



**KOMITE NASIONAL KESELAMATAN TRANSPORTASI
REPUBLIC OF INDONESIA**

PRELIMINARY

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Aircraft Accident Investigation Report

**PT. Whitesky Aviation
Helicopter Bell 429, PK-WSX
Morowali, Sulawesi Tengah
Republic of Indonesia
20 April 2018**

2018

This Preliminary Report was produced 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, May 2018

**KOMITE NASIONAL
KESELAMATAN TRANSPORTASI
Chairman**



SOERJANTO TIAHJONO

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ABBREVIATIONS AND DEFINITIONS

ADMM	:	Aircraft Data Memory Module
ATPL/H	:	Airline Transport Pilot License Helicopter
CAM	:	Cockpit Area Microphone
CCTV	:	Closed-circuit Television
DCU	:	Data Collection Unit
DU	:	Display Unit
ECU	:	Engine Control Unit
EEC	:	Electronic Engine Control
HF	:	High Frequency
HUMS	:	Health Usage and Monitoring System Processor
IMIP	:	Indonesia Morowali Industrial Park, mining company in Morowali Sulawesi Tengah Indonesia
KHz	:	Kilo Hertz
KNKT	:	Komite Nasional Keselamatan Transportasi
MHz	:	Mega Hertz
MPFR	:	Multi-Purpose Flight Recorder
PWC	:	Pratt & Whitney Canada
QRH	:	Quick Reference Handbook
TSB	:	Transportation Safety Board
UTC	:	The 24-hour clock used in this report to describe the time of day as specific events occurred is in Coordinated Universal Time (UTC). Local time that be used in this report is Waktu Indonesia Tengah (WITA) or Central Indonesia Standard Time which is UTC +8 hours.
VHF	:	Very High Frequency

SYNOPSIS

A Bell 429 helicopter, registered PK-WSX was being operated by PT. Whitesky Aviation, on Friday, 20 April 2018 to conducted unscheduled passenger flight chartered by PT. Indonesia Morowali Industrial Park (IMIP) Company in Sulawesi Tengah.

The flight was planned from IMIP helipad at Morowali in Sulawesi Tengah to Haluoleo Airport at Kendari, Sulawesi Tenggara. The helipad located in the IMIP industrial complex.

At 0925 LT (0125 UTC) the helicopter took off. On board in this flight were one pilot, one engineer and six passengers with total load approximately of 556 kilograms.

At about one minute after take-off, at altitude approximately 600 feet, the pilot noticed one of the Engine Control Unit (ECU) failed. After the discussion of the failed ECU between the pilot and engineer, afterward the pilot decided to return to the helipad.

The pilot selected one of the throttles to manual and afterward the altitude and the speed decreased. The pilot attempted to recover by manipulating the collective, throttle and cyclic, however the altitude and speed could not be recovered.

Before reaching the helipad, the helicopter impacted to the ground on the IMIP factory access road approximately 175 meters from the IMIP helipad.

All occupants were survived. One of the IMIP employees who walked at the road was fatally injured.

The investigation is continuing and KNKT plans to complete the investigation within 12 months since the day of the occurrence. Should any further relevant safety issues emerge during the course of investigation, KNKT will immediately bring the issues to the attention of the relevant parties and publish as required.

The KNKT had been informed safety action taken by the PT. Whitesky Aviation and considered relevant to the accident. KNKT issues safety recommendation to the aircraft operator to address identified safety issues.

1 FACTUAL INFORMATION

1.1 History of the Flight

A Bell 429 helicopter, registered PK-WSX was being operated by PT. Whitesky Aviation, on Friday, 20 April 2018 to conducted unscheduled passenger flight chartered by PT. Indonesia Morowali Industrial Park (IMIP) Company in Sulawesi Tengah.

The flight was planned from IMIP helipad¹ at Morowali in Sulawesi Tengah to Haluoleo Airport at Kendari, Sulawesi Tenggara. The helipad located in the IMIP industrial complex at coordinate 2° 49' 21.43" S, 122° 09' 58.98" E with elevation of 120 feet above sea level.

At 0925 LT (0125 UTC²) the helicopter took off. On board in this flight were one pilot, one engineer and six passengers with total load approximately of 556 kilograms.

