the vertical axis.

The tail rotor is on the left side of the helicopter and rotates clockwise when looking inboard. It is a delta hinge-type of rotor that prevents dissymmetry of lift. The tail rotor has a balance wheel so it can be dynamically balanced when high-frequency vibrations occur.

The tail rotor system includes the following systems:

- The rotor blade assemblies
- The tail rotor hub assemblies
- The tail rotor pitch link assemblies

The tail rotor blade system provides the necessary aerodynamic lift force to push the tail rotor in the opposite direction of the torque applied by the main rotor. It also has provisions to control that force so the helicopter can be moved around the vertical axis.

The tail rotor pitch link assemblies provide the movement of the pitch change axis of the tail rotor blade assemblies, so the aerodynamic lift force that pushes the tail rotor can be increased or decreased.

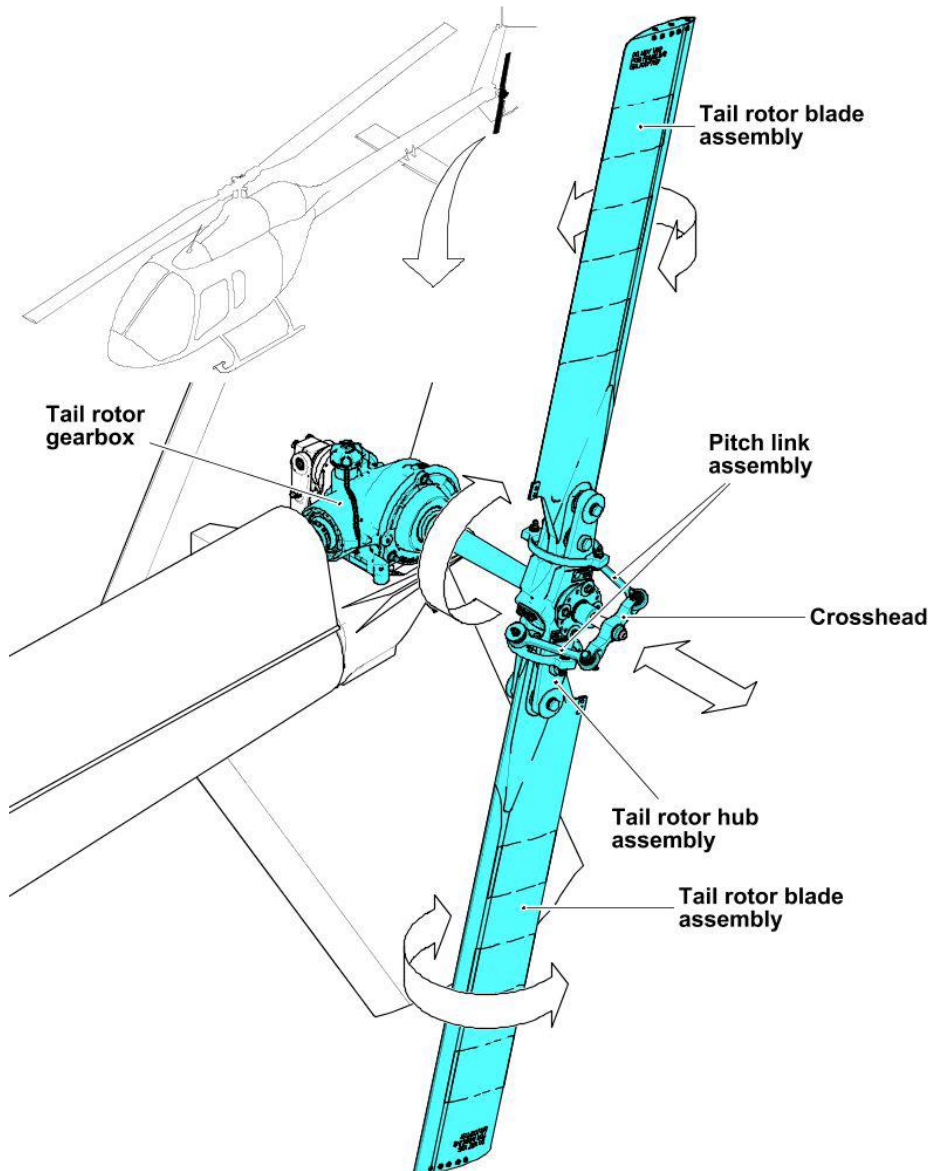


Figure 4: The tail rotor assembly

The tail rotor pitch link assembly is also part of the primary flight control that allows the pilot to control the torsional effect of the helicopter by applying the pedals. Any disturbance of the tail pitch link assembly in flight might result in the loss of tail rotor effectiveness and require the pilot to land as soon as possible, as the pilot would not be able to control the helicopter.

1.7 Meteorological Information

The GWK helipad did not have a weather observation station. The weather information was obtained from the *Badan Meteorologi Klimatologi dan Geofisika* (BMKG – Bureau of Meteorology, Climatology, and Geophysics) meteorology office at I Gusti Ngurah Rai International Airport.

The satellite image of the Bali area at 1430 LT, showed that conditions at the accident site were clear (see Figure 5). The video recording taken by a passenger from takeoff until the helicopter contacted the kite string also supported that the weather was clear (see [Subchapter 1.18.1](#)).

