KOMITE NASIONAL KESELAMATAN TRANSPORTASI
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FINAL

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Aircraft Accident Investigation Report

PT Carpediem Aviasi Mandiri

Bell 206 B3; PK-CDO

Mining 1, Kawe, Papua

Republic of Indonesia

5 December 2022

2024

This Final Report was published by the *Komite Nasional Keselamatan Transportasi* (KNKT), Transportation Building, 3rd Floor, Jalan Medan Merdeka Timur No. 5 Jakarta 10110, Indonesia.

The report is based upon the investigation carried out by the KNKT in accordance with Annex 13 to the Convention on International Civil Aviation, the Indonesian Aviation Act (UU No. 1/2009) and Government Regulation (PP No. 62/2013).

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Jakarta, 27 December 2024
KOMITE NASIONAL
KESELAMATAN TRANSPORTASI
CHAIRMAN

SOERJANTO TJAHJONO

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ABBREVIATIONS AND DEFINITIONS

AOC	:	Air Operator Certificate
ATC	:	Air Traffic Controller
C of A	:	Certificate of Airworthiness
C of R	:	Certificate of Registration
CASR	:	Civil Aviation Safety Regulation
CPL	:	Commercial Pilot License
DAAO	:	Directorate of Airworthiness and Aircraft Operation
DGCA	:	Directorate General of Civil Aviation
FOO	:	Flight Operation Officer
GPS	:	Global Positioning System
HIRA	:	Hazard Identification and Risk Assessment
HLO	:	Helicopter Landing Officer
KNKT	:	*Komite Nasional Keselamatan Transportasi* (is the Indonesia Independent Investigation Authority also known as National Transportation Safety Committee/NTSC)
LT	:	Local Time
M1	:	Mining 1
OM	:	Operation Manual
PIC	:	Pilot in Command
SMSM	:	Safety Management System Manual
UTC	:	Universal Time Coordinated
VFR	:	Visual Flight Rules
VHF	:	Very High Frequency

SYNOPSIS

On 5 December 2022, a Bell 206 B3 helicopter with registration PK-CDO was being operated by PT Carpediem Aviasi Mandiri (Carpediem Air) on unscheduled cargo flights from Iwot Helipad, Tanah Merah to several landing spots at Kampung Kawe area. On board the helicopter was one pilot and one Helicopter Landing Officer (HLO).

At 0418 UTC (1318 LT), in daylight condition, the helicopter departed from Iwot Helipad and performed nine landings at Kampung Kawe area. The landings and cargo unloading process were uneventful. At 1434 LT, the helicopter conducted subsequent flight from Kawe Helipad to Mining 1 (M1). The cargo on board the helicopter stored in the cargo and passenger compartment. This flight was the first flight for the pilot to M1 on that day.

At 1442 LT, the helicopter landed at unpaved road which connected the houses on the settlement area at M1. During the cargo unloading process, the pilot did not shut down the engine and waited inside the helicopter while the rotor blades were still running. The same method was also conducted during the previous nine flights. The pilot observed several residents standing about 40 meters in front of the helicopter.

The HLO observed that there were no people near the helicopter except the customer who went to the left side of the helicopter to meet the HLO. When unloading the cargo, the HLO heard a loud sound coming from the rear section of the helicopter. The HLO looked to the source of the sound and saw a person has laying on the ground. About the same time, the HLO noticed that the customer ran away from the helicopter followed by several residents who stood in front of the helicopter. The HLO thought that a dangerous security situation was unfolding as several people ran away from the helicopter. Thereafter, the HLO went to the helicopter and advised the pilot to take off immediately. The pilot, who was also aware of this assumed security issue, decided to take off momentarily.

During the takeoff, the pilot noticed that the BAGGAGE DOOR caution light was illuminated as the HLO had not closed the baggage door. The HLO informed the pilot that he saw a person laying on the ground and was concerned about their security. The pilot then decided to return to Iwot Helipad as there was no other abnormal indication of the helicopter system.

At 1458 LT, the helicopter landed at Iwot Helipad, the pilot shut down the engine. After the tail rotor stopped rotating, the pilot and HLO checked the tail rotor condition and found damage on the tail rotor. Thereafter, they received information that the person who laid on the ground was a local resident who approached the helicopter with intention to ask to get onboard. The local resident impacted the tail rotor blades and was fatally injured.