At about one minute after take-off, at altitude approximately 600 feet, the pilot noticed one of the Engine Control Unit (ECU) failed. The pilot and the engineer discussed to determine which ECU had failed. The pilot decided to return to the helipad. The pilot selected one of the throttles to manual and afterward the altitude and the speed decreased. The pilot attempted to recover by manipulating the collective, throttle and cyclic, however the altitude and speed could not be recovered.

Before reaching the helipad, the helicopter impacted to the ground on the IMIP factory access road approximately 175 meters from the IMIP helipad at coordinate 2°49'15.94" S, 122° 9' 57.78" E with elevation approximately 75 feet above sea level.

All occupants were survived. One of the IMIP employees who walked at the road was fatally injured.

1.2 Injuries to Persons

Injuries	Flight crew	Engineer	Passengers	Total in aircraft	Others
Fatal	–	–	–	–	1
Serious	1	1	2	4	–
Minor	–	–	4	4	–
None	–	–	–	–	NA
TOTAL	1	1	6	8	1

The pilot and the engineer were Indonesian and the all passengers were Chinese. The IMIP employee who fatally injured was Indonesian.

¹ IMIP helipad at Morowali Sulawesi Tengah will be named as IMIP helipad for the purpose of this report

² The 24-hour clock used in this report to describe the time of day as specific events occurred is in Coordinated Universal Time (UTC). Local time that be used in this report is Waktu Indonesia Tengah (WITA) or Central Indonesia Standard Time which is UTC +8 hours.

1.3 Damage to Aircraft

The aircraft was destroyed.

1.4 Other Damage

There was no other damage to property or the environment.

1.5 Personnel Information

1.5.1 Pilot in Command

Gender	: Male
Age	: 43 years old
Nationality	: Indonesian
Marital status	: Married
Date of joining company	: 2 October 2012
License	: ATPL/H
Date of issue	: 5 November 2010
Aircraft type rating	: Bell 429, Bell 407, BO 105
Instrument rating validity	: 30 November 2017
Medical certificate	: First class
Last of medical	: 23 November 2017
Validity	: 23 May 2018
Medical limitation	: None
Last line check	: 26 November 2017
Last proficiency check	: 23 December 2017
Flying experience	
Total hours	: 4296.5 hours
Total on type	: 615.1 hours
Last 90 days	: 44.8 hours
Last 30 days	: 27.4 hours
Last 24 hours	: 1.2 hours
This flight	: 9 minutes

1.6 Aircraft Information

1.6.1 General

Registration Mark	: PK-WSX
Manufacturer	: Bell Helicopter Textron
Country of Manufacturer	: Canada

Type/Model : Bell 429
 Serial Number : 57186
 Year of Manufacture : 2014

Certificate of Airworthiness

Issued : 2 February 2018
 Validity : 1 February 2019
 Category : Normal
 Limitations : None

Certificate of Registration

Number : 3612
 Issued : 2 February 2017
 Validity : 1 February 2020

Time Since New : 307.3 hours
 Cycles Since New : 628 cycles
 Last Major Check : 4 Years Inspection (5 January 2018)
 Last Minor Check : CCI 100 hours / 90 days (3 February 2018)

There was no abnormality to the helicopter before the accident as reported in the aircraft flight and maintenance log book.

1.6.2 Engines

Manufacturer : Pratt & Whitney Canada
 Type/Model : PW 207D1
 Serial Number-1 engine : PCE-BL 0377

- Time Since New : 307.3 hours
- Cycles Since New : 565 cycles

Serial Number-2 engine : PCE-BL-0384

- Time Since New : 307.3 hours
- Cycles Since New : 565 cycles

1.6.3 Transmission Assembly

Manufacturer : Bell Helicopter Textron
 Part number : 429-040-006-121
 Serial Number : TN102

