AIRCRAFT ACCIDENT FINAL REPORT

A 04/15P

Air Accident Investigation Bureau (AAIB)

Ministry of Transport Malaysia

Helicopter Bell 206B III, Registration 9M-LLM

at Kota Kinabalu International Airport, Kota Kinabalu, Sabah

on 28 May 2015

Air Accident Investigation Bureau
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Issued On 09 March 2017

AIR ACCIDENT INVESTIGATION BUREAU (AAIB)
MALAYSIA

REPORT NO.: A 04/15P

OPERATOR	**: LAYANG-LAYANG HELICOPTER ACADEMY**
AIRCRAFT TYPE	**: BELL JETRANGER III**
MODEL	**: B 206 B III**
NATIONALITY OF AIRCRAFT	**: MALAYSIA**
REGISTRATION	**: 9M-LLM**
PLACE OF OCCURRENCE	**: KOTA KINABALU INTERNATIONAL AIRPORT KOTA KINABALU, SABAH**
DATE AND TIME	**: 28 MAY 2015 AT 1151 LT**

The sole objective of the investigation is the prevention of accidents and incidents. In accordance with Annex 13 to the Convention on International Civil Aviation, it is not the purpose of this investigation to apportion blame or liability.

All-time in this report is Local Time (LT) unless stated otherwise. LT is UTC +8 hours.

INTRODUCTION

The Air Accident Investigation Bureau of Malaysia

The Air Accident Investigation Bureau (AAIB) is the air accident and serious incident investigation authority in Malaysia and is responsible to the Minister of Transport. Its mission is to promote aviation safety through the conduct of independent and objective investigations into air accidents and serious incidents.

The AAIB conducts the investigation in accordance with Annex 13 to the Chicago Convention and Civil Aviation Regulations of Malaysia 2016.

It is inappropriate that AAIB reports should be used to assign fault or blame or determine liability since neither the investigation nor the reporting process has been undertaken for that purpose.

Unless otherwise indicated, recommendations in this report are addressed to the investigating or regulatory authorities of the State having responsibility for the matters with which the recommendations are concerned. It is for those authorities to decide what action is taken.

TABLE OF CONTENTS

SYNOPSIS

The helicopter had hover-taxied from Layang Layang Helicopter Academy (LLHA) hangar to helipad marker 'H' adjacent to Kota Kinabalu threshold runway 02, to position it for the solo circuit flying. It landed on marker 'H' uneventfully.

While hovering to prepare for take off at runway 02, the student pilot scanned the instrument panel for temperatures and pressures to be within limits. Suddenly she noticed the rotor RPM (Nr) and free power turbine RPM (Nf) indicators were splitting and reducing. She was uncertain of the throttle position and was more focus to ensure that the throttle was in fully opened position. She became distracted and the helicopter started to drift to the right and started to loose height. She did not notice that the helicopter had descended too low until the right rear skid hit the ground. The helicopter subsequently banked to the right and the main rotor blades struck the ground. She closed the throttle and the helicopter crashed to the right side near the helipad.

The helicopter main gearbox had detached from the fuselage and the main rotor blades had disintegrated as a result of the impact. The tail boom structure had buckled and was severely damaged. The student pilot escaped by breaking through the front windshield and had minor injuries. There was a post impact fire around the fuselage baggage compartment and aft fuselage areas. The helicopter was subsequently destroyed by fire to beyond repair.

1.0 FACTUAL INFORMATION

1.1 History of the flight

On 28 May 2015, a female student pilot was cleared for a solo flight after being assessed by her instructor for 1 hour in the morning. After conducting a satisfactory external check, the student pilot did a start up at 1130 LT and engaged the rotors to 100 percent with temperature and pressure in the normal condition. The helicopter had lifted off from Layang-Layang Helicopter Academy (LLHA) hangar and hover- taxied to the Helipad Marker H adjacent to threshold runway 02. It landed on the Marker H unevenfully. (Refer Figure 1 below for the flight path to Marker H).

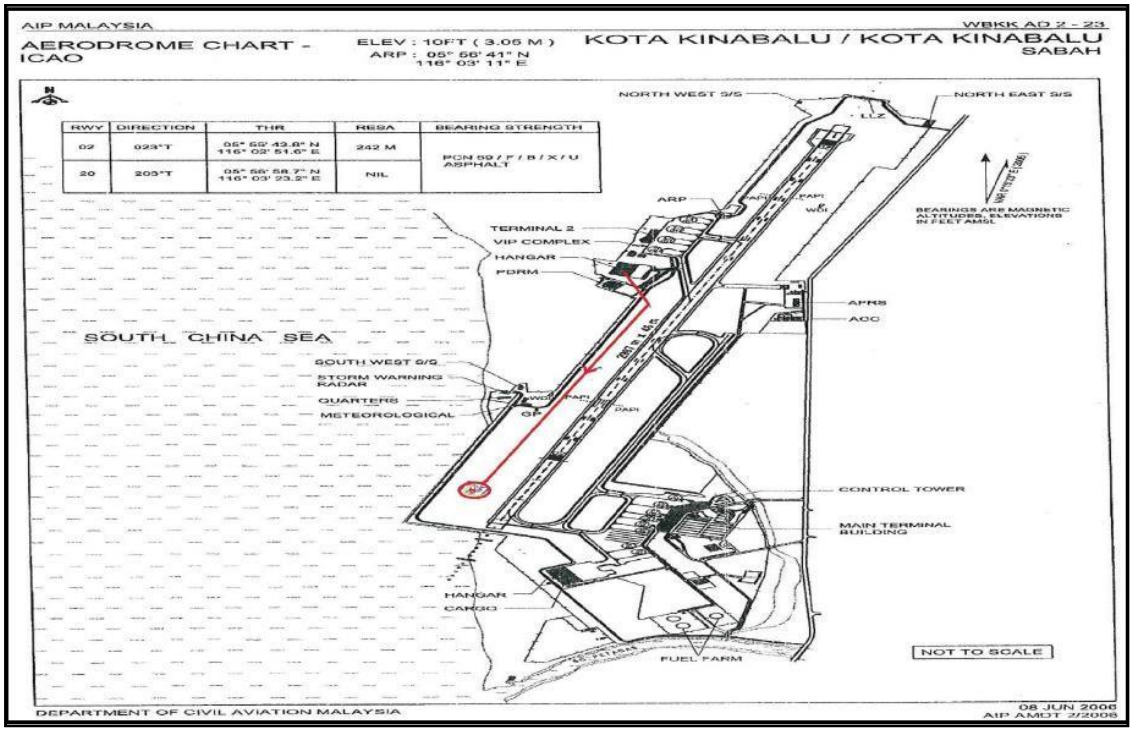

Figure: 9M-LLM hover taxi route from hangar to marker H

The helicopter was taken back to hover for circuit flying. After performing a pretake-off check and brought the helicopter to a hover; and while attempting a clockwise spot turn to position the helicopter for a take-off on runway 02, she noticed, while scanning the instruments panel, the dual tachometer Nr/Nf were splitting and decreasing.

She claimed that the throttle was not in a fully opened position and immediately tried to open the throttle to a fully opened position. Meanwhile, the helicopter was not maintaining a steady hover and it started to loose height and caused it to drift to the

right. The helicopter descended unchecked until the right skid hit the ground. The excessive right bank of the helicopter had caused the main rotor blades to strike the ground and subsequently causing it to topple to the right and crashed near the helipad.

The main rotor blades had disintegrated upon impact with the ground and had caused the main gearbox to detach from the fuselage structure. The impact had caused the tail boom to buckle and broken off from the main fuselage body.

The helicopter had post impact fire starting from the baggage compartment area and spread towards the passenger cabin. The pilot escaped by breaking through the front windshield and had minor injuries. The helicopter had extensive damaged beyond repair.

1.2 Injuries to persons

Injuries	Crew	Passenger	Others
Fatal	Nil	Nil	Nil
Serious	Nil	Nil	Nil
Minor	Nil	Nil	Nil
None	2	Nil	Nil

1.3 Damage to aircraft

The helicopter was totally damaged and caught fire.

1.4 Other damage

Nil.

