PRELIMINARY
KNKT.15.03.08.04

KOMITE NASIONAL KESELAMATAN TRANSPORTASI

Aircraft Accident Investigation Report

PT. Hevilift Aviation Indonesia
Sikorsky S76 C+ Helicopter; PK-FUP
Delta Mahakam river, East Kalimantan
Republic of Indonesia
21 March 2015

KOMITE NASIONAL KESELAMATAN TRANSPORTASI
MINISTRY OF TRANSPORTATION
REPUBLIC OF INDONESIA
2015

This Preliminary report was produced by the Komite Nasional Keselamatan Transportasi (KNKT), 3rd Floor Ministry of Transportation, Jalan Medan Merdeka Timur No. 5 Jakarta 10110, Indonesia.

The report is based upon the investigation carried out by the KNKT in accordance with Annex 13 to the Convention on International Civil Aviation 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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However, the KNKT fully recognizes that the implementation of recommendations arising from its investigations will in some cases incur a cost to the industry.

Readers should note that the information in KNKT reports and recommendations is provided to promote aviation safety. In no case is it intended to imply blame or liability.

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ABBREVIATIONS AND DEFINITIONS

aka	:	Also Known As
ATPL	:	Air Transport Pilot License
ATS	:	Air Traffic Service
ATSB	:	Australian Transportation Safety Board
BMKG	:	*Badan Meterologi Klimatologi dan Geofisika* (Meteorological Climatology and Geophysical Agency)
°C	:	Degrees Celsius
CAM	:	Cockpit Area Mic
COM	:	Company Operation Manual
CPL	:	Commercial Pilot Licence
CPU	:	Central Processing Unit
CTM	:	Company Training Manual
CVR	:	Cockpit Voice Recorder
DGCA	:	Directorate General Civil Aviation
FCOM	:	Flight Crew Operation Manuals
FDR	:	Flight Data Recorder
FOO	:	Flight Operation Officer
hPa	:	Hectopascal
IAS	:	Indicated Airspeed
ICAO	:	International Civil Aviation Organization
Km	:	Kilometer(s)
KNKT	:	Komite Nasional Keselamatan Transportasi
LT	:	Local Time
m	:	Meter
MPFR	:	Multi Purposes Flight Recorder
Nm	:	Nautical mile
PF	:	Pilot Flying
PIC	:	Pilot in Command
PM	:	Pilot Monitoring
SIC	:	Second in Command
S/N	:	Serial Number
TBO	:	Time Between Overhaul
TSO	:	Time Since Overhaul
UTC	:	Universal Time Coordinate
VOR	:	VHF Omni-directional Range

INTRODUCTION

SYNOPSIS

The synopsis will be included in the final report.

1 FACTUAL INFORMATION

1.1 History of the Flight

An Sikorsky S76C+ aircraft, registration PK-FUP was being operated by PT. Hevilift Aviation Indonesia on 21 March 2015 as unscheduled chartered flight by PT. Total E & P Indonesie. The flight was planned from Sepinggan, Balikpapan (BPN) – Handil – Flying Over CPU (Central Processing Unit) – Handil – Sepinggan for a survey photo flight.

The aircraft took off from Sepinggan BPN at 09.17 LT (01.17 UTC). There were 8 person on board of this flight consist of two pilots, one engineer, one flight operation officer, 4 passenger. The aircraft landed at Handil at 01.36 UTC and the Engineer on board removed the passenger doors.

After removing the passenger door and refueling, the aircraft took off from Handil to CPU to conduct photo flight for pipelines inspections.

There were 7 persons on board. The engineer was stand by at Handil.

When the aircraft reaching 1000 ft, the PIC gave the control to the Second in Command and the PIC acted a pilot monitoring. The pilot maintaining altitude 1000 feet and speed 95 knot IAS with 3 cue mode (flight director with altitude, heading and airspeed Hold).

There were no aircraft technical system abnormality or problem reported prior to the departure until the time of occurrence.

When the aircraft 8 Nm from CPU the PIC ask the PF descend to 600 feet, the aircraft start descend 200 feet/minute. While the aircraft passing 800 feet suddenly the aircraft attitude changed un-commanded. The aircraft bank to the left, pitch up and nose down. The PF tried to lower collective pitch and reduce the aircraft speed. The PIC took over the control and tried to recover the aircraft until the aircraft impacted the tree and crash into a swamp.

The last aircraft position at coordinate 00º 38.035 S 117º 20.896 E.

The PIC suffered serious injured, and others has minor injured.

1.2 Injuries to Persons

Injuries	Flight crew	Passengers	Total in Aircraft	Others
Fatal	-	-	-	-
Serious	1	-	1	-
Minor/None	1	5	6	-
TOTAL	2	5	7	-

1.3 Damage to Aircraft

The aircraft was substantially damaged.

1.4 Other Damage

There was no other damaged reported.