The investigation considered that there were no issues related to aircraft system and weather condition that can reduce the visibility at the accident site. Therefore, the analysis will discuss on the issue of monitoring people’s movement and risk management of the helicopter operation. The KNKT concluded the contributing factor of the absence of access restrictions to the landing spot without movement’s monitoring of the helicopter rear area allowed a resident, who may have been unaware of the tail rotor's rotation, to approach the helicopter.

KNKT acknowledged that the safety actions taken by the aircraft operator were relevant to improve safety, however there are safety issues that remain to be considered. The KNKT issued safety recommendations to aircraft operator to address the safety issues identified in this report.

1 FACTUAL INFORMATION

1.1 History of the Flight

On 5 December 2022, a Bell 206 B3 helicopter with registration PK-CDO was being operated by PT Carpediem Aviasi Mandiri (Carpediem Air) on unscheduled cargo flights from Iwot Helipad, Tanah Merah[1] to several landing spots at Kampung Kawe area[2]. The flights were conducted in a single pilot operation and in accordance with Visual Flight Rules (VFR). Considering that several landing spots were unprepared helipad in remote area, the aircraft operator assigned one Helicopter Landing Officer (HLO) on board the helicopter.

At 0418 UTC (1318 LT[3]), in daylight condition, the helicopter departed from Iwot Helipad and performed nine landings at Kampung Kawe area. The landings and cargo unloading process were uneventful. At 1434 LT, the helicopter conducted subsequent flight from Kawe Helipad to Mining 1 (M1)[4]. The cargo on board the helicopter stored in the cargo and passenger compartment. This flight was the first flight for the pilot to M1 on that day.

Prior to land at M1, the pilot performed reconnaissance procedure[5] to observe the landing spot. At 1442 LT, after ensuring the area was clear from obstacle the helicopter landed at landing spot which located at unpaved road connected the houses on the settlement area. The HLO disembarked the helicopter, and after checked that helicopter was landed properly, the HLO gave a hand signal to the pilot to inform that the landing was good. The HLO also gave hand signal to the customer who was waiting near the landing spot informing that the unloading cargo process would be initiated.

After the helicopter had landed properly, the HLO disembarked from the helicopter and saw the customer who went to the left side of the helicopter. The HLO observed that there were no people near the helicopter that might endanger the unloading process and advised the customer to stand on his left side while the HLO unloaded the cargo (see figure 1).

During the cargo unloading process the pilot did not shut down the engine and waited inside the helicopter while the rotor blades were still running. The same method was also conducted during the previous nine flights. The pilot observed several residents stood about 40 meters in front of the helicopter.

1 Iwot Helipad located about 2 Nm on bearing 014° from Boven Digoel Aiport (WAKT), Tanah Merah on coordinate 06°04’21” S 140°18’22” E.

2 Kawe located about 55 Nm from Iwot Helipad on bearing 359° from Iwot Helipad on coordinate 5°8'18.00"S 140°17'48.00"E. At Kawe area, there were several helipads for helicopter.

3 The 24-hours clock in Local Time (LT) is used in this report to describe the local time as specific events occurred. Universal Time Coordinated (UTC) is UTC+9 hours.

4 Mining 1 located about 12 Nm on bearing 312° from Kawe Helipad on coordinate 5°0'30.27"S 140°9'5.04"E.

5 Reconnaissance procedures involve visually surveying the area, collecting environmental data, and analyzing factors like terrain, obstacles, and weather conditions before initiating landing or takeoff at unknown or potentially hazardous locations.

Figure 1: The illustration of the accident site (annotated by KNKT)

When unloading the cargo, the HLO heard a loud sound from the rear section of the helicopter. The HLO looked to the source of the sound and saw a person has laying on the ground. About the same time, the HLO noticed that the customer ran away from the helicopter followed by several residents who were standing in front of the helicopter. The HLO thought that a dangerous security situation was unfolding as several people ran away from the helicopter. Thereafter, the HLO went to the helicopter and advised the pilot to take off immediately. The pilot, who was also aware of this assumed security issue, decided to take off momentarily.

During the takeoff, the pilot noticed that the BAGGAGE DOOR caution light was illuminated as the HLO had not closed the baggage door. The HLO informed the pilot that he saw a person laying on the ground and was concerned about their security. The pilot then decided to return to Iwot Helipad as there was no other abnormal indication of the helicopter system.