- Time Since New : 307.3 hours
- TBO : 5,000 hours

1.6.4 Main Rotor

Manufacturer : Bell Helicopter Textron
Part number : 429-015-100-135

Rotor Blade 1

- S/N : BH-48773
- Installed : 10 January 2014
- Time Since New : 307.3 hours

Rotor Blade 2

- S/N : BH-108467
- Installed : 10 January 2014
- Time Since New : 307.3 hours

Rotor Blade 3

- S/N : BH-114219
- Installed : 10 January 2014
- Time Since New : 307.3 hours

Rotor Blade 4

- S/N : BH-118275
- Installed : 10 January 2014
- Time Since New : 307.3 hours

1.6.5 Tail Rotor Gearbox Assembly

Manufacturer : Bell Helicopter Textron
Part number : 429-042-001-101

- S/N : BH092359
- Installed : 10 January 2014
- Time Since New : 307.3 hours
- TBO : 5,000 hours

1.6.6 Tail Rotor

Manufacturer : Bell Helicopter Textron
Part number : 429-016-101-105

Tail Rotor Blade 1

- S/N : BH088595
- Installed : 10 January 2014
- Time Since New : 307.3 hours

Tail Rotor Blade 2

- S/N : BH088596
- Installed 10 January 2014
- Time Since New 307.3 hours

Tail Rotor Blade 3

- S/N : BH075794
- Installed 10 January 2014
- Time Since New 307.3 hours

Tail Rotor Blade 4

- S/N : BH075478
- Installed 10 January 2014
- Time Since New 307.3 hours

1.7 Meteorological Information

The IMIP helipad had automatic weather observation facility, located about 100 meters from the helipad. This weather observation facility is capable to measure wind, temperature and air pressure. The weather information on 20 April 2018 is shown in the table below.

Time (LT)	0828	0928
Wind (°/knots)	calm	calm
TT/TD (°C)	26.4/22.7	26.6/21.4
QNH (mb/in Hg)	1001.9	1002.9
QFE (mb/in Hg)	1014.3	1015.3

1.8 Aids to Navigation

Not related to the accident.

1.9 Communications

The IMIP as the charterer company provided the communication facility consisted of high frequency (HF) radio on frequency 13.405 KHz and very high frequency (VHF) radio on frequency 130.85 MHz. The communication was not recorded. During the flight until the accident, the pilot had not communicated with the IMIP radio operator.

1.10 Helipad Information

Helipad Name	:	Indonesia Morowali Industrial Park (IMIP)
Helipad Identification	:	IMIP
Helipad Operator	:	PT. Indonesia Morowali Industrial Park (IMIP) Company, Sulawesi Tengah
Helipad Certificate	:	083/ RSFC-DBU/ III/ 2016
Validity	:	11 March 2019
Type	:	Surface level heliport
Coordinate	:	2° 49' 21.43" S; 122° 09' 58.98" E
Elevation	:	120 feet

1.11 Flight Recorders

The helicopter was equipped with Penny & Giles solid state Multi-Purpose Flight Recorder (MPFR) capable to record flight data and cockpit voice. The MPFR was recovered from the accident site and transported to the KNKT recorder facility on 23 April 2018.

The details information of the MPFR was:

Manufacturer	:	Penny & Giles Aerospace Ltd.
Type/Model	:	Multi-Purpose Flight Recorder
Part Number	:	D51615-202-011 issue 1
Serial Number	:	A07951-001

The MPFR downloaded process was conducted at KNKT recorder facility. The download process successfully retrieved flight data consisted of 832 parameters of 25 hours of flight data comprising the accident flight.

The voice data contained 120 minutes of audio recording data on four channels consisted of Public Address (P/A), co-pilot, pilot and Cockpit Area Microphone (CAM) channels.

The detail of the flight recorder data will be included in the final report.

1.12 Wreckage and Impact Information

The helicopter last position was rolled over to the left with the last heading approximately of 080°. The wreckage occupied the dimension approximately 10 meters × 10 meters situated on the intersection IMIP factory access road as shown in the figure below.



Figure 1: Aerial view of the helicopter

All main rotor blades were broken and detached from the main rotor hub. The tail boom broken and laid on the right of the helicopter and all the tail rotor blades were still intact.

The left landing gear skid was broken and laid on the right of the helicopter while floatation device was slightly open but not expanded. The right landing gear skid was still intact and the floatation device was unfurled but not expanded.



Figure 2: the wreckage of the helicopter

1.13 Medical and Pathological Information

The medical and pathological information will be included in the final report.