1.5 Personnel Information

1.5.1 Pilot in Command

Gender	:	Male
Age	:	58 Years old
Nationality	:	Indonesian
Marital status	:	Married
Date of joining company	:	11 December 2014
License	:	ATPL
Date of issue	:	9 September 1998
Aircraft type rating	:	Sikorsky S76
Instrument rating	:	31 July 2015
Medical certificate	:	Class 1
Last of medical	:	4 December 2014
Validity	:	4 June 2015
Medical limitation	:	No limitation
Last line check	:	28 January 2015
Last proficiency check	:	7 January 2015

Flying experience

Total hours	:	10,640.55 Hours
Total on type	:	1,132.15 Hours
Last 90 days	:	131.8 Hours
Last 60 days	:	85.6 Hours
Last 24 hours	:	3.8 Hours
This flight	:	19 Minutes

1.5.2 Second in Command

Gender	:	Male
Age	:	34 Years old
Nationality	:	Indonesian
Marital status	:	Married
Date of joining company	:	4 April 2014
License	:	CPL
Date of issue	:	26 May 2009

Aircraft type rating	:	Sikorsky S76
Instrument rating	:	31 May 2015
Medical certificate	:	Class 1
Last of medical	:	26 February 2015
Validity	:	26 August 2015
Medical limitation	:	No limitation
Last line check	:	5 March 2015
Last proficiency check	:	29 May 2014
Flying experience		
Total hours	:	2,338.5 Hours
Total on type	:	469.5 Hours
Last 90 days	:	137 Hours
Last 60 days	:	70.4 Hours
Last 24 hours	:	1.9 Hours
This flight	:	19 Minutes

1.6 Aircraft Information

1.6.1 General

Aircraft general information as follows:

Registration Mark	:	PK-FUP
Manufacturer	:	Sikorsky
Country of Manufacturer	:	USA
Type/ Model	:	S76C+
Serial Number	:	760582
Year of manufacture	:	2005
Certificate of Airworthiness		
Issued	:	31 October 2014
Validity	:	30 October 2015
Category	:	Transport
Limitations	:	None
Certificate of Registration		
Number	:	3514
Issued	:	31 October 2014
Validity	:	30 October 2015
Time Since New	:	3,820

Cycles Since New	:	19,651
Last Major Check	:	Equalized “C” Airframe inspection (1500 Hours)
Last Minor Check	:	25 Hours Airframe Inspection

1.6.2 Engines

Engines information as follows:

Manufacturer	:	Turbomeca
Type/Model	:	Arriel 2S1
Serial Number-1 engine	:	20555TEC
▪ Time Since New	:	9,935.3 Hours
▪ Cycles Since New	:	13,487 Cycle
Serial Number-2 engine	:	20607TEC
▪ Time Since New	:	7,034.3 Hours
▪ Cycles Since New	:	8,616 Cycle

1.6.3 Main Rotor

Manufacturer	:	Sikorsky
Type/Model	:	76150-09100-053

Main Rotor Gearbox

Manufacturer	:	Sikorsky
Type/Model	:	76351-09600-044
Serial Number-1 engine	:	A231-00104
▪ Time Since New	:	16727.9
▪ Cycles Since New	:	N/A
▪ Last major Inspection	:	06 JUL 2013
▪ TBO	:	3250 Hours
▪ TSO	:	1960.3 Hours
▪ Last shop visit	:	06 Jul 2013

Rotor Blade 1

▪ S/N	:	A086-03056
▪ Installed	:	23 June 2005
▪ Time Since New	:	4113.1 Hours
▪ Cycles Since New	:	N/A

Rotor Blade 2

- S/N : A086-03059
- Installed : 12 June 2006
- Time Since New : 3828.1 Hours
- Cycles Since New : N/A

Rotor Blade 3

- S/N : A086-03074
- Installed : 12 June 2006
- Time Since New : 3828.2 Hours
- Cycles Since New : N/A

Rotor Blade 4

- S/N : A086-03075
- Installed : 12 June 2006
- Time Since New : 3828.2 Hours
- Cycles Since New : N/A

1.6.4 Tail Rotor

Manufacturer : Sikorsky

Type/Model : 76101-05501-042

Rotor Blade 1

- S/N : A245-00552
- Installed : 9 October 2014
- Time Since New : 1,298.5
- Cycles Since New : N/A

Rotor Blade 2

- S/N : A245-00551
- Installed : 9 October 2014
- Time Since New : 1,298.5
- Cycles Since New : N/A

1.7 Meteorological Information

The weather information provided by Balikpapan Meteorological Office issued 21 March 2015, at that 00.00 UTC were as follows:

Wind : 030 / 02 knots

Weather	:	*NIL*
Visibility	:	5 Km
Temperature	:	25°C
Dewpoint	:	24°C
Humidity	:	92%
Pressure	:	1011 hPa

1.8 Aids to Navigation

Not relevant to this accident

1.9 Communications

Communications between air traffic services (ATS) and the crew was normal and no communication difficulty. There was no distress message.

1.10 Aerodrome Information

Airport Name	:	Sultan Aji Muhammad Sulaiman International (*aka. Sepinggan International Airport*)
Airport Identification	:	WALL / BPN
Airport Operator	:	PT. Angkasa Pura I (Persero)
Coordinate	:	01º 16’ 03” South 116º 53’ 38” East
Elevation	:	12 feet
Runway Direction	:	07/25
Runway Length	:	2500 m
Runway Width	:	45 m
Surface	:	Asphalt concrete

1.11 Flight Recorders

1.11.1 Flight Data Recorder

The aircraft was equipped with a Penny & Giles solid state Multi-Purpose Flight Recorder and received at the KNKT recorder laboratory on 24 March 2015. The details information of the MPFR was:

Manufacturer	:	Penny & Giles Aerospace Ltd.
Type/Model	:	Multi-Purpose Flight Recorder
Part Number	:	D51612-102 ISS:1
Serial Number	:	18038-004

The MPFR was downloaded on 7 April 2015 at the ATSB facility in Canberra,

Australia. The recorder contained about 70 parameters of 80 hours in good quality data comprising the accident flight and previous flights, included 30 minutes of audio on four channels (P/A, Co-pilot, Pilot, Cockpit Area Microphone/CAM) and 120 minutes of audio on two channels (Combined Crew Audio & CAM).