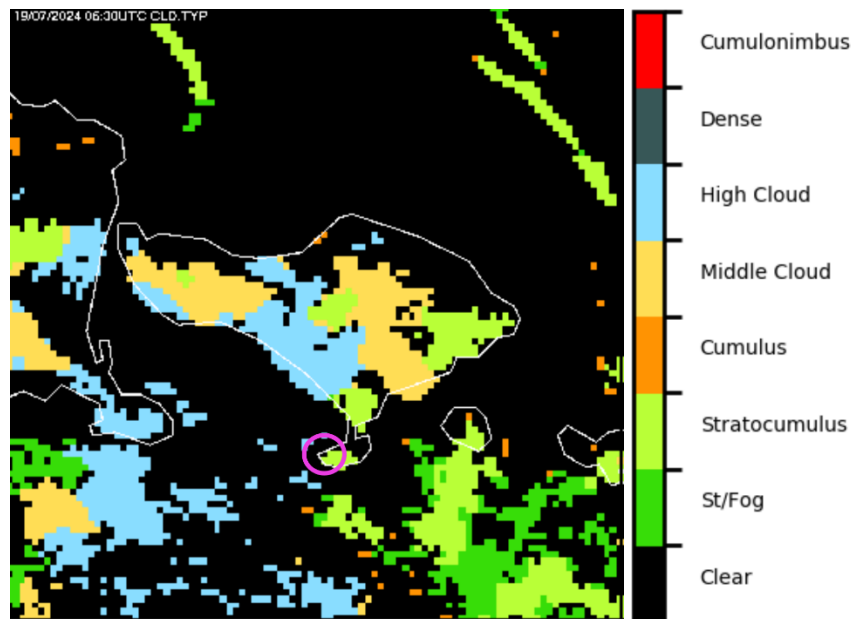


Figure 5: The satellite image of Bali area at 1430 LT (accident site was inside the purple circle)

1.8 Aids to Navigation

The GWK helipad and the entire sightseeing flight area were not equipped with a ground-based navigation aids. The pilot used visual checkpoint and Global Positioning System (GPS) as reference to navigate the helicopter along the route specified in the flight plan.

1.9 Communication

The communication between the pilot and tower controller was recorded by ground-based automatic voice recording equipment. The quality of the recorded transmission was good and there was no communication issue in this occurrence.

1.10 Aerodrome Information

The Garuda Wisnu Kencana (GWK) Helipad was operated by PT Indo Aviassi Perkasa. The GWK Helipad was located at coordinates 8°48'30.2" S; 115°9'44.9" E, about 3.7 Nm on radial about 186° from I Gusti Ngurah Rai International Airport, Bali.

1.11 Flight Recorders

The helicopter was not fitted with a flight data recorder or cockpit voice recorder. Neither recorder was required by current Indonesian aviation regulations for this type of aircraft.

The helicopter was equipped with the Garmin G1000 system which is capable of recording flight. The investigation successfully retrieved the flight data logging from the Garmin G1000 system. The flight data logging of the accident flight recorded 11 minutes 3 seconds of helicopter operation, with 64 parameters. The altitude parameters in the flight data logging consisted of barometric altitude⁷ (AltB), mean sea level altitude⁸ (AltMSL), and GPS altitude⁹ (AltGPS).

The investigation calculated the helicopter's radio altitude¹⁰ by correlating the recorded barometric altitude with terrain elevation data for the purpose of estimating the kite's height.

The significant event from the flight data logging is as follows:

1. At 14:32:39 LT, the fuel flow (E1FFlow gph parameter) increased, indicating that the engine start was initiated.
2. At 14:33:38 LT, the altitude parameters showed an increased value, indicating that the helicopter was airborne. At the same time, the vertical speed (VSpd fpm parameter) also increased.
3. At 14:35:00 LT, the barometric altitude reached a cruising altitude of 800 feet (radio altitude of 708 feet above ground elevation).
4. At 14:36:25 LT, the fuel flow started to drop followed by decreasing value of the altitude parameters.
5. At 14:36:26 LT, the fuel flow values were nearly the values of the fuel flow in an idle state, which then the parameter information was unreliable.

⁷ Barometric altitude is the altitude of an aircraft as measured by a barometer, usually an altimeter in the cockpit, which determines altitude by measuring air pressure.

⁸ Mean sea level altitude is the average level of the surface of the sea, used as a standard reference point for measuring altitude and elevation.

⁹ GPS altitude is a geometric measurement of height above a reference surface, typically an idealized ellipsoidal model of the Earth, rather than the actual ground level or mean sea level.

¹⁰ Radio altitude is the precise vertical distance between an aircraft and the terrain directly beneath it, measured by a radio altimeter.