At 1458 LT, the helicopter landed at Iwot Helipad, the pilot shut down the engine. After the tail rotor stopped rotating, the pilot and HLO checked the tail rotor condition and found damage on the tail rotor. Thereafter, they received information that the person who laid on the ground was a local resident who approached the helicopter with intention to ask to get onboard.

1.2 Injuries to Persons

One local resident was fatally injured as result of this occurrence.

1.3 Damage to Aircraft

The helicopter was substantially damaged. The damaged of the helicopter limited on the tail rotor blades.

1.4 Other Damage

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

1.5 Personnel Information

1.5.1 Pilot in Command

The pilot was an Indonesian who held valid Commercial Pilot License (CPL) and qualified as Bell 206 B3 helicopter pilot. The pilot also held valid Class 1 medical certificate without medical limitation.

The last proficiency check for the pilot was conducted on 13 December 2021, the result was satisfactory.

The pilot had total flying hour of 1,084 hours 20 minutes, included 1,023 hours 5 minutes on Bell 206 B3 helicopter. Prior to the occurrence, the pilot had flown about 2 hours with total of nine landings at Kawe Area.

The pilot's total flight hour for Papua area was about 500 hours. All flights in Papua area were performed since the pilot joined the Carpediem Aviasi Mandiri in 2020. The pilot had encountered several security issues during flight operation at Papua area, including local resident who were forced to get onboard the helicopter.

1.5.2 Helicopter Landing Officer (HLO)

The HLO was an Indonesian who had a total experience of 7 years as HLO in Papua area. The HLO held a HLO license that has been due in 2018.

The HLO had encountered several security issues during flight operation at Papua area, including local resident who were forced to get on board the helicopter.

1.6 Aircraft Information

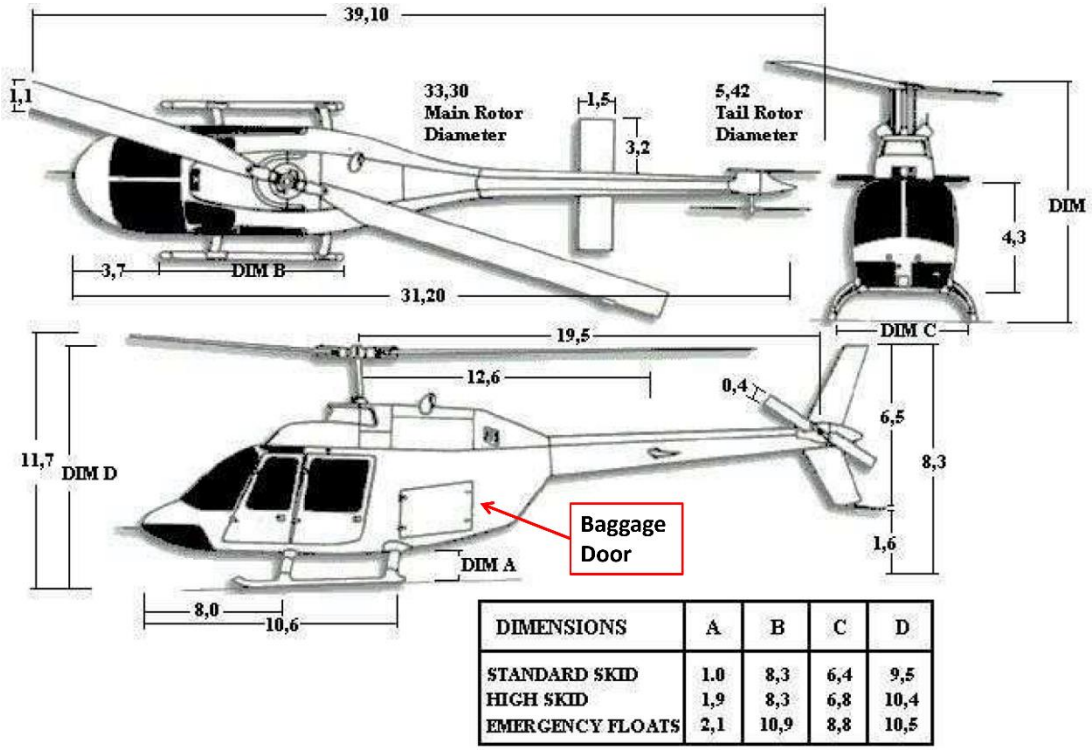
The Bell 206 B3 Helicopter, registered PK-CDO with serial number of 4539, was manufactured by Bell Helicopter Textron in 2000. PK-CDO had a valid Certificate of Airworthiness (C of A) and Certificate of Registration (C of R).