Figure 1.The MPFR

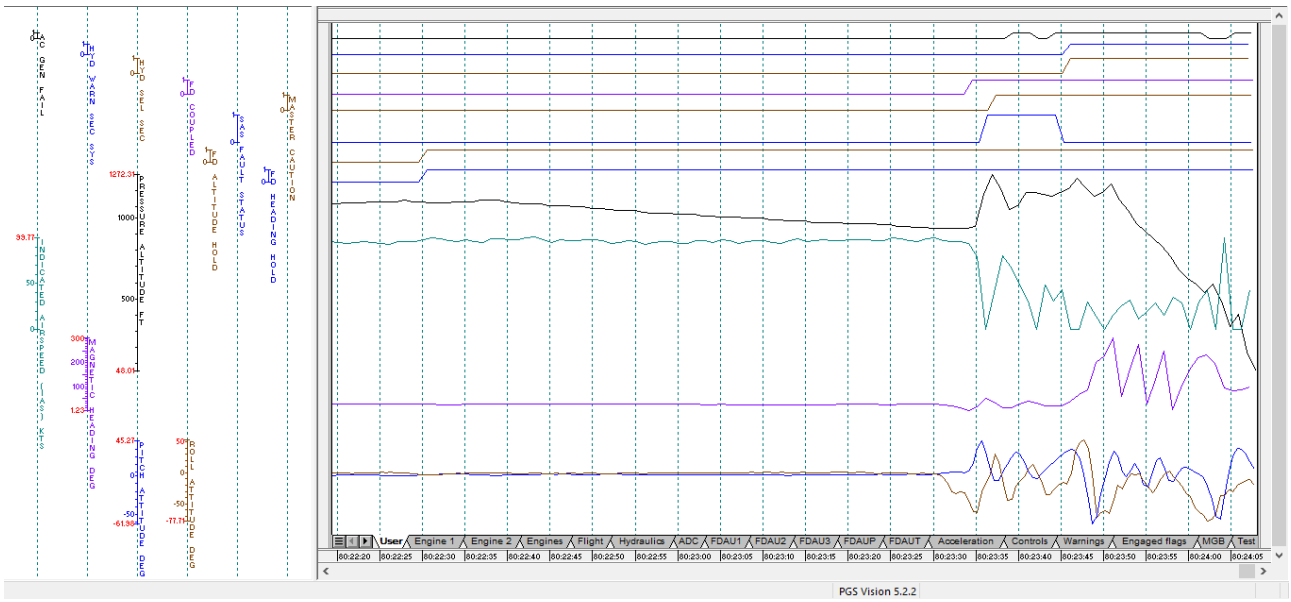

Figure 2. The Sequence of event recorded by flight recorder

1.12 Wreckage and Impact Information

When the aircraft passing 800 feet the aircraft attitude changed un-commanded, the aircraft bank to the left, pitch up and then nose down, the aircraft hit a tree and crash into a swamp. The aircraft was substantially damaged.

1.13 Medical and Pathological Information

To be completed on the final report.

1.14 Fire

There was no evidence pre or post impact fire

1.15 Survival Aspects

Following the Helicopter forced landing at a muddy area, one of passenger was manage himself to escape form Helicopter. Then FOO onboard can also get out of the helicopter. FOO later helped Co-pilot who wedged his foot on the pedal. Other passengers also got out from the wreckage. Furthermore, Co-pilot and FOO helped the Captain who was injured and his left arm and several ribs were fractures.

A few minutes later a sea truck was helping all the victims and transported to Total E & P Indonesie Central Processing Unit (CPU) to get first medical treatment.

After getting medical treatment then they transferred to Handil by using sea truck and subsequently the victims was transported by ambulance to the Siloam hospital in Balikpapan for further medical treatment.

1.16 Tests and Research

There was no test and research conducted at this stage of the investigation. Any test and research will be included in the final report.

1.17 Organizational and Management Information

Aircraft owner	:	Wells Fargo Bank Northwest national Association
Aircraft operator	:	PT. Hevilift Aviation Indonesia Hanggar B6 Sepinggan International Airport Jl. Marsma R. Iswahyudi Balikpapan, East Kalimantan 76115 Indonesia
Air operator certificate	:	AOC/135-042

1.17.1 Flight Following System

The operator utilized flight following system by Skynet. This system was capable of monitoring the flight path as the data were transmitted by the aircraft periodically.