1.14 Fire

KNKT received video recorded from the closed-circuit television (CCTV) record during the occurrence from the security post near the crash site.

Based on the video recorded, there was no inflight fire however, approximately ten seconds after impact, small explosion followed by fire burst off from the exhaust. Approximately 50 seconds later the fire grown bigger and one of the security personnel sprayed the portable fire extinguisher into the exhaust until the fire was extinguished.

1.15 Survival Aspects

KNKT received video recorded from the CCTV from the security post near the crash site.

Based on the video recorded, approximately 40 seconds after impact, the first passenger evacuated through the passenger door while the main rotor hub was still rotating. The main rotor hub stops rotating approximately one minute after impact.

Approximately two minutes after impact, the pilot evacuated through the right cockpit window and passengers evacuated one by one assisted by the security personnel who were performed duty on the security post. The pilot was transported to the medical facility nearby.

The engineer was evacuated by security personnel, approximately five minutes after the impact and the engineer was the last occupant evacuated from the helicopter. The engineer transported to the medical facility nearby.

1.16 Tests and Research

The information of any test and research will be included in the final report.

1.17 Organizational and Management Information

1.17.1 General

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

The operator had operation base in Jakarta. The operator operated total of xxx aircraft including the accident aircraft.

1.17.2 Quick Reference Handbook

The operator utilized the company quick reference handbook (QRH) that was derived from the manufacture manual. The relevant part of the QRH is shown in the figure below.

ECU FAILURE

NOTE

30 second OEI power may not be available in MANUAL mode.
OEI maximum continuous power is available for all ambient
conditions.

NOTE

If ECU failure occurs at high power, collective should be reduced
before reducing affected engine throttle, allowing engine in
AUTO mode to remain within limits.

1. FLY STOP REL (affected engine) ----- Disengage.
2. Throttle (affected engine) and collective — Coordinate and
adjust as necessary to maintain PSI needle of affected engine
slightly below PSI needle of normal engine (two to three
needle width split).
3. Land as soon as practical.

Figure 3: Operator QRH

The relevant QRH from the manufacture manual is shown in the figure below.

3-3-G. ECU FAILURE

NOTE

30 second OEI power may not be available in MANUAL mode. OEI maximum continuous power is available for all ambient conditions.

• INDICATIONS:

ECU FAIL message illuminated.

Affected engine automatically switches to manual mode.

ENGINE CONTROL switch (affected engine) indicates MAN.

PSI display indicates MANUAL under Q, MGT, N_G display of affected engine and PSI needle changes color to cyan.

Possibly other ECU messages displayed.

NOTE

If ECU failure occurs at high power, collective should be reduced before reducing affected engine throttle, allowing engine in AUTO mode to remain within limits.

• PROCEDURE:

- 1. FLY STOP REL (affected engine) — Disengage.**
- 2. Throttle (affected engine) and collective — Coordinate and adjust as necessary to maintain PSI needle of affected engine slightly below PSI needle of normal engine (two to three needle width split).**
- 3. Land as soon as practical.**

Figure 4: The manufacture emergency checklist

Refer to the manufacture checklist, showed that the section indication did not include in the aircraft operator QRH.

1.18 Additional Information

After received the report of the accident, KNKT forwarded notification to relevant parties including Transportation Safety Board (TSB) Canada and KNKT requested the information to be forwarded to engine and aircraft manufactures.

The TSB Canada assigned accredited representative and deployed the adviser from the Bell (aircraft manufacturer) and Pratt & Whitney Canada (engine manufacturer) to conduct data collection at IMIP Company Morowali.

Some components were removed from the wreckage such as two Electronic Engine Control (EEC), two Data Collection Unit (DCU), Aircraft Data Memory Module (ADMM), Health Usage and Monitoring System Processor (HUMS) and three Compact Flash memories of the three Display Unit (DU). These components will be examined to retrieve the contain information on Bell and PWC.

Significant information result of the examination of these components will be included in the final report.

The investigation is continuing and KNKT plans to complete the investigation within 12 months since the day of the occurrence. Should any further relevant safety issues emerge during the course of 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 FINDINGS³

According to factual information during the investigation, the KNKT identified initial findings as follows:

1. The pilot held valid licenses and medical certificates.
2. The pilot instrument rating had expired on 30 November 2017.
3. The aircraft had a valid Certificate of Airworthiness (C of A) and Certificate of Registration (C of R).
4. There was no system abnormality reported prior to the flight.
5. The flight was planned from IMIP helipad at Morowali in Sulawesi Tengah to Haluoleo Airport at Kendari Sulawesi Tenggara. On board in this flight were one pilot, one engineer and six passengers with total load approximately of 556 kilograms.
6. At about one minute after take-off, at altitude approximately 600 feet, the pilot noticed one of the Engine Control Unit (ECU) failed. The pilot and the engineer discussed to determine which ECU had failed. The pilot decided to return to the helipad. The pilot selected one of the throttles to manual and afterward the altitude and the speed decreased. The pilot attempted to recover by manipulating the collective, throttle and cyclic, however the altitude and speed could not be recovered.
7. Before reaching the helipad, the helicopter impacted to the ground on the IMIP factory access road approximately 175 meters from the IMIP helipad at coordinate 2°49'15.94" S, 122° 9' 57.78" E with elevation approximately 75 feet above sea level.
8. All occupants were survived and one of the IMIP employees who walk at the road was fatally injured.
9. The aircraft was destroyed. The wreckage occupied the dimension approximately 10 meters × 10 meters.
10. The IMIP helipad had automatic weather observation facility, located about 100 meters from the helipad which measure wind, temperature and air pressure.
11. The IMIP as the charterer company provided the communication facility consisted of HF radio on frequency 13.405 KHz and VHF radio on frequency 130.85 MHz. The communication was not recorded and the pilot had not communicated with the IMIP radio operator during the flight until the accident.
12. The MPFR download process was conducted at KNKT recorder facility. The download process successfully retrieved flight data consisted of 832 parameters of 25 hours of flight data comprising including the voice data contained 120 minutes of audio recording data on four channels consisted of Public Address (P/A), co-pilot, pilot and Cockpit Area Microphone (CAM) channels.

³ 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.

13. There was no inflight fire however, approximately ten seconds after impact, small explosion followed by fire burst off from the exhaust. Approximately 50 seconds later the fire grown bigger and one of the security personnel sprayed the portable fire extinguisher into the exhaust until the fire was extinguished.
14. All of the occupants were evacuated from the helicopter assisted by the security personnel and IMIP employees. The pilot and the engineer were transported to the medical facility nearby.
15. The operator utilized the company QRH that was derived from the manufacture manual where the cockpit indication did not include in the aircraft operator QRH.

3 SAFETY ACTION

At the time of issuing this Preliminary Report, the KNKT had been informed of safety actions by the operator as result from this occurrence.

3.1 PT. Whitesky Aviation

1. Assembled the internal investigation team lead by safety accountable executive.
2. Issued Safety Recommendation #003/QSS/SR/IV/2018 dated 24 April 2018 regarding immediate post-accident actions to be taken by all employee and company including to assembled the Working Safety Group which periodically review the Emergency Procedure for all aircraft operated by the company.
3. Issued Safety Notice number 04/QSS/SN/V/2018 dated 2 May 2018 regarding Single Pilot which include:
 - a. To obey the Safety Circular published by the DGCA number SE-013 issued on 2018 regarding the Single Pilot Crew Resource Management.
 - b. To uphold the airmanship principle for all Pilot in Command as Single Pilot Operations and comprehend the duties and responsibility regarding the flight safety.
 - c. Encourage for all Pilot in Command as Single Pilot Operations to improve the proficiency and system knowledge in compliance to the procedure.
 - d. To remind for non-crew personnel due to their onboard duties (Engineer or HLO or FOO Onboard) to aware and respect the roles, duties and responsibilities of Pilot in Command.

4 SAFETY RECOMMENDATIONS

The KNKT acknowledges the safety actions taken by PT. Whitesky Aviation 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 PT. Whitesky Aviation

- **04.O-2018-10.1**

The operator utilized the company quick reference handbook (QRH) that was derived from the manufacture manual where the significant part was missing from the QRH, KNKT recommend to the operator to review and revised the checklist to refer to the manufacture checklist.

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