Prior to the departure, there was no record of helicopter system malfunction.

The aircraft had total hour since new of 3,207.6 hours, and the total cycles since new of 4,717 cycles. The engine installed on the helicopter was M250-C20J type manufactured by Rolls Royce.

The helicopter had two blades of tail rotor manufactured by Bell Helicopter Textron with part number 206-016-201-137.

The following was the helicopter dimension taken from the Carpediem Operation Manual (OM) Part B.



DIMENSIONS	A	B	C	D
STANDARD SKID	1.0	8,3	6,4	9,5
HIGH SKID	1,9	8,3	6,8	10,4
EMERGENCY FLOATS	2,1	10,9	8,8	10,5

Figure 2: Helicopter dimensions and baggage door location (annotated by KNKT)

1.7 Meteorological Information

Meteorological observation service was not provided in the M1 landing spot. According to the pilot and HLO recollection, the weather, including visibility during the accident was good and met the VFR criteria.

1.8 Aids to Navigation

The M1 landing spot was not equipped with ground-based navigation aids. The aircraft operator utilized Global Positioning System (GPS) for navigation aid.

1.9 Communications

There was no ground-based communication system available in the M1 landing spot, and the pilot should broadcast in certain VHF frequency to inform the position and communicate with other pilot for the traffic communication. This communication was not recorded.

1.10 Aerodrome Information

The M1 landing spot was an unprepared helipad on coordinate 5° 0'29.26" S 140°9'5.70" E which located near mining area. The landing spot situated at unpaved road which connected houses in the settlement area (see figure 1).

1.11 Flight Recorders

The aircraft 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.

1.12 Wreckage and Impact Information

Both tail rotor blades were dented as shown in the figures below:

Figure 3: The dent on the tail rotor blades

The visual inspection after the accident identified that the tail rotor driveshaft and flexible coupling discs were normal. The inspection also did not find any debris on the magnetic chip detector.

1.13 Medical and Pathological Information

Medical and pathological examinations were not conducted.

1.14 Fire

There was no evidence of fire during the occurrence.

1.15 Survival Aspects

The local resident was fatally injured after the impact with the tail rotor.

1.16 Test and Research

Test and research were not conducted in this investigation.

1.17 Organizational and Management Information

1.17.1 Helicopter Operator

The helicopter was operated by PT Carpediem Aviasi Mandiri (Carpediem Air) which had valid Air Operator Certificate (AOC) number of 135-061. The Carpediem Air was authorized by the Directorate General of Civil Aviation (DGCA) to conduct air transportation carrying passenger and cargo in unscheduled operation within and outside Indonesia for aircraft operations under Civil Aviation Safety Regulation (CASR) Part 135.

The Carpediem Air developed operation manuals (OM)s which contains company policies and procedures that has been approved by the DGCA.

1.17.1.1 Safety on Helicopter Landing Area

The Carpediem Air OM Part B subchapter 1.12.1 described procedures regarding helipads and drop areas as follows:

> *A clean controlled helipad is mandatory for safe helicopter operations. Access to any helipad should be restricted to those personnel directly involved with helicopter operations. Where possible the area should be fenced to restrict public access. The helicopter Loadmaster should be in attendance during all helicopter operations to control people and cargo movement. The area should be kept free of all debris and loose articles likely to be blown about by rotor wash, particularly iron and plastic sheeting used to protect cargo awaiting transshipment.*
>
> ...

The Carpediem Air did not assign a Helicopter Loadmaster as the flight operation was conducted using pilot self-dispatch system. Based on OM Part A Subchapter 1.8.2:

> *Pilot self- dispatch means a system where authority and responsibility for flight release, operation and flight following have been delegated solely to the PIC.*

In terms of controlling people and cargo movement, the aircraft operator assigned one Helicopter Landing Officer (HLO) on board the helicopter, considering that several landing spots in Papua were unprepared helipad and most of them were at remote area.