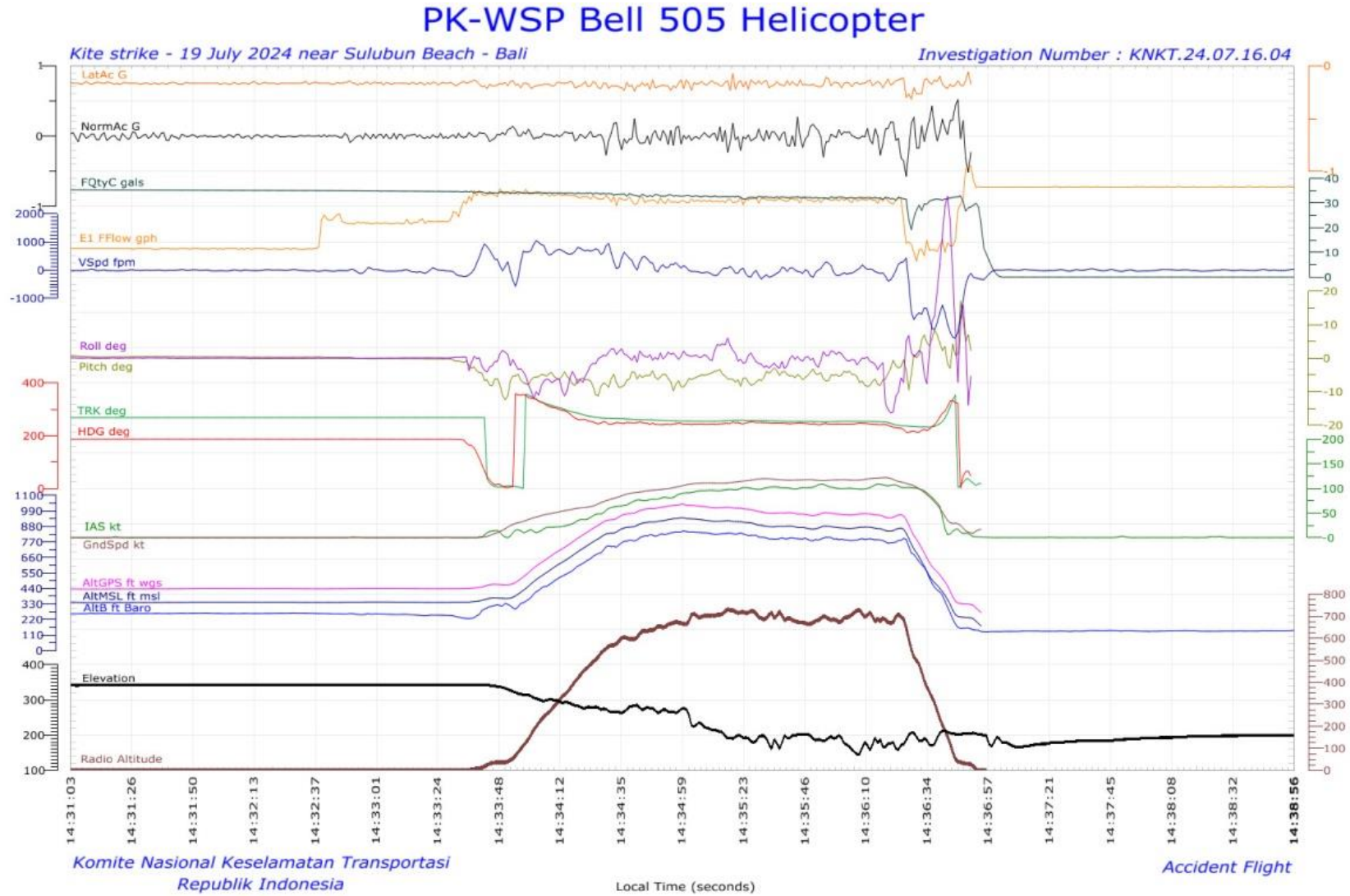


Figure 6: The significant parameters of the flight instrument of the accident flight

1.12 Wreckage and Impact Information

The helicopter was found at coordinates 8°49'13.62" S 115°5'36.89" E at an elevation of about 175 feet Above Mean Sea Level (AMSL). The main wreckage was situated between man-made cliffs, about 7.5 meters wide and 10 meters high.

The main rotor cut several trees at the top of the cliff before crashing down in the field. The direction from the initial impact point to the helicopter's final stop position was about 030°. An open area near the man-made cliff had served as the pilot's intended site for the emergency landing.



Figure 7: The helicopter location seen from the incoming direction

The helicopter faced a heading of about 047°, with the windshield angled about 45° on the ridge as shown in the Figure 8. The tail boom and tail rotor were separated and found at about 5 meters from the helicopter.



Figure 8: The helicopter condition after impact

The main rotor mast exhibited damage, with the main rotors being detached. Part of the main rotors was found about 20 meters from the main wreckage above the man-made cliff.

Evidence of the kite string wrapped around the main rotor mast resulted in deformation of the flight control rod. The tail rotor also exhibited damage, and kite string was also found wrapped around the tail rotor mast. The kite was not found at the accident site.



Figure 9: The kite string on the main rotor and tail rotor mast

The investigation collected the kite string that was entangled in the helicopter main and tail rotors as shown in the following figure.

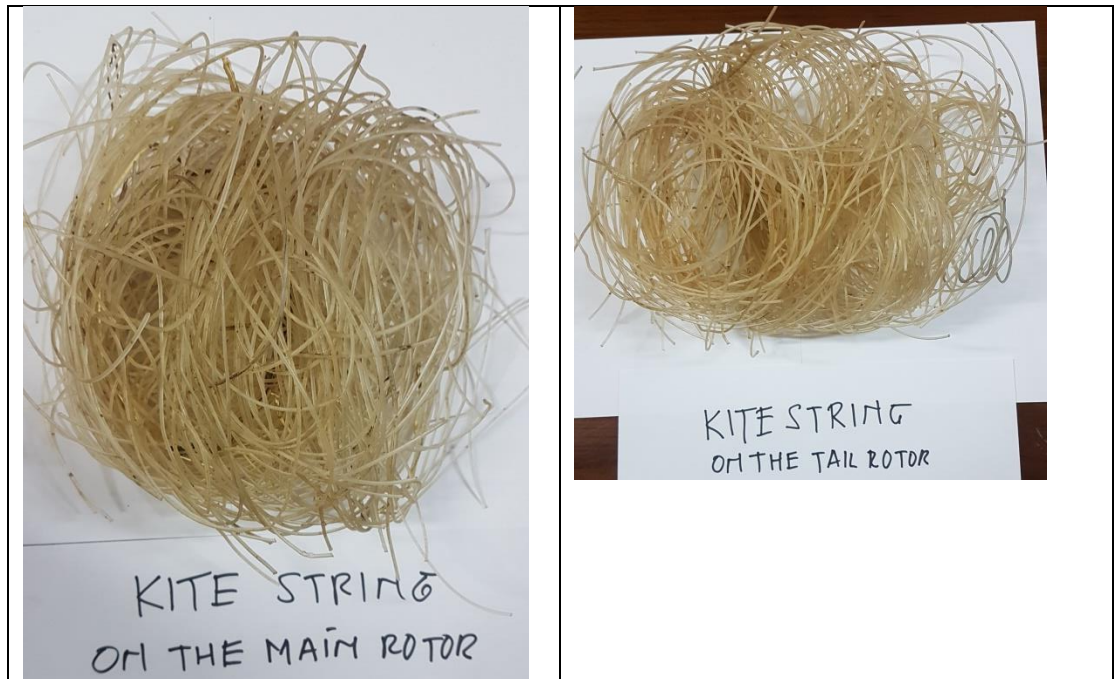


Figure 10: The kite string on the main rotor and tail rotor

The entangled kite string on the main rotor was estimated at more than 200 coils, and on the tail rotor at more than 120 coils.

The diameter of the kite string was about 2 millimeters, as shown in the following figure.