1.5 Personal information

1.5.1 Pilot

Age	59 years old
Gender	Male
Licence Type	ATPL/H 1502

Medical Examination	31 May 2015
Aircraft Rating	Bell 206 B
Certificate of test valid until	09 June 2014
Instructor Rating valid until	08 January 2017
Flying Experience	Total helicopter hours: 9,969 hours Total type: 2,310 hours Instructional all type: 1,447 hours

1.5.2 Student Pilot

Age	21 years old
Gender	Female
Licence Type	SPL 12522/H
Medical Examination	17 October 2014
Aircraft Rating	SPL
Certificate of test valid until	Nil
Instructor Rating valid until	Nil
Flying Experience	Fixed wing total hours: 270 hours Rotary Dual : 31:00 Hours Solo: 0.4 Hours

1.6 Aircraft information

Aircraft Type	Bell Jet Ranger III
Aircraft Model	B206 B III
Aircraft Serial No.	3488
Aircraft Registration	9M-LLM
Year of Manufacture	September 1981
Airframe Hours	6,492.7 hours
Engine Type	Allison 250-C20B
Engine Serial No.	CAE-833211
Engine Total Time	11,975.3
Engine Cycle Since New	12,775

Certificate of Airworthiness Valid	05 September 2015
Certificate of Registration issued	29 June 2011
Last CMR issue	02 March 2015
Last CRS-SMI Issue	29 August 2014
Owner	Layang Layang Helikopter Academy Sdn. Bhd
Operations	Training
Certificate of Approval Number	M1430
Certificate of Approval valid until	05 September 2015

1.7 Meteorological information

Weather is not the main factor on this accident. The forecast weather report as follows:

METAR WBKK 280330Z 27003KT 9999 FEW015 BKN 290 34/25
Q1010 NOSIG RMN F02 P00.0 R56=
METAR WBKK 280400Z 27003KT 9999 FEW 015 BKN 290 34/25
Q1009 NOSIG RMN F02 P00.0 R56=

1.8 Aid to navigation

Nil.

1.9 Communication

The Student Pilot was in positive communication with Kota Kinabalu tower on VHF frequency 121.6 Mhz from the start up at Layang Layang hangar to the last transmission before she was ready for lift off for Marker H at 1143 LT. It crashed shortly after that last radio communication when the helicopter arrived at Marker H.

1.10 Aerodrome information

The helipad is measured 40 feet by 40 feet in dimension with a layer of hard tarmac. It has a yellow circle for the helicopter to land and has been in operation for several years. The picture of the Helipad is as per Figure 2 below.

Figure 2: Helipad

1.11 Flight recorders

There is no flight recorder fitted to this helicopter.

1.12 Wreckage and impact Information

The helicopter crashed close to the helipad Marker H. The tail boom was severely bent towards the tail rotor section and almost broken off at the aft fuselage attachment section upon impact with the ground. The main rotor blades struck the helipad and broke into several pieces. The main rotor head had sheared off from its main mast indicating high energy rotation. The main gearbox was detached and flung about 10 meters away from the main wreckage. The engine was removed and sent to Heli Holland Technics for tear-down examination.

Figure 3: Collective lever and throttle position

Figure 4: Fuselage rested on its right side

Figure 5: Tail rotor and tail boom condition

Figure 6: Wreckage from the tail

Figure 7: Fire started from the baggage compartment

Figure 8: Helicopter instrumentations

Figure 9: The main gear box detached from the fuselage

Figure 10: Main rotor broken off due to high rotor energy

Figure 11: Main rotor blades damage

Figure 12: Close look at the main rotor blade tips

1.13 Medical information

The Student Pilot sustained a minor injury.

1.14 Fire

There was post impact fire which destroyed the aft baggage compartment, upper and aft fuselage area.

1.15 Survival aspects

The accident was survivable.

1.16 Test and research

The dual tachometer P/N 206-075-681-3 and S/N T1722 was removed from the wreckage and tested on 9M-LLH helicopter during an engine run and hover check on 9 June, 2015. The tachometer was found to function normally.

1.17 Organisational and management information

Not a factor to this accident.

1.18 Additional information

Nil.

1.19 Useful or effective investigation techniques

Nil.

2.0 ANALYSIS

2.1 Introduction

On 28 May 2015, the helicopter Bell 206 B bearing registration 9M- LLM was on a training flight. It was a solo training flight with a female student pilot (SP) on board. She was a young lady doing her basic ab- initio training for her Commercial Pilot Licence (CPL) on helicopter. She had a Philippines CPL on aeroplane with 250 hours of aeroplane experience. She joined Layang Layang Helicopter Academy on 24 May 2014 to continue her flight training. She had accumulated 13 hours of training on Bell 206B helicopter and did her first solo flight on 12 February 2015.

Her training record shows that there was no flying activity from 12 February 2015 until 27 May 2015. She only did a dual flight for a duration of one hour. The dual flight on the 27 May 2015 was an average sortie but the instructor gave her a remark of ‘a little stiff on the controls. She was then scheduled for another dual sortie before she could go for the second solo flight. The dual sorties were carried out on 28 May 2015 from 0825 LT to 0925 LT. The flight was satisfactory and the SP was ready for the second solo circuit flight.