1.17.1.2 Operational Personnel Responsibility and Requirement

Carpediem Air OM Part A subchapter 2.5 described responsibility of PIC as follows:

> *The PIC is responsible for the preparation and execution of the flight, and has the final authority as to the safety of the aircraft and its payload. He has the authority to take such measures as necessary for the safety of the flight, and take such reasonable actions to maintain order and discipline on board.*

Carpediem Air determined the HLO has the same role and responsibility with the Flight Operation Officer (FOO). The OM Part A subchapter 2.6.4. described HLO responsibility as follows:

> *The FOO/HLO are responsible to the Operations Manager. He shall carry out those tasks delegated to him by the Operations Manager which shall include but are not limited to:*
>
> *a. Responsible for flight following*
> *b. Responsible for the safe and efficient running of the radio and operations room and all ground operational elements*
> *c. Immediately advising the Operations Manager in the event of an accident, incident or occurrence*
> *d. Liaison with the customer and or the applicable company department*
> *e. Keeping the customer informed as necessary regarding the progress of all flight tasks*
> *f. Is responsible for execution of flight clearances, stored flight plans and slots*
> *g. Ensuring the availability of up-to-date meteorological information and briefing*
> *h. Responsible for the filing of journal related matters such as manifest, Operational flight plan, Load sheets and other flight document as required by Operations Manuals.*

i. *Weight and manifest all passengers and freight and assist in the loading and unloading of passengers and freight.*

j. *Follow all security / screening checks as required under the guidelines laid down by local authorities and Carpediem Air.*

k. *Preparing all loads to ensure that they are secure and fastened properly and their weights accurately determined before loading.*

According to the OM Part A Subchapter 5.5, the qualification requirements for HLO were as follows:

1. *Hold / has held FOO or HLO License*
2. *Knows the contents of the Carpediem Air Operations Manual, flight dispatch procedures, passenger / cargo handling procedures, and provisions of this part necessary to the proper performance of his duties.*

1.17.1.3 Hazard Identification and Risk Assessment

Carpediem Air Safety Management System Manual (SMSM) Subchapter 9.5 described hazard identification as follows:

Reactive and proactive schemes for hazard identification are the formal means of collecting, recording, analyzing, acting on and generating feedback regarding, hazards and the associated risks that can affect the safety of the operational activities.

Carpediem Air will use the Predictive and Proactive approach to Hazard identification.

The process of the hazard identification described in the SMSM Subchapter 9.5.3 as follows:

The hazard identification process shall include the following steps:

- *Reporting of hazards, events or safety concerns*
- *Collection and storing the safety data*
- *Analysis of the safety data*
- *Distribution of the safety information distilled from the safety data.*

The SMSM Subchapter 9.6, describe risk assessment process as follows:

Having confirmed the presence of a safety hazard, some form of analysis is required to assess its potential for harm or damage. Typically, the assessment of the hazard involves three considerations.

a. *The probability of the hazard precipitating an unsafe event (i.e. the probability of adverse consequences should underlying unsafe conditions be allowed to persist).*

b. *The severity of the potential adverse consequences, or the outcome of an unsafe event; and*

c. *The rate of exposure to the hazards. The probability of adverse consequences becoming greater through increased exposure to unsafe conditions. Thus, exposure may be viewed as another dimension of probability. However, some methods of defining probability may also include the exposure element, for example, a rate of 1 in 100,000 hours.*

...

f. If Carpediem Air is undergoing structural changes, such as rapid growth and expansion, the influx of a large group of new operational staff, new route structure or introduction of new aircraft types.

...

On 17 February 2021, Carpediem Air conducted Hazard Identification and Risk Assessment (HIRA) for Bell 206 L4 helicopter operation in Papua area. The process identified several hazards including "safety on and around helicopter" and "security issues" as follows:

NO	HAZARD IDENTIFIED	SPECIFIC COMPONENTS OF THE HAZARD	ASSOCIATED RISKS	CURRENT MEASURES TO REDUCE RISKS	RISK INDEX	FURTHER ACTION TO REDUCE RISK	RISK INDEX
4	Safety on and around helicopter	FOD and people near the aircraft	1. Aircraft damage 2. Injury or fatality	1. Pax Safety Briefing 2. Ensure the area are clean, free of debris or loosing objects 3. Ensure all pax and/or cargo are secured.	3B	1. Do all possible to get ground personnel assistance 2. Observe and ensure all personnel and cargo movements are within pilot's sight	2D
5	Security issue	Security threat	1. Aircraft damage 2. Injury or fatality	1. Coordination with local government or security auth to obtain information concerning security issue in the area 2. Observe or obtain security information from other operators 3. Obtain Security Clearance if appropriate.	3B	1. Check and recheck for security threat at departure, enroute and destination. 2. Always conduct reconnaissance flight to observe the area prior to landing.	2D

Figure 4: Sample of HIRA on Papua flight operation

Carpediem Air considered that the HIRA for Bell 206 L4 helicopter operation in Papua area has represented the flight operation of Bell 206 B3 helicopter to M1 landing spot.

1.18 Additional Information

There was no other information that was considered relevant to the circumstances leading up to the occurrence.

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 considered that there were no issues related to aircraft system and weather condition that can reduce the visibility at the accident site. Therefore, the analysis will discuss the issue of monitoring people's movement and risk management of helicopter operations.

The aircraft operator Operation Manual (OM) Part B described that to ensure the safe operation of helicopter, access to any helipad should be restricted to those personnel directly involved with helicopter operations. Where possible, the area should be fenced to restrict public access. The OM Part B also required a helicopter loadmaster to supervise the movement of people during the helicopter operation.

The aircraft operator did not assign a helicopter loadmaster as the flight operation was conducted using a pilot self-dispatch system. In terms of controlling people's movement, the aircraft operator assigned one Helicopter Landing Officer (HLO) on board the helicopter.

The landing spot did not have any means to prohibit people approaching the helicopter as there was no restricted access to the landing spot. After the helicopter had landed properly, the HLO observed that there were no people near the helicopter that might endanger the unloading process. The pilot did not shut down the engine and waited inside the helicopter. The HLO then unloaded the cargo from the cargo door, which was located on the left side of the helicopter. During the unloading process, there was a customer standing on the left side of the HLO. The HLO's attention was further directed towards the front and sides of the helicopter, where the primary unloading activities were taking place and where the customer stood by. Therefore, neither HLO, the customer, nor the pilot monitored any movement on the rear of the helicopter.

The absence of access restrictions to the landing spot without movement's monitoring of the helicopter rear area allowed a resident, who may have been unaware of the tail rotor's rotation, to approach the helicopter.

The aircraft operator Safety Management System Manual (SMSM) described prior to opening a new route structure, the aircraft operator must perform a risk assessment. The aircraft operator had conducted Hazard Identification and Risk Assessments (HIRA) prior to operating Bell 206 L4 helicopter in Papua area and considered that the HIRA has represented the flight operation of Bell 206 B3 helicopter to M1.

The assessment had identified people near aircraft as a hazard with associated risk of injury or fatality to the people and aircraft damage. The determined mitigation action to reduce that risk was to acquire ground personnel assistance to monitor the people's movement and ensure that all movement was within the pilot's sight.

The landing spot at Mining 1 (M1) was unpaved road which connected houses in the settlement area at M1 which potentially generates people movement from behind and front of the helicopter. The people's movement behind the helicopter was considered a hazard as the movement was outside pilot's sight. In addition, there was no ground company personnel available at M1 except the HLO on board the helicopter to ensure all people movement were within pilot's sight. Based on those conditions, the determined mitigation action for helicopter operation in Papua area was not sufficient to mitigate the hazard at M1. In addition, the determined mitigation actions were not transposed into detailed procedures nor guidance for pilot and/or HLO. The absence of detailed procedures nor guidance to implement the mitigation action made the hazard of people movement during helicopter operation at M1 landing spot not mitigated properly, increasing the risk of people being seriously injured.

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, the KNKT identified several findings as follows:

1. The helicopter had a valid Certificate of Airworthiness (C of A) and Certificate of Registration (C of R). Prior to the departure, there was no record or report of helicopter system malfunction.
2. The pilot held valid Commercial Pilot License (CPL) and qualified as Bell 206 B3 helicopter pilot. The Helicopter Landing Officer (HLO) held a HLO license that was due at the day of the accident.
3. Both pilot and HLO had encountered several securities issues during flight operation at Papua area, including local resident who forced to get on board the helicopter.
4. Prior to the accident, the pilot and HLO had performed nine landings. The accident flight was the first flight for the pilot to M1 on that day.
5. The helicopter landed at an unpaved road which connected houses in the settlement area at M1. The landing spot did not have any means to prohibit people approaching the helicopter as there was no restricted access.
6. After the helicopter had landed properly, the HLO observed that there were no people near the helicopter that might endanger the unloading process. The HLO then unloaded the cargo from the cargo door, which was located on the left side of the helicopter.
7. The pilot waited inside the helicopter while the rotor blades were still running and observed several local residents stood about 40 meters in front of the helicopter, watching the unloading process.
8. During the unloading process, there was a customer standing on the left side of the HLO. The HLO's attention was further directed towards the front and sides of the helicopter, where the primary unloading activities were taking place and where the customer stood by.
9. Neither HLO, the customer, nor the pilot monitored any movement on the rear of the helicopter.
10. The absence of access restriction to the landing spot without anyone monitoring the rear area of the helicopter had made a resident who might not be aware of the tail rotor rotation manage to approach the helicopter too close to the tail rotor.
11. When HLO unloaded the cargo, the HLO heard a loud sound from the rear section of the helicopter. The HLO looked to the source of the sound and saw a person has laying on the ground. About the same time, the HLO noticed that the customer ran away from the helicopter followed by several residents who were standing in front direction of the helicopter.