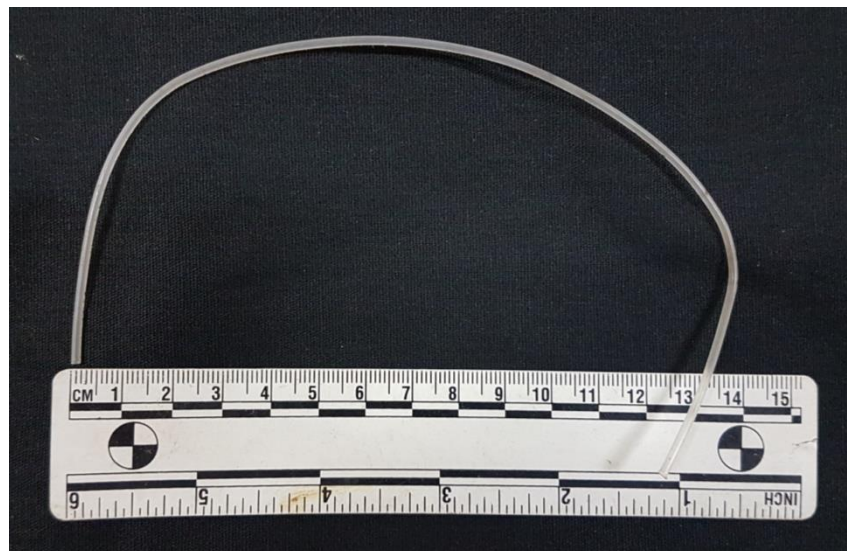


Figure 11: The diameter of the kite string

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 in-flight or post-impact fire.

1.15 Survival Aspects

During the flight, all occupants were using seatbelts.

After the helicopter crashed and stopped, the pilot shut down the engine and attempted to seek assistance by asking whether anyone could hear his transmission on the tower controller frequency. The tower controller responded to the pilot's transmission, however the helicopter radio did not receive any reply.

Several minutes after the occurrence, some local people arrived and helped the occupants to evacuate from the helicopter. One of the local people kicked the windscreen to rescue the passengers.

About 40 minutes after the occurrence, an ambulance arrived and transported all the occupants to the nearest hospital.

1.16 Tests and Research

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

1.17 Organizational and Management Information

1.17.1 Aircraft Operator

Aircraft owner and operator : PT Whitesky Aviation
Secure Building – Tower A1.1 Floor
Jalan Raya Protokol Halim Perdanakusuma
Jakarta 13610

Air operator certificate : 135-016 (valid until 26 April 2026)

The aircraft operator had an operation base in Jakarta. At the time of the occurrence, the operator operated 4 (four) Bell 505 helicopters (including PK-WSP), 2 (two) Airbus helicopters EC135, 1 (one) Airbus helicopter EC145, and 1 Cessna 208.

The operation of the helicopter at Bali was mainly for sightseeing flights at low altitude, where most area of kite flying activity was observed.

On 30 August 2023, prior to operate PK-WSP at Bali, the operator conducted Hazard Identification and Risk Assessment (HIRA). According to the aircraft operator Safety Management System Manual (SMSM) Chapter 1 describes:

...

Hazard means condition, object or activity with the potential of causing injuries to personnel, damage to equipment or structures, loss of material, or reduction of ability to perform a prescribed function or a condition that could foreseeably cause or contribute to an accident.

...

Risk means the assessment, expressed in terms of predicted probability and severity, of the consequence(s) of a hazard taking as reference the worst foreseeable situation.

The HIRA identified “Bell 505 PK-WSP helicopter operation at GWK Helipad, Bali” as hazard. The assessed safety risk of that mentioned hazard included “In the helicopter flight operational area, many people were found flying kites”. The operator determined the safety risk probability for the mentioned risk (flying kite activity) as “occasional” with safety risk severity as “major”. Therefore, the safety risk tolerability of flying kite activity was defined as tolerable, meaning that the flight operation requires management decision to accept the risk. The operator decided to perform mitigation actions to reduce the safety risk as follows:

- 1) *Make sure, When transferring flight plan and Briefing before flight PIC acknowledge with the hazards.*
- 2) *Increase Safety Awareness, when the Helicopter should have been conducting flight mission, it is consider probable that the PIC always coordination with ATC to inform the current situation and do necessary action to avoid the Flying Kites.*
- 3) *Maintaining Periodic Discussion, To Achieve standardization related hazard information, entire Operations team maintain the discussion and take necessary action on the hazards.*
- 4) *Send official Letter to Airnav¹¹ and airport Authority¹² for the attention.*

Based on those mitigation action, the operator determined that the safety risk probability for flying kites activity could be lowered as “improbable”, and the safety risk severity remained the same as “major”.

The HIRA document indicated that four mitigation actions were conducted at the same day the HIRA was performed. The investigation did not find any changes in procedures nor was the official letter sent to Air Traffic Services provider and DGCA Region IV Office following the closed mitigation actions.

1.17.2 Civil Aviation Authority

Civil aviation in Indonesia is regulated and oversighted by Directorate General of Civil Aviation (DGCA) under the Ministry of Transportation. The DGCA has several regional offices including Region IV Office which is responsible to oversight the aviation activities at the airport in Bali, West Nusa Tenggara, and East Nusa Tenggara.

The DGCA Region IV Office was aware of the flying kite hazard for helicopter operation in Bali. In period of 2008 until 2023 there were 12 kite strike incidents involving helicopter operation in Bali.

On 17 May 2024, the DGCA Region IV Office issued a letter addressed to the local government within Bali Provincial Government, asking to remind community to adhere to the flying kite restriction and prohibition as described in the Regional Regulation of Bali Province No. 9 Year 2000 (see [Subchapter 1.17.3](#) for the detailed content of the regulation).

¹¹ Airnav in the HIRA means an air traffic service provider.

¹² Airport Authority in the HIRA means DGCA Region IV Office.