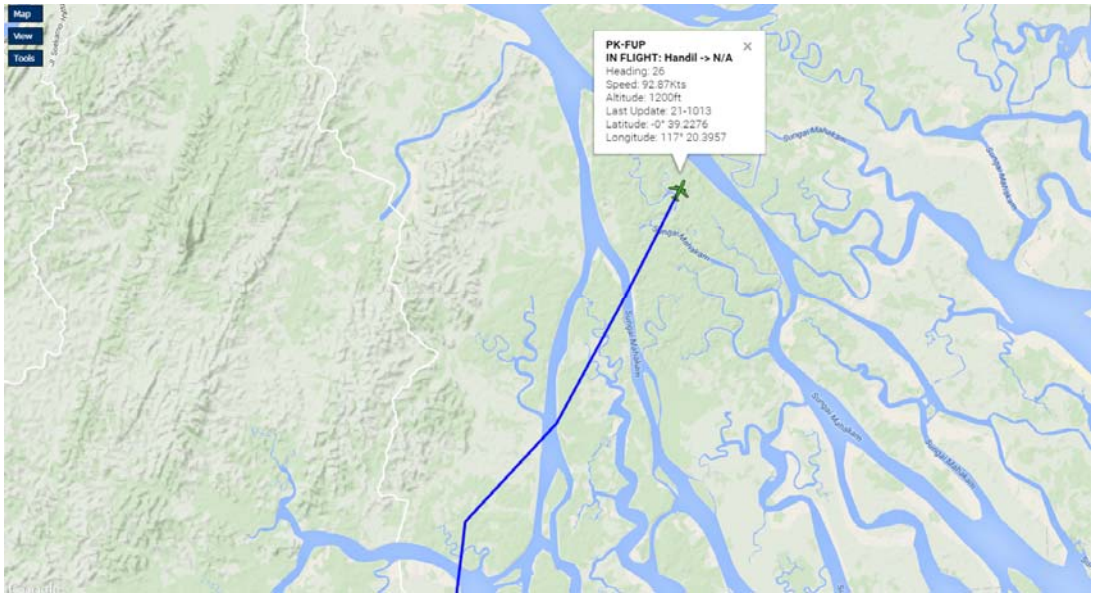

Figure 3. The aircraft PK-FUP accident route recorded in the Skynet.

1.17.2 Company Training Manual

After the occurrence the operator amended the Company Training Manual (CTM) subchapter 2.16 Simulator Recurrent Syllabus. The implementation included on the revision of flight training report form which includes Automation/electronic stabilization malfunction.

1.17.3 Company Operation Manual

The company operation Manual chapter 5.15 Precautions on Helicopter Operations issued at 18 June 2014.

5.15.1 Dynamic Rollover

The dangers of dynamic rollover are not restricted to slope operations. Several rollover accidents have occurred on level surfaces.

The fact that a skid caught on steel planking (PSP) or stuck in soft asphalt does not necessarily mean the aircraft rollover is inevitable. The end result depends on the pilot at the controls and the speed and accuracy by which he analyzes the problem and initiates corrective action.

Improper control application can intensify the rolling motion and place the aircraft in an unrecoverable attitude.

5.15.1.1 Rollover Characteristics:

During takeoffs and landings with one skid on the ground, bank angle or side drift can cause the helicopter to pivot around a skid (or wheel). When this happens, lateral cyclic control response is more sluggish and less effective than for a free-hovering helicopter. Consequently, if the bank angle (the angle between the aircraft

and horizon) is allowed to build past 15°, the helicopter will begin a rolling maneuver that cannot be corrected even with the application of full cross-cyclic control.

As the roll rate and acceleration of the helicopter's rolling motion increases, the angle at which a recovery remains possible is greatly reduced. The helicopter will roll over on its side.

5.15.1.2 Avoidance Procedures:

a) When performing maneuvers with one skid on the ground, pilots must be careful to keep the aircraft trimmed, especially laterally. For example, if a slow takeoff is attempted and the tail rotor thrust contribution to rolling moment is not trimmed out with cyclic, the critical recovery angle will be exceeded in less than two seconds.

b) Control can be maintained if the pilot keeps:

(i) The aircraft in trim;

(ii) Aircraft pitch, roll, and yaw rates small; and

(iii) The aircraft's bank angle small.

c) The pilot must fly the aircraft into the air smoothly, keeping pitch, roll and yaw movements smooth and small.

5.15.2 Retreating Blade Stall

A tendency for the retreating blade to stall in forward flight is inherent in all present-day helicopters, and is a major factor in, limiting their forward airspeed.

Basically, the stall of the wing limits the low airspeed capabilities of the airplane. The stall of a rotor blade limits the high airspeed potential of a helicopter.

The airflow over the retreating blade of the helicopter slows down as forward airspeed of the helicopter increases; the airflow over the advancing blade speeds up as forward airspeed increases.

The retreating blade must, however, produce the same amount of lift as the advancing blade. Therefore, as the airflow over the retreating blade decreases with forward airspeed, the blade angle of attack must be increased to help equalize lift throughout the rotor disc area. As this increase in angle of attack is continued, the retreating blade will stall at some high forward airspeed.

The advancing blade has relatively low angle of attack and is not subject to blade stall. Blade stall occurs during powered flight at the tip of the retreating blade, spreading inboard as forward airspeed increases.

Retreating blade stall does not occur in normal autorotations.

a) Conditions That Could Contribute To Retreating Blade Stall:

(i) High gross weight;

(ii) Low RPM;

(iii) High density altitude;

(iv) Steep or abrupt turns;

(v) Turbulent air.

b) Major Warnings of An Approaching Retreating Blade Stall:

(i) Abnormal 2 per revolution vibration in two-bladed rotors or 3 per revolutions in three-bladed rotors.

(ii) Pitch-up of the nose;

(iii) Tendency for the helicopter to roll.

c) Avoidance Procedures:

At the onset of blade stall vibration, the pilot should take the following corrective measures:

(i) Reduce collective pitch;

(ii) Increase rotor RPM;

(iii) Reduce forward airspeed; and

(iv) Minimize maneuvering.

5.15.3 Settling With Power

This condition of flight is sometimes described as settling in your own downwash. It involves high vertical rates of descent, and the addition of more power produces an even greater rate of descent.