12. The HLO thought that a dangerous security situation was unfolding as several people ran away from the helicopter. Thereafter, the HLO went to the helicopter and advised the pilot to take off immediately.

13. The pilot, who was also aware of the assumed security issue, decided to take off momentarily after the HLO went to the helicopter.

14. The BAGGAGE DOOR caution light illuminated during the flight as the HLO has not closed the baggage door. Afterward, the HLO advised the pilot that he saw a person laying on the ground and concerned about their security. The pilot then decided to return to Iwot Helipad as there was no other abnormal indication of the helicopter system.

15. The person who laid on the ground was a local resident who approached the helicopter with intention to ask to get onboard. The local resident impacted the tail rotor blades and was fatally injured.

16. Both tail rotor blades were damaged. The visual inspection after the accident identified that the tail rotor driveshaft and flexible coupling discs were normal. The inspection also did not find any debris on the magnetic chip detector.

17. The Carpediem Operation Manual (OM) Part B subchapter 1.12.1 described that access to any helipad should be restricted to those personnel directly involved with helicopter operations. Where possible the area should be fenced to restrict public access. During all helicopter operations, the movement control of people and cargo should be managed by Helicopter Loadmaster.

18. The aircraft operator did not assign a helicopter loadmaster as the flight operation was conducted using a pilot self-dispatch system. In terms of controlling people's movement, the aircraft operator assigned one HLO on board the helicopter.

19. According to the OM Part A subchapter 2.6.4, besides assisting the unloading cargo, the HLO also responsible for the safe and efficient of all ground operational elements.

20. The aircraft operator had conducted Hazard Identification and Risk Assessments (HIRA) prior to operate Bell 206 L4 helicopter in Papua area.

21. The HIRA had identified people near aircraft as a hazard with associated risk of injury or fatality to the people and aircraft damage. The mitigation action to reduce that risk was to acquire ground personnel assistance to monitor the people's movement and ensure that all movement was within the pilot's sight.

22. The determined mitigation actions from the HIRA were not transposed into detailed procedures nor guidance for pilot and/or HLO. This condition made the hazard of people movement during helicopter operation at Kampung Kawe not mitigated properly, increasing the risk of people being seriously injured.

3.2 Contributing Factors

Contributing factors are defined as actions, omissions, events, conditions, or a combination thereof, which, if eliminated, avoided, or absent, would have reduced the probability of the accident or incident occurring, or mitigated the severity of the consequences.

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

The KNKT concluded that the contributing factors as follow:

The absence of access restrictions to the landing spot without movement’s monitoring of the helicopter rear area allowed a resident, who may have been unaware of the tail rotor's rotation, to approach the helicopter.

4 SAFETY ACTION

At the time of issuing this report, the KNKT had been informed of any safety actions taken by the aircraft operator resulting from this occurrence.

On 6 December 2022, the aircraft operator issued safety notice to all pilots, engineers, HLO and support personnel which highlighted the danger of the rotating tail rotor. The notice included reminders as follows:

- Increase the supervision of human and material traffic around the Tail Rotor, ensuring that the Tail Rotor area is clear of obstacles or any personnel.
- Always approach and leave the helicopter from or toward the front, in the pilot's view, and only after receiving a safety signal (clearance) from the pilot.
- Do not approach or leave the helicopter from a surface that is higher than the helipad.
- Observe the area before takeoff and landing to ensure there is no potential movement of personnel from the rear of the helicopter.
- Ensure that the helicopter is parked in such a way that the tail is in an area inaccessible to people.
- If possible, approach or leave the helicopter after the rotors have come to a complete stop.

On 13 December 2022, the aircraft safety notice to all pilots, engineers, HLO and support personnel. The notice included a reminder for all mentioned personnel to always allocate sufficient time for thorough planning before conducting operations. Well-planned ahead, so that all potential hazards can be identified, allowing for proper risk assessment, decision-making, and mitigation steps. Good planning can make the task three times easier or faster. Avoid time pressure, peer pressure, and customer pressure.

On 27 December 2022, KNKT issued safety recommendations to the aircraft operator as follows:

04.O-2022-18.01

Carpediem Operation Manual (OM) Part B described that access to any helipad should be restricted to those personnel directly involved with helicopter operations. Where possible the area should be fenced to restrict public access. During all helicopter operations, the movement control of people and cargo should be managed by Helicopter Loadmaster.

The Carpediem Air did not assign Helicopter Loadmaster. In terms to control people and cargo movement, the company assigned one Helicopter Landing Officer (HLO) on board the helicopter.

During the accident, the HLO did not aware of the local resident movement near the tail rotor as he was performing the cargo unloading which made the task of people movement was unable to be controlled properly.

Therefore, KNKT recommends the Carpediem Air to review the method for ensuring that the people movement could be controlled properly.

Responding to the safety recommendation, the aircraft operator issued operational memo addressed to all helicopter pilot which requires pilot to analyze and supervise the safety and security of the people and cargo movement from and or to, within the helicopter dangers area. If there were no sufficient company personnel available during ground handling activities while helicopter engine is running, the pilot is required to ask the available personnel such as site leader person to act as watchers in the danger zone that is invisible by pilot (i.e., tail rotor or rearward area), and any area as necessary.

04.O-2022-18.02

Carpediem Safety Management System Manual (SMSM) described several conditions which required a risk assessment, including when the company open new route structure. The Carpediem Air has conducted hazard identification and risk assessment (HIRA) for Bell 206 L4 helicopter operation in Papua area. The process identified several hazards including people's safety on and around helicopter. The mitigation for the hazard included to obtain all possible ground personnel assistance and to ensure all people movement were within pilot's sight.

The landing spot at Mining 1 was unpaved road which connected houses in the settlement area at M1 which potentially generates people movement from behind and front of the helicopter. The people movement behind the helicopter is considered hazard as the movement was outside pilot's sight. In addition, there was no ground personnel available at M1 except the HLO on board the helicopter to ensure all people movement were within pilot's sight. Based on those conditions, the mitigations for the identified hazard for helicopter operation in Papua area was not sufficient to mitigate the hazard at M1.

Therefore, KNKT recommends the Carpediem Air to conduct hazard identification and risk assessment (HIRA) for specific route of flight operation for ensuring the hazard can be identified and mitigated properly.

Responding to the safety recommendation, the aircraft operator reminded the safety department to implement hazard identification and risk assessment (HIRA) for specific route of flight operation as required by the Safety Management System Manual (SMSM). On 7 February 2023, the aircraft operator performed HIRA for Bell 206 helicopter operation to landing site Mining 1, Kawe, Papua.

5 SAFETY RECOMMENDATIONS

The KNKT acknowledges the safety actions taken by PT Carpediem Aviasi Mandiri (Carpediem Air) and considers them not relevant for improving safety. Therefore, the KNKT issued safety recommendations to address the safety issues identified in this report for Carpediem Air. The safety recommendations are intended to prevent accidents or incidents and are not meant to create a presumption of blame or liability for the occurrence.

5.1 PT Carpediem Aviasi Mandiri (Carpediem Air)

04.O-2022-18.03

The aircraft operator had conducted Hazard Identification and Risk Assessments (HIRA) prior to operating Bell 206 L4 helicopter in Papua area and considered that the HIRA has represented the flight operation of Bell 206 B3 helicopter to M1.

The HIRA had identified people near aircraft as a hazard with associated risk of injury or fatality to the people and aircraft damage. The mitigation action to reduce that risk was to acquire ground personnel assistance to monitor the people's movement and ensure that all movement was within the pilot's sight. The determined mitigation actions from the HIRA were not transposed into detailed procedures nor guidance for pilot and/or HLO. This condition made the hazard of people movement during helicopter operation at Kampung Kawe not mitigated properly, increasing the risk of people being seriously injured.

Therefore, KNKT recommends the aircraft operator to ensure the determined mitigation actions from the HIRA are implemented properly.

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