On 19 June 2024, the DGCA Region IV Office held a safety collaboration meeting with the helicopter operators, local government, and community leaders to discuss the risk of flying kite activity. The result of the meeting indicated that most communities were not yet aware of the Regional Regulation of Bali Province No. 9 Year 2000 which restricts and prohibits kite flying activity in certain areas. The DGCA Region IV Office scheduled another meeting to discuss the activities to be carried out to disseminate the kite flying regulations and the necessity to evaluate the related regulation.

On 28 June 2024, the DGCA Region IV Office conducted several safety campaigns highlighting the risk of kite strike incidents to the communities.

On 18 July 2024 or a day before the occurrence, a meeting was held as a follow-up to the meeting on 19 June 2024 to discuss the effective means to disseminate the kite flying regulations. The meeting agreed to form a team to socialize the risks of kite flying for aviation safety and to outline the steps to be taken.

1.17.3 Flying Kite Regional Regulation

Flying kites have been a tradition in Bali for a long time and are considered part of the local culture and wisdom. Kite flying has also become means of promoting Balinese culture and tourism. Several kite festivals are held annually between July and August. In early July, the Bali area experiences strong and steady easterly winds, which usually continue until the end of September.

Balinese kites are typically designed with a colorful tail that can sometimes stretch 20 to 30 meters, or even more than 50 meters from the base of the kite structure. The size of the kites varies from 5 to 10 meters or more.

As the wind blows and the kite is airborne, the kite string may extend 1,000 feet long and sometimes more than 1,500 feet. The material of the kite string varies, but the most common is Silicon Carbide (SiC), which is transparent, strong despite its small diameter (normally about 2 millimeters), and suitable for the large structure of the Balinese kites.

The Bali Provincial Government has identified flying kites as hazards to aviation. The Regional Regulation of Bali Province No. 9 Year 2000 was promulgated to regulate the flying kite activities. Article 2 of the regulation defines prohibited and restricted zones to fly kite as follows:

- Zone 1, within a radius of 5 NM (9 km) from I Gusti Ngurah Rai International Airport, kite flying is prohibited.
- Zone 2, within a radius of 5 to 10 Nm (9 to 18 km) from I Gusti Ngurah Rai International Airport, kite flying is permitted up to a maximum height of 100 meters (300 feet).
- Zone 3, within a radius of 10 to 30 Nm (18 to 54 km) from I Gusti Ngurah Rai International Airport, kite flying is permitted up to a maximum height of 300 meters (1,000 feet).



Figure 12: Illustration of the flying kite regulated zone

Article 6 of the regulation states that the local government of Bali, in coordination with the airport operator, customary village, and cultural organization, is obliged to oversee the implementation of the regulated kite-flying zone.

The Bali Provincial Government had issued several circulars to each head of region, head of customary village, and head of cultural organization, reminding the communities to adhere to the prohibition and restrictions on kite flying in accordance with the Regional Regulation of Bali Province No. 9 Year 2000. The latest circular prior to the accident was issued on 18 March 2024.

The Bali Provincial Government, in coordination with relevant stakeholders had conducted several oversight activities to ensure adherence to the restrictions and prohibitions of kite flying. The team also carried out educational outreach to individuals, including children, found engaging in kite flying activities in prohibited areas. The latest oversight activity prior to the accident was conducted on 8 July 2025.

According to Article 13 of the Regional Regulation of Bali Province No. 4 Year 2019, each head of a customary village in Bali is authorized to issue customary law, called *Awig-Awig*. Within Balinese society, longstanding traditions, customs, and beliefs continue to hold significant influence. As a result, customary laws enacted by the head of the customary village are often observed with greater adherence than regional regulations. The investigation did not find any prohibition and restriction on kite flying in customary law.

1.18 Additional Information

1.18.1 Video Footage from Cockpit

During takeoff until the helicopter crashed, a passenger seated next to the pilot recorded a video using a mobile phone. The video indicated that the weather was clear. The kites and their strings were not visible, and the recording captured a sound consistent with the helicopter contacting a kite string.

The relevant sequence of events from the recorded video was as follows:

1. At 14:35:58 LT, the helicopter at altitude about 800 feet on heading towards the accident site (Figure 13).



Figure 13: Recorded video at 14:35:58 LT

2. At 14:36:23 LT, the video recorded sound similar to helicopter contacted with kite string (Figure 14).



Figure 14: Recorded video at 14:36:23 LT

3. At 14:36:53 LT, the helicopter crashed.

1.18.2 Similar Occurrences

Prior to the accident, on 2 July 2024, a Robinson R66 helicopter registration PK-VPJ operated by another aircraft operator conducted a commercial sightseeing flight from Fly Bali Helipad¹³ to Nusa Lembongan¹⁴ and Nusa Penida¹⁵, via Tanjung¹⁶ and

¹³ Fly Bali Helipad was located at coordinate of 8°50'24.01" S; 115° 9'42.58" E about 5.3 Nm at radial of 180° from I Gusti Ngurah Rai International Airport.

¹⁴ Nusa Lembongan was located at coordinate of 8°41'57.00" S; 115°27'7.00" E about 18 Nm at radial of 80° from I Gusti Ngurah Rai International Airport.

¹⁵ Nusa Penida was located at coordinate of 8°43'40.00" S; 115°32'40.00" E about 18 Nm at radial of 80° from I Gusti Ngurah Rai International Airport.

¹⁶ Tanjung was located at coordinate of 8°46'45.56" S; 115°12'33.43" E about 3 Nm at radial of 120° from I Gusti Ngurah Rai International Airport.

Sanur¹⁷. There was no information about the total number of persons on board during the occurrence.

At 0900 LT, the helicopter took off from the Fly Bali Helipad. About 27 minutes after takeoff, while approaching Tanjung at an altitude about 900 feet AMSL, the pilot heard an abnormal sound from the engine. The pilot decided to Return to Base (RTB) and landed at Fly Bali Helipad. No one was injured in this occurrence, and no damage was found to the helicopter.

After landing, it was found that the main and tail rotor masts were entangled with kite strings, as shown in the following figures.

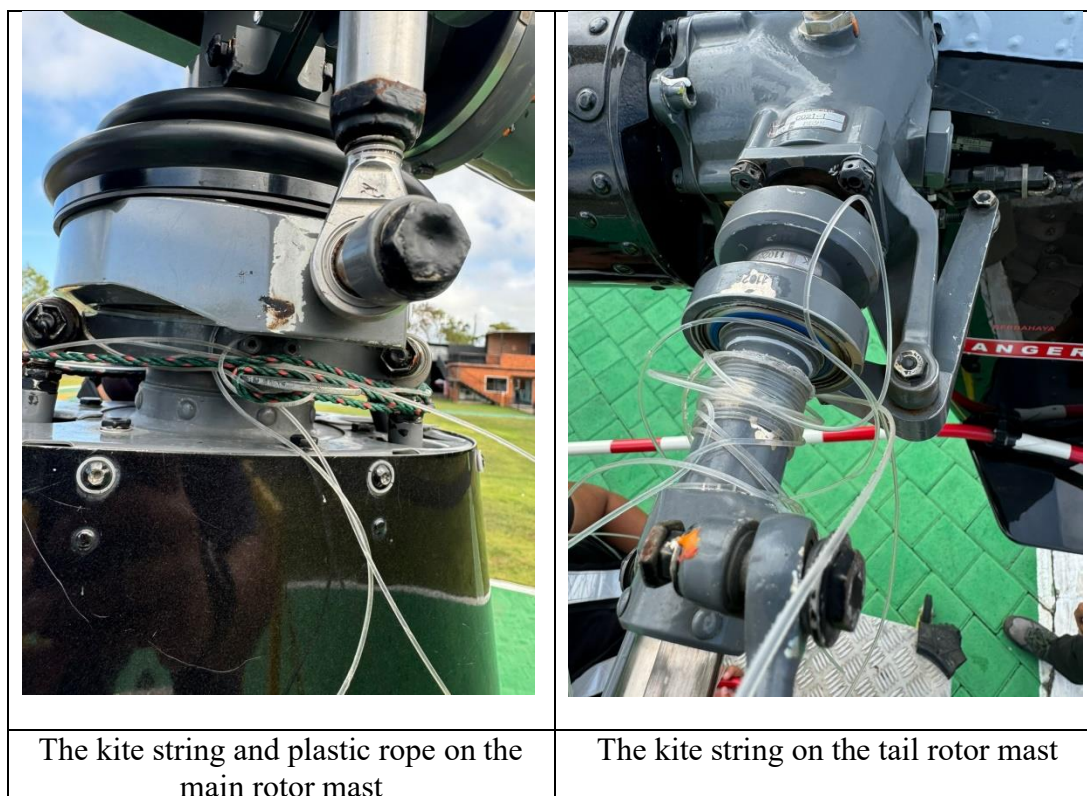


Figure 15: The kite strings found on the main and tail rotor mast of the PK-VPJ

¹⁷ Sanur was located at coordinate of 8°41'41.00"S; 115°15'47.00"E about 7 Nm at radial of 60° from I Gusti Ngurah Rai International Airport.



Figure 16: The kite string and plastic rope that were removed from the main rotor and tail rotor masts

The diameter of the kite string was similar to the PK-WSP occurrence. The dimension of the plastic rope was estimated to be about twice of the kite string.

After the accident, on 29 July 2024, another Robinson R66 helicopter registration PK-VPN operated by the same operator as PK-VPJ conducted a commercial sightseeing flight from JAG Helipad¹⁸. On board the helicopter were one pilot and two passengers.

At about 0930 LT, the helicopter took off from the JAG Helipad. The pilot felt no abnormality since takeoff until the helicopter landed at JAG Helipad. The weather during the occurrence was cloudy.

After landing, the radio operator advised the pilot that the main and tail rotor masts had been wrapped with kite strings, as shown in the following figure.

¹⁸ The JAG Helipad was located at coordinate 8°49'51.94" S; 115°12'29.25" E about 5.5 Nm at radial of 150° from I Gusti Ngurah Rai International Airport.



Figure 17: The PK-VPN kite strike occurrence

No one was injured in this occurrence, and no damage was found to the helicopter.

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 ANALYSIS

The investigation did not find any issue related to aircraft system malfunction or the weather. The analysis will discuss the pilot awareness, flying kite regulated zone and safety management system implementation.

2.1 Pilot Awareness

The satellite image and video recording taken by the passenger indicated that the weather during the sightseeing flight was clear. After departure and during enroute prior to the accident, the pilot noticed several kites at the same, below and above the helicopter altitude.

About one minute after the helicopter reached cruising altitude, a sound similar to helicopter striking a kite string was recorded in the video taken by the passenger. A few seconds later, the fuel flow started to drop followed by decreasing altitude parameters. At this state, it is suspected that the kite string became entangled around the main rotor and tail rotor pitch link assemblies. Considering that neither the pilot and nor the passengers saw any kite in the helicopter's flight path, it can be concluded that the kite was flying higher than the helicopter. The kite's transparent and thin string made the pilot and the passengers difficult to detect it, leaving the pilot unable to take any avoidance maneuver.

The observation of the entangled kite string showed an estimated more than 200 coils, and more than 120 coils on the tail rotor. The entanglement on these components, which part of the helicopter flight control system, rendered the helicopter difficult to control.

2.2 Flying Kite Regulated Zone

Balinese kites have become part of local culture and wisdom. Kite flying also became means to promote Balinese culture and tourism. However, the kite-flying activities have been identified as hazard to aviation, especially helicopters operating at low altitudes.

Regional Regulation of Bali Province No. 9 Year 2000 was promulgated to restrict the kite-flying activities and prohibit them in certain areas, and it obliges the local government of Bali, in coordination with the airport operator, village and cultural organization, to oversee the implementation of regulated kite-flying zone. Bali Provincial Government has issued several circulars to each head of region, head of village and head of cultural organization reminding the communities to adhere to these prohibitions and restrictions. The latest circular was issued about three months before the accident.

About two months before the accident, DGCA Region IV Office issued letter to local government within Bali Provincial Government, asking them to remind communities to adhere to kite-flying restrictions and prohibitions as described in the regional regulation. About one month before the accident, the DGCA Region IV Office held a safety collaboration meeting with the helicopter operators, local government, and community leaders to discuss kite flying risks. The result of the meeting indicated that most of the communities were unaware of the regulation related to the kite flying

activity. Therefore, the DGCA Region IV Office conducted several safety campaigns highlighting the risk of kite strike incidents to the communities.

The helicopter entangled the kite string in Zone 2 at radio altitude of 708 feet above ground elevation. Based on Regional Regulation of Bali Province No. 9 Year 2000, kite flying is permitted only up to 300 feet. As mentioned in Subchapter 2.1, the kite involved was flying higher than the helicopter's altitude, and thus well above the permitted height. After the accident, another helicopter conducting a commercial sightseeing flight also reported a kite strike incident.

In addition to reminders and safety campaigns, the Bali Provincial Government, in collaboration with relevant stakeholders, conducted several oversight activities to ensure adherence to the restrictions and prohibitions of kite flying activities. Despite these efforts, kite flying activities were still widely observed in many areas across Bali.

According to Article 13 of the Regional Regulation of Bali Province No. 4 Year 2019, each head of customary village in Bali is authorized to issue customary law called *Awig-Awig*. However, the investigation did not find any prohibition and restriction of kite-flying in customary law. Considering that within Balinese society, longstanding traditions, customs, and beliefs continue to hold significant influence, customary laws are often observed with greater adherence than regional regulations which might strengthen the restrictions and prohibitions of the flying kite activity in certain areas.

2.3 Safety Management System Implementation

The sightseeing helicopter operations in Bali were conducted at low altitude, in areas where kite flying activity was frequently observed. Prior to operating PK-WSP at Bali, the aircraft operator conducted Hazard Identification and Risk Assessment (HIRA) and identified helicopter operations at GWK Helipad as a hazard. The stated safety risk included "*in the helicopter flight operational area, many people were found flying kites*".

According to the aircraft operator's Safety Management System Manual (SMSM) Chapter 1, hazard was defined as condition, object or activity with the potential of causing injuries to personnel, damage to equipment or structures, loss of material, or reduction of ability to perform a prescribed function or a condition that could foreseeably cause or contribute to an accident. The SMSM Chapter 1 defined safety risk as an assessment, expressed in terms of predicted probability and severity, of the consequence(s) of a hazard taking as reference the worst foreseeable situation. Based on these definitions, the kite flying in helicopter flight paths is considered a hazard, and the worst foreseeable situation is a kite strike. Therefore, the identification of helicopter operation at GWK Helipad as a hazard, with kite flying listed as a consequence in worst foreseeable situation, did not align with the definition mentioned in the SMSM.

The safety risk tolerability of the kite flying activity was classified as "*tolerable*" requiring management decision to accept the risk. The aircraft operator adopted four mitigation actions to reduce the probability of kite flying activity: ensuring pilots awareness of kite risks, increasing pilot safety awareness to avoid the flying kites, performing periodic discussion to mitigate the kite-flying risks, and sending letters to ATS provider and DGCA Region IV Office to raise the kite-flying issue. The HIRA document indicated that four mitigation actions were conducted on the same day the

HIRA was performed. However, the investigation did not find any evidence of changes or additional procedures to ensure that all mitigation actions were performed accordingly.

The improper hazard identification, safety risk assessment, and its mitigation actions resulted in risk management that was ineffective in preventing the kite-flying accident or reduce the severity.

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, KNKT identified several findings as follows:

1. The pilot held valid Commercial Pilot License (CPL), and qualified, and qualified as helicopter Bell 505 pilot.
2. The pilot held valid Class 1 medical certificate without any limitation.
3. The helicopter had a valid Certificate of Airworthiness and Certificate of Registration.
4. Prior to and during flight, there was no report or record of helicopter system malfunction.
5. Prior to departure, the GWK Helipad radio operator advised the PIC that several kites had been observed near the PK-WSP flight plan route.
6. The satellite image and video recording taken by the passenger indicated that the weather during the sightseeing flight was clear.
7. After departure, the pilot and passengers also noticed several kites at and below the helicopter's altitude. During cruising from Pecatu to Uluwatu, the pilot saw another kite flying high above the helicopter.
8. About one minute after the helicopter reached cruising altitude, a sound similar to helicopter striking a kite string was recorded in the video taken by the passenger. A few seconds later, the fuel flow started to drop followed by decreasing altitude parameters.
9. The investigation suspected that the kite string became entangled around the main rotor and tail rotor pitch link assemblies when the fuel flow started to drop followed by decreasing altitude parameters.
10. The observation of the entangled kite string showed an estimated more than 200 coils, and more than 120 coils on the tail rotor. The entanglement on these components, which part of the helicopter flight control system, rendered the helicopter difficult to control.
11. The pilot and the passengers never saw any kite on the helicopter's flight path, therefore it can be concluded that the kite was flying higher than the helicopter's altitude.
12. The kite's transparent and thin string made the pilot and the passengers difficult to detect it, leaving the pilot unable to take any avoidance maneuver.
13. Balinese kites have become part of local culture and wisdom. Kite flying also became means to promote Balinese culture and tourism. However, the kite-flying

activities have been identified as hazard to aviation, especially helicopters operating at low altitudes.