The helicopter is descending in turbulent air that has just been accelerated downward by the rotor. Reaction of this air on rotor blades at high angle of attack stalls the blades at the hub (center of the rotor) and the stall progresses outward along the blade as the rate of descent increases.

a) Conditions Likely To Cause Settling With Power:

(i) A vertical or nearly vertical descent of at least 300 feet per minute. Actual critical rate depends on the gross weight, RPM, density altitude, and other pertinent factors;

(ii) The rotor system must be using some of the available engine power (from 20 to 100 percent);

(iii) The horizontal velocity must be no greater than approximately 10 miles per hour;

b) Situations That Are Conducive To Settling-With-Power:

(i) Attempting to hover out of ground effect at altitudes above the hovering ceiling of the helicopter;

(ii) Attempting to hover out of ground effect without maintaining precise altitude control; or

(iii) A steep power approach in which airspeed is permitted to drop nearly to zero.

c) Recovery From A Settling With Power Condition:

In recovering, the tendency on the part of the pilot to first try to stop the descent by increasing collective pitch will result in increasing the stalled area of the rotor and increasing the rate of descent.

Since inboard portions of the blades are stalled, cyclic control will be reduced. Recovery can be accomplished by increasing forward speed, and/or partially lowering collective pitch.

5.15.4 Abnormal Vibrations

The ability to detect and isolate different vibrations when they first develop makes it possible to correct the cause of the vibration before it becomes serious.

- *Abnormal vibrations in the helicopter will generally fall into three ranges:*
- *Low frequency - 100 to 400 cycles per minute (cpm).*
- *Medium frequency - 1,000 to 2,000 cpm;*
- *High frequency - 2,000 cpm or higher.*

a) Low Frequency Vibration:

(i) Abnormal vibrations in this category are always associated with the main rotor.

(ii) The vibration will be some frequency related to rotor RPM and the number of blades of the rotor, such as one vibration per revolution (1 per rev.), 2 per rev.

(iii) Low frequency vibrations are slow enough that they can be counted.

(iv) The frequency and the strength of the vibration will cause the pilot or passengers to be bounced or shaken noticeably.

(v) *If felt through the cyclic stick, it will have the same definite kick at the same point in the cycle.*

(vi) *May be felt only in the fuselage or only in the stick or they may be evident in both at the same time.*

(vii) *Those felt through the fuselage may be classified as lateral, longitudinal, or vertical - or some combination of the three:*

- *Lateral throws the pilot from side to side.*
- *Longitudinal throws the pilot forward and back;*
- *Vertical throws the pilot up and down.*

(viii) *If felt definitely in both the stick and fuselage, the cause is generally in the rotor or the rotor support. A failure of the pylon support at the fuselage is also a possible cause.*

(ix) *If felt in the fuselage during translational flight or during climb at certain airspeeds, the vibration may be the result of blades hitting the droop or blade stops.*

(x) *If felt predominantly through the stick, the most likely place to look for trouble is in the control system linkage from the stick to the rotor head.*

b) Medium Frequency Vibration:

(i)Abnormal vibrations in this category are a result of trouble with the tail rotor.

(ii) Source of these vibrations can be from improper rigging, unbalance, defective blades, or bad bearings in the tail rotor.

(iii)Difficult or impossible to count due to the fast rate.

c) High Frequency Vibration:

(i) *Normally associated with engines, however, could also be associated with tail rotor.*

(ii) *Impossible to count due to the high rate*

(iii) *Possible from a defective clutch or missing or bent fan blades.*

(iv) *Any bearings in the engine or in the transmission or the tail rotor drive shafts that go bad.*

5.15.5 Anti torque System Failure

Antitorque system failure could be the result of a failure in the tail rotor blades, a failure in the mechanical linkage between the pedals and the pitch-change mechanism of the tail rotor, or a failure in the tail rotor drive shaft between the transmission and the tail rotor.

Pilots should know the manufacturer's recommendations in case of a tail rotor failure for each particular helicopter they fly.

a) Failure in Forward Cruising Flight:

(i) Depending on the type helicopter the nose will usually pitch slightly and yaw to the right.

(ii) Violence of the pitching and yawing is generally greater when the failure occurs in the tail rotor blades and is usually accompanied by severe vibration.

(iii) If sufficient forward speed is maintained, the fuselage remains fairly well streamlined; however, if descent is attempted at slow speeds, a continuous turning movement to the left can be expected.

(iv) Direction control should be maintained primarily with cyclic control and, secondarily, by gently applying throttle momentarily, with needles joined, to swing the nose to the right.

(v) A landing may be made with forward speed or by flaring. The best and safest landing technique, terrain permitting, is to land directly into the wind with approximately 20 miles per hour airspeed.

(vi) The helicopter will turn to the left during the flare and during the subsequent vertical descent.

(vii) The helicopter should be level or approximately level at ground contact.

b) Failure While Hovering:

(i) Quick action will be required by the pilot.

(ii) A turning motion to the right will build rapidly because of the torque reaction produced by the relatively high-power setting.

(iii) The throttle should be closed immediately (without varying collective pitch position) to eliminate this turning effect. Simultaneously, the cyclic stick should be used to stop all sideward or rearward movements and to place the helicopter in the landing attitude prior to touchdown.

(iv) Execute a hovering autorotation.

5.15.6 Contract Training

a) The Company may contract its crewmember training to another training organization provided;

(i) The training agreement is included in the Hevilift approved Company Training program and the methods by which the Company will monitor quality assurance, of the training being delivered by the outside organization.

(ii) The outside organization shall use the actual manuals, or procedural documents approved for the Hevilift's use.

(iii)All flight training devices and aircraft used for training must be of the same type and model as the aircraft operated by the Hevilift, except where adequate differences training have been approved in the training program.

(iv) The training organization shall record any training or checking administered by it, on the company's approved training records.

b) When an outside training organization is used, Company shall ensure that all training received, has been given by training and checking personnel, who meet or have equivalent qualifications as those prescribed by Section 5.15.7 of this subpart.