The Instructor was monitoring the solo flight from Layang Layang hangar by using a portable VHF radio and listening on Kinabalu ground and subsequently the tower frequency at all times during the solo flight.

2.2 The accident flight

The SP started the engine and engaged the rotors. After completing the pretake-off check, the helicopter was brought to a hover at LLH dispersal and hover-taxied to helipad Marker H and landed there uneventfully. Acccording to the SP, she had to wait for approximately two minutes on ground to allow for one aeroplane on final to land before she picked up the helicopter to hover. She did her hover check and made a 180 degrees turn to face runway 02 for take off. At that juncture, she noticed the rotor Revolution Per Minute (Nr) was reducing and the free power turbine (Nf) needles were splitting and appeared to be reducing further. The splitting of the Nr and Nf needles had prompted her to check the throttle position again. Meanwhile her focus was on the instrument indications and as she turned the helicopter on its spot to a clockwise direction, the helicopter had moved sideway to the right. The pilot claimed that she was focussing on the throttle position and had tried to open the throttle. Under that circumstances, she did not realise that the helicopter was drifting to the right and loosing height. The helicopter right skid hit the ground and banked excessively to the right. The main rotor blades struck the ground and the helicopter toppled to the right. Unconsciously, she closed the throttle to the idle position. This was consistent with the throttle position upon inspection at the wreckage site. She could not remember the sequence clearly and the investigation believed that at this juncture, the pilot was in a state of panic and was not able to maintain the helicopter in a steady hover. The helicopter had descended unchecked to the ground with excessive right bank and consequently, had caused the right aft skid to hit first and followed by the main rotor blades striking the ground. The helicopter crashed and rested on its right side not far from the helipad. She managed to exit the helicopter by breaking through the front perspex windshield with minor injuries. The helicopter main gearbox had completely separated from the main rotor shaft. The high energy impact had caused the severed main rotor head coupled with a portion of the damaged rotor blades to fling within 100 metres of the helicopter wreckage. There was a post impact fire which could have initiated from the fuel leakage and had spread from the baggage compartment area to the aft fuselage and forward tail boom area. The tail rotor shaft had sheared from the transmission gear box. The impact had almost broke the tail boom from the aft fuselage.

2.3 Engine bench test report.

The Allison 250-C20B engine of Serial Number CAE 833211 was taken to Heli-Holland Technics for a tear down inspection after the accident. The report revealed that the 1st Stage, 2nd Stage and 3rd Stage, 4th Stage, 5th Stage and 6th Stage compressor wheels had evidence of damage to the vanes due to FODs. Visual inspections on No. 1, No. 2, No. 3 and No. 4 Nozzles revealed nil damage. The visual inspection on No. 1, No. 2, No. 3 and No. 4 Turbine wheels also revealed nil damage. The No. 1 and No. 2 bearings were also visually inspected and revealed no cause of failure. Chip plugs were inspected, cleaned and found satisfactory. The engine to freewheel coupling was seriously damaged. This indicates that there was power on the engine output shaft during the accident. The FOD damage is another indication that the engine was running during the impact.

3.0 CONCLUSIONS

3.1 Findings

3.1.1 The helicopter was properly maintained and airworthy to fly for VFR training sortie.

3.1.2 The student pilot was properly licensed and appropriately satisfactory to undertake a solo flight.

3.1.3 The instructor pilot was properly licensed and experienced to conduct the instructional flight.

3.1.4. The helicopter did not show any abnormality in its performance from the previous flight. The engine and main rotors were with power when the accident happened.

3.1.5 The student pilot admitted that she was concentrating on the throttle position after noticing the Nr/Nf needles started to split causing the helicopter to drift and descend with right bank unchecked and consequently causing the main rotor blades to strike the ground.

3.1.6 The student pilot was not able to stabilise the throttle position during hover as she was new on type and did not perform the Engine Off Landing technique properly.

4.0 SAFETY RECOMMENDATIONS

4.1 The DCA is to ensure that the teaching technique in handling throttle opening and closing procedure to be correctly applied for trainee student pilot at the Flying Training School.

4.2 Flying Training School should not lay off student pilot for too long before the subsequent training flight involving solo flying.

INVESTIGATOR-IN-CHARGE
Air Accident Investigation Bureau
Ministry of Transport