14. Prior to operating PK-WSP at Bali, the aircraft operator conducted Hazard Identification and Risk Assessment (HIRA). However, the identified hazard and its risk assessment did not align with the hazard and safety risk definition mentioned in the aircraft operator Safety Management System Manual (SMSM).
15. The safety risk tolerability of the kite flying activity was classified by the aircraft operator as “*tolerable*” which requiring management decision to accept the risk.
16. The aircraft operator adopted four mitigation actions to reduce the probability of kite flying activity: ensuring pilots awareness of kite risks, increasing pilot safety awareness to avoid the flying kites, performing periodic discussion to mitigate the kite-flying risks, and sending letters to ATS provider and DGCA Region IV Office to raise the kite-flying issue.
17. The investigation did not find any evidence of changes or additional procedures to ensure that all mitigation actions were performed accordingly by the aircraft operator.
18. The improper hazard identification, safety risk assessment, and its mitigation actions resulted in risk management that was ineffective in preventing the kite-flying accident or reduce the severity.
19. Regional Regulation of Bali Province No. 9 Year 2000 was promulgated to restrict the kite-flying activities and prohibit them in certain areas (Zone 1, Zone 2 and Zone 3).
20. The helicopter entangled the kite string in Zone 2 at radio altitude of 708 feet above ground elevation. Based on Regional Regulation of Bali Province No. 9 Year 2000, kite flying is permitted only up to 300 feet. Considering that the kite involved was flying higher than the helicopter’s altitude, and thus well above the permitted height.
21. Regional Regulation of Bali Province No. 9 Year 2000 obliges the local government of Bali, in coordination with the airport operator, village and cultural organization, to oversee the implementation of regulated kite-flying zone.
22. Bali Provincial Government has issued several circulars to each head of region, head of village and head of cultural organization reminding the communities to adhere to these prohibitions and restrictions. The latest circular was issued about three months before the accident.
23. About two months before the accident, Directorate General of Civil Aviation (DGCA) Region IV Office issued letter to local government within Bali Regional Government, asking them to remind communities to adhere to kite-flying restrictions and prohibitions as described in the regional regulation.
24. About one month before the accident, the DGCA Region IV Office held a safety collaboration meeting with the helicopter operators, local government, and community leaders to discuss kite flying risks. The result of the meeting indicated that most of the communities were unaware of the regulation related to the kite flying activity.

25. The DGCA Region IV Office had conducted several safety campaigns highlighting the risk of kite strike incidents to the communities. However, after the accident, another kite strike incident still occurred.
26. In addition to reminders and safety campaigns, the Bali Provincial Government, in collaboration with relevant stakeholders, had conducted several oversight activities to ensure adherence to the restrictions and prohibitions of kite flying activities. Despite these efforts, kite flying activities were still widely observed in many areas across Bali.

3.2 Contributing Factors

Contributing factors is 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 the consequences of the accident or incident.

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

The KNKT concluded the contributing factors as follows:

- A kite flying higher than helicopter's altitude, with transparent and thin string, made the pilot and the passengers unaware of its location, preventing pilot from making avoidance maneuver.
- The kite string became entangled in the main and tail rotors, which are part of the helicopter's flight control system, resulting in difficulty controlling the helicopter.

4 SAFETY ACTION

At the time of issuing this investigation report, KNKT had been informed of the safety actions resulting from this occurrence taken by Directorate General of Civil Aviation (DGCA) Region IV Office as follows:

On 22 July 2024, DGCA Region IV Office held a meeting with the aviation stakeholders and local government to discuss the kite flying hazard for aviation. All meeting participants agreed to proactively disseminate the regulation that restricts and prohibits kite flying activities.

On 23 July 2024, DGCA Region IV Office in coordination with aviation stakeholders and local government formed a task force to monitor the kite flying in the Bali area. Two days later, the task force performed a safety campaign of the kite strike risk to the public and installed warning signs at the Kelan Beach area.

On 26 July 2024, DGCA Region IV Office took a joint helicopter flight in order to observe the kite flying activities.

5 SAFETY RECOMMENDATIONS

KNKT acknowledges the safety actions taken by the Directorate General of Civil Aviation (DGCA) Region IV Office and considers that the safety actions were relevant to improving safety however, there are still safety issues remaining to be considered. Therefore, KNKT issued safety recommendations to address safety issues identified in this report.

The safety recommendation in this investigation report is made with the intention of preventing accidents or incidents and which in no case has the purpose of creating a presumption of blame or liability for an accident or incident.

5.1 PT Whitesky Aviation

04-O-2024-17.01

The helicopter sightseeing operation in Bali was conducted at low altitude, where most kite flying activity was observed. Prior to operating PK-WSP at Bali, the aircraft operator conducted Hazard Identification and Risk Assessment (HIRA) and identified helicopter operation at GWK Helipad as a hazard. The aircraft operator identified helicopter operation at GWK Helipad as hazard with flying kite activity as one of its associated safety risks. This hazard identification and determination of safety risk did not meet align with the definition mentioned in the aircraft operator Safety Management System Manual (SMSM).

The safety risk tolerability of the flying kite activity was defined as “*tolerable*” requiring management’s decision to accept the risk. The aircraft operator decided to perform four mitigation actions to reduce the probability of kite-flying activity. However, the investigation did not find any evidence of changes or additional procedures to ensure that all mitigation actions were performed accordingly.

The improper hazard identification, safety risk assessment and its mitigation actions resulted in risk management in risk management that was ineffective in preventing the accident or reduce the severity.

Therefore, KNKT recommends that the aircraft operator review the HIRA process to ensure risk management measures effectively preventing accident or reducing its severity of their consequences.

5.2 Bali Provincial Government

04-R-2024-17.02

Regional Regulation of Bali Province No. 9 Year 2000 was promulgated to restrict the kite flying activity and prohibit it in certain areas. Despite the efforts to remind community members of the risk of kite strike and to implement the restriction as well as prohibition of flying kite activity, the kite strike incidents continued to occur even after the accident.

According to Article 13 of the Regional Regulation of Bali Province No. 4 Year 2019, each head of customary village in Bali is authorized to issue customary law called *Awig-Awig*. Considering that within Balinese society, longstanding traditions, customs, and beliefs continue to hold significant influence, customary laws are often

observed with greater adherence than regional regulations. However, the investigation did not find any prohibition and restriction of the kite-flying in customary law.

Therefore, KNKT recommends that the Bali Provincial Government strengthen the restrictions and prohibitions of the flying kite activity in certain areas through the development and implementation of customary law.

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