5.15.7 Qualifications and Training requirements for Instructors

a) Hevilift shall use any person to give crewmember ground training, unless that person;

(i) Has satisfied the Hevilift that he or she has the knowledge and skills required to conduct that training,

(ii) If conducting aircraft type training, has successfully completed the ground school for the type of aircraft including required examinations, and

(iii) Has completed the training prescribed in Subsection (c) of this section.

b) Hevilift shall use a person to give flight instruction to a flight crewmember unless that person;

(i) Qualified in accordance with Subsection (a) of this section,

(ii) The holder of all licences, ratings and certificates issued pursuant to CASR Part 61, which are required to act as the pilot in command of the aircraft type he or she is to give instruction on,

(iii) Has been certified as competent from both pilot seats, to perform the duties and responsibilities of the pilot flying and pilot not flying, while giving flight instruction to the trainee, and

(iv) Has been given training in operation of aircraft type flight simulators or other synthetic flight training device used for training purposes.

c) Each instructor used to give formal training to any crewmember shall receive training in;

(i) The fundamental principles of the teaching/learning process,

(ii) Teaching methods and procedures,

(iii) The instructor/student relationship, and

(iv) Human factors relating to the effects of stress and hazardous attitudes.

After the occurrence the Operator issued additional chapter 5.15.8 Automation of the Company Operation Manual stated that:

The full usage of automation system shall be restricted to a lesser degree of automation authority when conducting special type of operations i.e. Under-Slung, Aerial photography with open doors and when operating under the VFR condition below 1000 ft.

Notwithstanding with the above statement,the full usage of automation recommended when operating under the IFR condition.

1.18 Additional Information

The investigation is continuing and will include but is not limited to an analysis of the CVR, FDR, operational regulations and procedures, and any other relevant information.

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

According to factual information during the investigation, the Komite Nasional Keselamatan Transportasi founded any initial findings as follows:

1. the aircraft had a valid Certificate of Airworthiness
2. The aircraft was airworthy prior the departure.
3. The pilot was properly and current licensed.
4. There were no indications of a malfunction in the aircraft system before the aircraft loss of control occurred.
5. The aircraft was substantially damaged.

3 SAFETY ACTION

The Komite Nasional Keselamatan Transportasi (KNKT) had been informed of safety actions taken by PT. Hevilift Aviation Indonesia were as follows:

1. Revision of Company Operation Manual (COM) regarding to restriction of automation usage during special type of operations i.e Under-slung, Aerial photography with open doors and when operating under VFR condition below 1000 ft.
2. Revision of Company Training Manual (CTM) regarding to Sikorsky S-76 training syllabus by adding Chapter 2.16. The objective of recurrent training syllabus is to provide a standardized program for the initial and transition ground and flight training of Company Check Pilot and Flight instructors, to ensure their qualifications, competency and to maintain their proficiency.

The detail of the safety action was on the appendices of this report.

4 SAFETY RECOMMENDATIONS

According to factual information and initial findings, the National Transportation Safety Committee issued safety recommendations to the Directorate General Civil Aviation (DGCA):

1. To ensure the implementation of safety action taken by Hevilift Aviation Indonesia.
2. To review the others Sikorsky similar operation's Operator related to the training and the restriction of automation usage.

5 APPENDICES

5.1 COM Revision

(iii) Has completed the training prescribed in Subsection (c) of this section.

b) Hevilift shall use a person to give flight instruction to a flight crewmember unless that person;

(i) Qualified in accordance with Subsection (a) of this section,

(ii) The holder of all licences, ratings and certificates issued pursuant to CASR Part 61, which are required to act as the pilot in command of the aircraft type he or she is to give instruction on,

(iii) Has been certified as competent from both pilot seats, to perform the duties and responsibilities of the pilot flying and pilot not flying, while giving flight instruction to the trainee, and

(iv) Has been given training in operation of aircraft type flight simulators or other synthetic flight training device used for training purposes.

c) Each instructor used to give formal training to any crewmember shall receive training in;

(i) The fundamental principles of the teaching/learning process,

(ii) Teaching methods and procedures,

(iii) The instructor/student relationship, and

(iv) Human factors relating to the effects of stress and hazardous attitudes.

5.15.8 Automation

The full usage of automation system shall be restricted to a lesser degree of automation authority when conducting special type of operations i.e. Under-slung, Aerial photography with open doors and when operating under the VFR condition below 1000 ft.

Notwithstanding with the above statement, the full usage of automation recommended when operating under the IFR condition

5.2 CTM Revision

2.16. SIMULATOR RECURRENT SYLLABUS

Objective : To provide a standardized program for the initial and transition ground and flight training of Hevilift Aviation Indonesia Company check pilot and pilot flight instructors to assure their qualifications, competency and to maintain their proficiency in those duties and functions.

Instructional Delivery Methods : Lecture/Guided Discussion.

Training Aids : Lesson Plans, Reference Documents.

Testing/Checking : Oral or written examination.

A. Ground Training 14.00 Hours

1) Aircraft General

(a) Lighting.
(b) Master Warning/IIDS.
(c) Electrica.
(d) Fuel.
(e) Powerplant.
(f) Ice & Rain Protection.
(g) Fire Protection.
(h) Powertrain.

2) Main Rotor

3) Tail Rotor

4) Hydraulics (General)

5) Landing Gear & Breaks

6) Flight Controls

7) Automatic Flight Controls (AFCS/DAFCS)

8) Avionics

9) Environmental

10) Kits & Accessories

11) Weight & Balance

12) Performance

13) Flight Planning

14) Approved RFM

15) Crew Resources Management (CRM)

16) System Integration

B. Flight Training

PF.....4.50 HRS

PNF.....4.50 HRS

1) Preflight Procedurs
   (a) Preflight Inspection
   (b) Powerplant Start
   (c) Pretakeoff Check
2) Takeoff and Departure Phase
   (a) Normal Takeoff
   (b) Crosswind Takeoff
   (c) Powerplant Failure During Takeoff
   (d) Rejected Takeoff
   (e) Instrument Takeoff RVR (2400)
   (f) Instrument Departure
3) In-Flight Procedurs
   (a) Powerplant Failure
   (b) Settling With Power
   (c) Steep Turns
   (d) Recovery From Unusual Attitudes
4) Instrument Procedures
   (a) Instrument Arrival
   (b) Holding
   (c) Precision Instrument Approach-RVR (5000)
   (d) Precision Instrument Approach-RVR (2400)
   (e) Nonprecision Instrument Approach
   (f) Precision Instrument Approach with One Engine Inoperative-RVR (2400)
   (g) Missed Approach From a Precision Approach
   (h) Missed Approach With One Engine Inoperative
5) Approaches
   (a) Approach with Degraded Augmentation
   (b) Balked Landing
   (c) Circling
   (d) Copter ILS
   (e) Coupled Precision

(f) Elevated landing site
(g) GPS
(h) High Altitude
(i) LOC
(j) LOC/BC
(k) LOC/DME
(l) Manual Precision (with F/D)
(m) NDB
(n) Obstacle Clearance
(o) Raw Data Precision
(p) VNAV
(q) Visual
(r) VOR
(s) VOR/DME
(t) Precision
(u) Non Precision
(v) Missed Approaches

6) Landing and Approaches to Landing
   (a) Approaches and Landing with Simualted Powerplant Failure
   (b) Normal Approaches and Landings
   (c) Rejected Landing
   (d) Crosswind Appoach and Landing
   (e) Landing from a Precision Approach
7) Normal/Abnormal Procedures
   (a) Powerplant
   (b) Electrical Systems
   (c) Helicopter and Personal Emergency Equipment
   (d) Anti-ice and Deice System
   (e) Hydraulic Systems
   (f) Fuel System
   (g) Loss of Tail Rotor Effectiveness
   (h) Flight Control Systems
   (i) Fire Detection and Extinguishing Systems
   (j) Environmental System
   (k) Navigation and Avionics Systems
   (l) Automatic Flight Control System, DAFCS, EFIS and Related Subsytems
8) Emergency Procedures
   (a) Ditching
   (b) Emergency Evacuation
   (c) Emergency Descent
   (d) Autorotation (Training Only)
   (e) Inflight Fire and Smoke Removal

9) Post Flight Procedure
   (a) After landing Procedures
   (b) Parking and Securing
10) Special Emphasis Area
   (a) Positive Aircraft Control
   (b) Positive Exchange of the Flight Controls (who is flying the aircraft)
   (c) Collision Avoidance
   (d) Wake Turbulence Avoidance
   (e) Communications Management
   (f) Crew Resources Management (CRM)
   (g) Aernautical Decision Making (ADM)
   (h) Use of Automation
      - Normal Procedure
         - Procedure engagement Autopilot 2 cue & 3 cue
      - Emergency procedures
         - Sudden Attitudes Changes
         - Oscillatory Malfunctions
         - Single Autopilot Failure
         - Dual Autopilot Failure
         - Decouple Light
         - Collective Light
         - Trim Failure
         - Flight Director Failure
         - Flight Director Coupler Failure

5.3 Pilot Flight Check Report form

Pilot Flight Check Report

Hevilift

NAME OF AIRMAN: LICENSE TYPE & NUMBER:

DATE OF FLIGHT CHECK: EXPIRATION DATE:

PURPOSE: INITIAL TYPE RATING ☐ VFR BASE ☐ IFR BASE ☐ LINE / ROUTE ☐

COMPANY ACCEPTANCE ☐ RECURRENT ☐ OTHER ☐ (SPECIFY):

CONDITIONS: DAY ☐ NIGHT ☐ VMC ☐ IMC ☐ HOODED ☐ REV ☐ NON REV ☐

A/C TYPE: CALL SIGN: LOCATION: FLIGHT TIME:

PRE-FLIGHT PROCEDURES	S*	US*
01. Flight Planning		
02. Aircraft Limitations & Performance		
03. Preflight Inspection(BFF)		
04. Flight Clearance & ATC Liaison		
05. Cockpit Procedures		
06. Radio & Navigation Aid Checks		
07. Passenger Briefing		
08. Weight & Balance Calculations		
09. Flight and Duty and Fatigue Awareness		
NORMAL PROCEDURES		
10. Hovering Maneuvers		
11. Normal (Runway) Take Off		
12. Circuit Pattern		
13. Confined Area Landing / Take Off		
14. Off Shore Landing / Take Off		
15. Sling Load / Under-slung operations		
16. Quick Stop		
17. Steep And Level Turns		
18. Shut-Down Procedures		
19. Mountainous Terrain		
EMERGENCY PROCEDURES		
20. Hovering Engine Failure		
21. OEI Before CDP [Multi]		
22. OEI After CDP [Multi] [Committed]		
23. Engine Fire		
24. Airframe/Electrical Fire		
25. Hydraulic Failure		
26. DECU Failure/Governor Failure		
27. Tail Rotor Failure/Tail Rotor Drive Failure		
28. OEI Prior To LDP [Landing] [Multi]		
29. OEI After LDP [Landing] [Multi]		
30. Autorotation (180°/360°) & Engine Restart		
31. Ditching Procedures		
32. Running Landing		
33. Emergency Egress		
34. Discuss Vortex Ring State		
INSTRUMENT PROCEDURES		
35. Instrument Theory		
36. Basic Instruments		
37. Facilities Identification & Tracking		
38. Departure and En-route Procedures		
39. Holding		
40. Approaches: NDB, ILS, LLZ, RNAV		
41. Circling Approaches		
42. Missed Approach Procedures		
43. Use Of Auto Pilot		

FLIGHT CONDUCT	S*	US*
44. Use Of Company Checklists		
45. Effective Crew Resource Management		
46. Use Of Lifejackets & Seat Harness		
47. Radio Etiquette		
48. Navigation Aid Use / Identification		
49. Use Of Global Positioning System		
50. Fuel Calculations And Estimated Return Fuel		
51. Critical Point Calculations		
52. Multi Sector Load Sheet Use.		
53. Use Of Unapproved Documents		
54. Use Of Navigation Log		
55. Handover / Take Over Brief		
56. Post Flight Inspection (ALF)		
57. Post Flight Paperwork Completed.		
58. Appropriate Landing And T/O Profiles		
59. Power Assurance Flight At Altitude		

EMERGENCY EQUIPMENT					
60. Life Jackets		64. Floatation System		68. Pax Control	
61. Life Rafts		65. Ditching brief		69. Pax Evac	
62. Fire Ext		66. ADELT/EPIRB		70. Satellite Pos	
63. Fire System		67. HABD		71. Other Equip*	
				* List in Remarks	

REMARKS

RESULT OF FLIGHT OR GROUND CHECK: SATISFACTORY ☐ UNSATISFACTORY ☐

This Is To Certify That _____ Satisfactorily Demonstrated Proficiency on This Flight Check and is Authorized to Act As _____ with The Following Limitations:

_____

Trainee: Check & Trng Capt:

5.4 Revised Pilot Flight Check Report form

Flight Training Report
Rotary Wing

Hevilift

Pilot:	License:	Date:	Purpose:		
			VFR Base ☐	IFR Base ☐	Line / Route ☐
Position:	A/C Type:	A/C Reg:	Differeces ☐	Co Acceptance ☐	Type Rating ☐
PIC / P1 ☐ PIUS ☐ SIC / P2 ☐			ICUS ☐	Up Grading ☐	Other ☐
Location:	Hours Flown: Rev ☐ N.Rev ☐	Expire Date:	Conditions: Day ☐ IMC ☐ Night ☐		Status: Training ☐ Recur ☐ Check ☐

NORMAL	S	US	FLIGHT CONDUCT	S	US
01. Aircraft Limitations & Performance			42. Handling		
02. Flight Planning			43. Task Management		
03. Weight & Balance Calculations			44. Situational Awareness		
04. Preflight Inspection			45. Problem Solving and Decission Making		
05. Passenger Briefing			46. Threat and Error Management		
06. Engine Starting			47. Use of Checklists		
07. System Check / Run Up Procedures			48. Use Of Nav Aids		
08. Taxi / Hovering Maneuvers			49. Radio Telephony		
09. PC1 Take Off / Landing			50. Critical Point Fuel Calculations		
10. PC 2 Take Off / Landing			51. Std Call Out / Briefing		
11. Off Shore Take Off / Landing			52. Sterille Cockpit		
12. Confined Area Take Off / Landing			53. Stabilized Approach		
13. Sloping Ground Take Off / Landing			54. Ground / In Flight Power Assurance		
14. Quick Stop			55. Paperwork Completion		
15. Level and Steep Turns			56. Post Flight Inspection		
16. Circuit Pattern			EMERGENCY EQUIPMENT		
EMERGENCY			57. Life Jackets		63.CPI
17. Abnormal Engine Starting			58. Life Rafts		64.EPIRB
18. Taxi / Hovering Engine Failure			59. External Fire Extinguisher		65. HABD
19. PC 1 Emergency Take Off / Landing			60. A/C Firex Sys		66. Emergency Egress
20. PC 2 Emergency Take Off / Landing			61. A/C Floatation Sys		67 Other Equipment
21. Engine Fire On Grd / In Flight			62. ADELT		
22. Airframe / Electrical Fire			REMARKS		
23. Hydraulic Failure					
24. Governor / DECU Failure					
25. Tail Rotor Drive / Control Failures					
26. Autorotation, Straight In, 180° & Eng Restart					
27. Running Take Off / Landing					
28. Automation / Electronic Stabilization Malfunctions					
29. Vortex Ring State / Settling With Power					
30. Ditching Procedures					
31. Pilot Incapacitation					
INSTRUMENT					
32. Basic Instruments Flying					
33. Facilities Identification, Tracking, Interception					
34. Entry Holding / Holding					
35. SID, STAR and En-route					
36. Non Precission App, Fully Couple / Manual					
37. Perecission App, Fully Couple / Manual					
38. Go Around Procedures, Normal / Emergency					
39. Unusual Attitude					
40. IMC Autorotation					
41. Transponder Coding					

Flight Training Result: Satisfactory ☐ Unsatisfactory ☐

This is to certify that the Pilot has completed this flight training and recommend to.....

and or act as: PIC / P1 ☐ *PIUS* ☐ *SIC / P2* ☐ *,with limitations* .....

Pilot: signature:	Check & Traning Capt:	Chief Pilot:	Other:
	Name OTR No.	Name:	Name: