

**PRELIMINARY
AIRCRAFT ACCIDENT REPORT
30 APRIL 2015**

**EUROCOPTER DAUPHINE AS365 N3, REGISTRATION 9M-IGB
CRASH AT KG. SUNGAI PENING-PENING, SEMENYIH, SELANGOR
MALAYSIA
04 APRIL 2015**



**AIR ACCIDENT INVESTIGATION BUREAU OF MALAYSIA
MINISTRY OF TRANSPORT
MALAYSIA**

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1. 9M-IBG track (flight path) from Pekan to Muadzam Shah and crash site
2. Pictures - approach path for landing at school football field
3. Pictures - close look at the landing point
4. Pictures - Left wheel landing hole
5. Pictures - crash site

The Air Accident Investigation Bureau of Malaysia

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

The AAIB conducts the investigations in accordance with Annex 13 to the Chicago Convention and Civil Aviation Regulations of Malaysia 1996.

In carrying out the investigations, the AAIB will adhere to ICAO's stated objective, which is as follows:

“The sole objective of the investigation of an accident or incident shall be the prevention of accidents and incidents. It is not the purpose of this activity to apportion blame or liability.”

Accordingly, 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.

INTRODUCTION

PRELIMINARY AIRCRAFT ACCIDENT REPORT

Aircraft Type : Eurocopter Dauphine

Model : AS 365N3

Operator : Orion Corridor Sdn. Bhd.

Nationality : Malaysian

Year of Manufacture : 1990

Aircraft Registration : 9M-IGB

Serial Number: : 6374

State of Registration : Malaysia

State of Operator : Malaysia

Place and State of Occurrence : 40 Nautical Miles West of Subang Airport, MALAYSIA (N 03 00.64 E101 51.19)

Date and Time of Accident : 04 April, 2015 at 1652 hours (Local Time)

All times in this report are Local Time (LT) (UTC + 8 hours).

This report contains a statement of facts which have been determined up to the time of issue. It must be regarded as tentative, and subject to alteration or correction if additional evidence becomes available.

This investigation is carried out to determine the circumstances and causes of the accident with a view to the preservation of life and the avoidance of accident in the future: It is not the purpose to apportion blame or liability. (Annex 13 to the Chicago Convention and Civil Aviation Regulation 1996).

SYNOPSIS

On the 4th April 2015, a Dauphine helicopter, AS365 N3 bearing registration 9M-IGB was on a private flight carrying 7 passengers from Pekan, Pahang at 1540 LT to Muadzam Shah. The flight was to transport the passengers who had attended a series of meetings and wedding reception at Pekan. It landed Muadzam Shah at 1600 LT with engine shut down for approximately 10 minutes. It then flew towards South Westerly direction with intention to land at Bandar Tun Razak with the same number of passengers on board. While enroute, it started to rain at the destination. Due to the weather condition, a decision was made by one of the passengers not to continue to the destination; however, they decided to proceed direct to Subang. Since one of the passengers had to stay back at Muadzam Shah, the helicopter executed a landing at an unplanned landing point, a football field along the main road to off load him. While landing at the football field, the left landing gear suddenly sunk into the ground. The pilot subsequently maneuvered the helicopter to a hover, and repositioned it about 10 meters forward. One passenger disembarked from the right passenger door and the helicopter took-off from the field on westerly heading enroute to Subang airport. With 6 passengers onboard, it climbed to 2,000 feet. After passing Kuala Klawang, the helicopter made a radio call and started to descend to 1,500 feet. According to an eye witness report on ground, he saw the helicopter suddenly making a steep dive and crashed into a rubber trees plantation.

A pilot of another helicopter, an EC155, flying from the south, who was earlier in communication and on visual contact with the ill-fated helicopter, saw it entering into a steep dive to the ground followed by black smoke. The helicopter altitude based on the TCAS of EC 155 was estimated to be at approximately 1,700 feet. Upon observing the helicopter had crashed to the ground, the pilot of the EC155 made a radio call on the operating frequency and informed the sighting to Lumpur Information. There was no distress call made by the crew of the ill-fated helicopter on any of the operating frequency.

Several witnesses on ground also claimed that they heard a loud noise from the helicopter followed by steep descend to the ground. The helicopter crashed into a ravine and caught fire. All occupants were fatally injured.

The Chief Inspector of Accident was informed immediately of the accident. An Investigation team was appointed by the Minister of Transport which comprise of 9 members headed by Captain Dato Yahaya bin Abdul Rahman as the Investigator-In-Charge. The investigation begun at the crash site on the 5th April, 2015.

The investigation is assisted by BEA, France as Accredited Representative. The Air Accident Investigation Branch of the United Kingdom was involved in the downloading of the CVR/FDR.

1. FACTUAL INFORMATION

1.1 History of the flight.

A privately owned helicopter, AS365 N3, registration 9M-IGB departed Subang Airport on the 2nd April, 2015 at 1815 LT for Tanjung Gemok, Rompin, Pahang, with a pilot and 3 passengers on board. From Tanjung Gemok, the pilot and a lady passenger departed for Lanjut, Pahang and arrived at 1930 LT for an overnight stay.

(For easy reference of this report, the subsequent helicopter registration will be termed as IGB).

On the 3rd April, 2015, at 0902 LT, IGB departed Lanjut with the pilot and a lady passenger on board. It flew to Tanjung Gemok to pick up 3 passengers and then to Muadzam Shah. It stayed on ground at every location for approximately 15 minutes and departed for Kuantan Airport at 1510 LT. It arrived Kuantan Airport at 1532 LT. After disembarking the passengers, it departed Kuantan Airport with 2 passengers on board, the pilot and a lady passenger departed for Kerteh, Trengganu. At Kerteh, the crew refuelled the helicopter with 935 liters of aviation gasoline. It flew back to Kuantan airport and landed at 1700 LT for a night stop.

On the 4th April, 2015, it departed Kuantan airport at 1141 LT with the same pilot and a lady passenger enroute to Pekan. The short flight to Pekan was to pick up passengers for onward flight back to Subang. It landed Pekan at 1213 LT and stayed on ground for more than 3 hours. The 5 joining passengers boarded the helicopter with the lady passenger occupying the front left seat. It departed Pekan at 1540 LT for Muadzam Shah. The flight was uneventful and on arriving Muadzam Shah, one of the passengers suggested to land at an area near an abandoned factory for 5 minutes to 10 minutes. The engines and rotors were shut down to allow the passengers to disembark to view the abandoned factory building. At 1605 LT, all the 6 passengers boarded the helicopter, with the pilot occupying the front right seat and the lady passenger occupying the front left seat.

The helicopter departed Muadzam Shah at 1610 LT with 7 persons on board. Initially it was flying towards a south westerly heading to a town called Bandar Tun Razak in Rompin. The Cockpit Voice Recorder (CVR) information revealed that after getting airborne, one of the passengers was not happy with the weather condition en-route to the destination. On several occasions, he was suggesting to the pilot to proceed direct to Kuala Lumpur; however, after a short discussion, they agreed to off load one of the passengers at any open field along the way. While flying along the road, they spotted a football field and execute an approach for a landing. During the final approach, there was silence in the intercom until the helicopter was getting close to the ground for the landing. Upon landing, the CVR picked up a loud “thud” sound which alerted the passengers. One of the passengers commented in the intercom

system by saying 'watch out' twice. The pilot was uncertain on the landing gear position by saying "why my landing gear... is it down? I got three in the green, I am little nervous about this now, let me see it". The lady passenger was heard in the intercom saying "it's ok.. it's a... the dirt at the back... its ok...". The lady continues "wheel went into the ground..., it's a soft ground there.. after the rain .. we are good, we are good.. yes.. yes.. yes, we are good; it's a soft ground there.. after the rain.. it's the field... it's the football field. The pilot then commented "wow... that was crazy".

According to a witness statement, he saw the helicopter left wheel sunk into the ground and the helicopter tilted to the left. Shortly afterward, the helicopter was seen to take off to a high hover and repositioned it approximately 10 meters to the front of its last position. One passenger disembarked the helicopter while both engines were still running and exited via the right door escorted by the pilot. Shortly afterward at 1625 LT, the helicopter took off from the field. As it climbed to a cruising altitude, the lady passenger commented through the intercom "Don't worry, we absolutely safe". The lady passenger reminded the pilot "shall we collapse our gear" and the pilot responded "no.. no.. no.. leave it down, there is probably some damage to the hydraulic or something" The pilot said "we went all the way to the belly, its not good". He further said "its definitely not normal for the wheels go down into the ground that far". It's definitely not good to tip like that". He said "as a matter of fact, I saw hydraulic fluid leaking and that's why I don't want to put them up". They are locked in the down position and we keep them locked in the down position".

At 16:31 LT, a radio call to Lumpur Information on frequency 126.1 Mhz was made by the pilot that he had passed Muadzam and Bandar Tun Razak, tracking for Kuala Klawang at 2,000 feet and below with 6 persons on board and endurance of 1 hour 45 minutes.

At the same time, there was another helicopter 9M-DBI, EC155 flying from Johor Bahru to Subang. There was communication between the two pilots to maintain a safe separation.

At 16:52 LT, IGB disappeared from the radar screen and at 16:54 LT, 9M-DBI made a radio call to Lumpur informing that IGB had crashed.

9M-DBI Pilot reported that he saw visually IGB make a steep dive and crashed into rubber trees followed by black smoke.

From the Air Traffic Control record, there was no distress call made by the pilot on any operating radio frequency.

The helicopter was found crashed in a ravine at a rubber plantation, Kampung Sungai Pening-Pening, Semenyih approximately 40 nautical miles to the west of Subang Airport. All the 6 occupants were fatally injured.

1.2 Injuries To Persons

Following are the numbers and the injuries to the crew and passenger:

Fatality	Crew	Passenger
6	1	5

1.3 Damage To Aircraft

The helicopter was destroyed due to high impact and consumed by post crash fire.

1.4 Other Damages

Nil

1.5 Personnel Information

a) The following are pertinent information concerning of the flight crew.

Status	Commander
Nationality	American
Age	47 Years old
Gender	Male
Licence Type	CPL 2762/H
Medical Examination	Valid until 31 September 2015
Aircraft Rating	R22, R44, R66, AS 365N3
Certificate of test	4 November 2014
Instructor Rating	R44 & R66
Flying Experience	Total flying : 2,487:07 Hours Total on type: 188 Hours

1.6 Aircraft Information

1.6.1 Aircraft Maintenance History

Helicopter Registration	-	9M-IGB
Helicopter Serial Number	-	6374
Engine No. 1 Serial Number	-	24477
Engine No. 2 Serial Number	-	24479

Certificate of Registration - M1714
Certificate of Airworthiness: - M1475

The helicopter maintenance was carried out by Airbus Helicopters Malaysia Sdn. Bhd. based in Subang Airport.

The last Certificate of Maintenance Release to Service – Schedule Maintenance Inspection (CRS-SMI) was issued on 20th January, 2015.

Aircraft Last check : 1 year and 6 months inspection,
Airframe Hours : 6,331:04
Engine No. 1 Hours : 437.04
Engine No. 2 Hours : 437.04

Last Certificate of Maintenance Review (CMR No: 554) was carried out on 7th January, 2015

1.6.2 Weight and Balance

The helicopter weighing check was carried out on 31st May, 2012 after a major interior modification to install the VIP seats at the Airbus Helicopter hangar at Subang Airport. The aircraft Weight Schedule, dated 8th June, 2012 was reviewed with the following pertinent details.

Basic Empty Weight (BEW) of 2,791.50 kg.
Centre of Gravity (C of G); Longitudinal 4.153 meter and Lateral -0.0025 meter
Weight limitations (maximum authorised weight in flight) are 4,300 kg.

This indicates the weight and balance of the aircraft was within the allowable limits.

1.6.3 Fuel

The helicopter was refuelled at Petronas Kerteh station on 3rd April, 2015. Amount up-lifted 935 Litres.

1.7 Meteorological Information

1.7.1 METAR REPORT

Based on the weather information and observation, there was group of rain clouds forming in the northern part of the accident location. There were clouds moving toward the southwest (west location of the accident) with increasing intensity after 5pm.

Based on radar echoes, cloud group does not have high intensity before 5pm. Cumulonimbus large cloud with high intensity seems more concentrated in the western state of Johor, southern Pahang, Kuala Lumpur Federal Territory and part of Selangor in district of Petaling and Klang.

1.8 Navigation Aids

Not applicable.

1.9 Communication

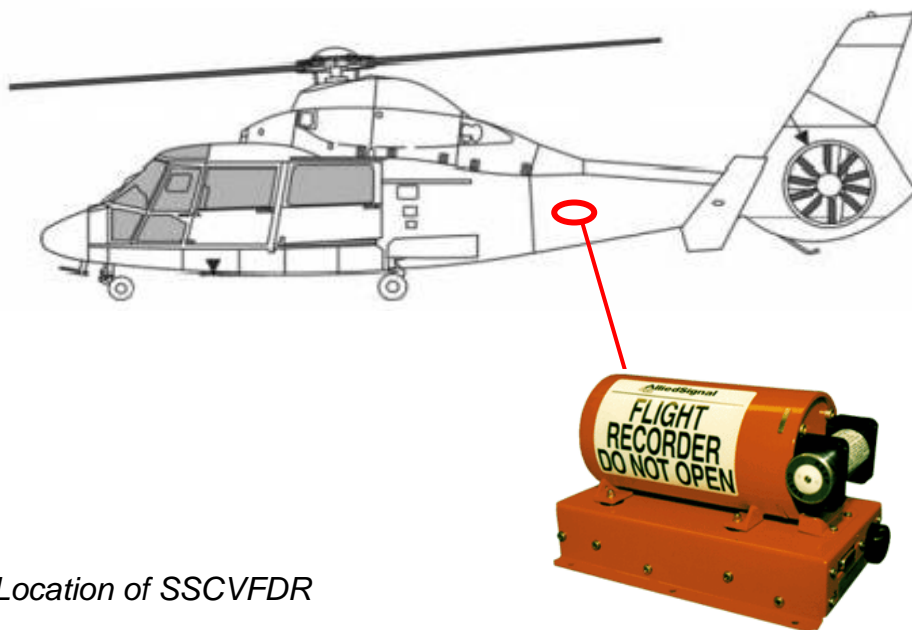
To be incorporated later.

1.10 Aerodrome Information

To be incorporated later.

1.11 Flight Recorders

1.11.1 The helicopter was equipped with Solid State Combination Cockpit Voice and Flight Data Recorder (SSCVFDR) model Honeywell AR-204C. The SSCVFDR is located on the rack at the left hand shelf behind the baggage compartment.



Location of SSCVFDR

The voice recorder of this SSCVFDR has a recording capacity of at least 120 minutes (two hours) and capable of recording 3 crew channels and 1 area microphone channel. It keeps this audio in a solid state memory.

The flight data recorder of this SSCVFDR has a recording capacity to record 25 hours of flight data information at rate of 256 words per seconds.

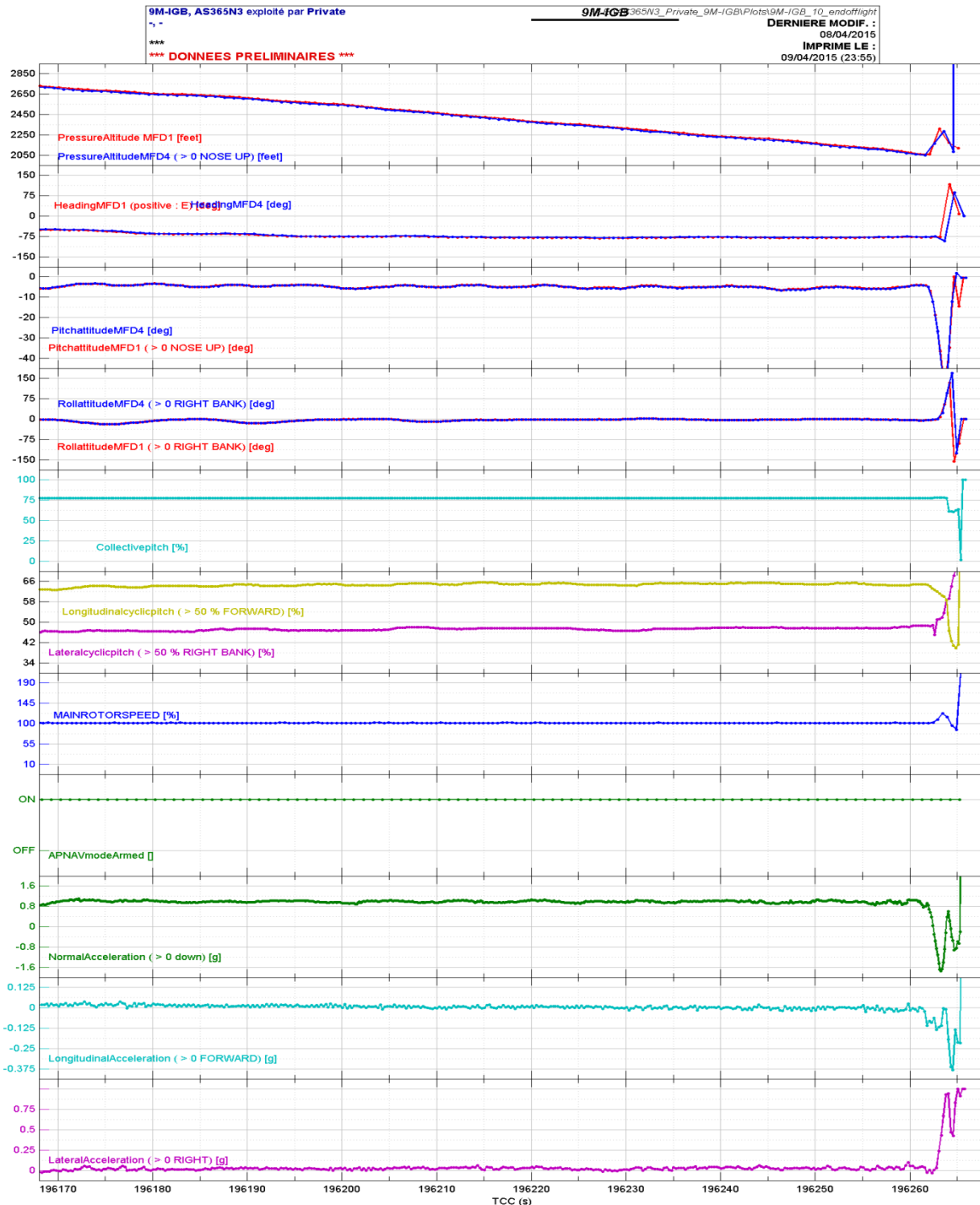
1.11.2 Details of the SSCVFDR installed and specifications are as follows:

Manufacturer	: Honeywell
Model	: AR-204C
Part Number (P/N)	: 980-6021-066
Serial Number (S/N)	: 12129
Date last installed on aircraft	: 9 January 2015
Weight	: 4.2 Kg (9.2 lbs)
Power Supply	: 28VDC
Impact Shock	: 3400 G for 6.5 ms
Fire Temperature	: Max 1100°C (60 min)
Deep Sea Pressure and Sea Water Immersion	: 20,000 ft (30 days)

1.11.3 The SSCVFDR was equipped with underwater locator beacons (ULB) whose transmission time is at least 30 days, on the 37.5 kHz frequency, operating depth up to 20,000ft (6096 m) and activated with fresh or salt water immersion. The SSFDR was attached with a ULB as per below:

Manufacturer	: Dukane
Mode	: DK-120
S/N	: SD38654
ULB Expiry Date	: 30 June 2020

1.11.4 The SSCVFDR was recovered at the crash site approximately 18 hours after the accident. The SSCVFDR was hand carried by AAIB Malaysia personnel to Air Accidents Investigation Branch (AAIB) United Kingdom at Farnborough for the voice and data download on 7th April, 2015. Both voice (from 4 channels) and data (approximately more than 400 parameters) from the SSCVFDR were able to be downloaded and readable. Detail analysis of the voice and data recorders for each parameter is being carried out. Figure below shows some of the parameters recorded by the flight data recorders approximately 65 seconds prior to the accident.



1.12 Wreckage and Impact Information

1.12.1 The helicopter wreckage was destroyed by the impact forces and by the post-crash fire at the bottom of a ravine. The main gearbox (MGB) and both engines were found close to the wreckage area. Some components of the helicopter including the fenestron, door, main rotor blade parts, cowlings, engine exhaust pipe, tail rotor drive shaft and horizontal stabilizer were found scattered around 200 - 300 meters from the main

wreckage. The components were scattered along the trajectory of the helicopter. There was no evidence of the helicopter making contact with the terrain until it impacted the ground.

1.12.2 Engine Inspections.

No. 1 Engine.

Serial Number : 4270

- Inspections on the Metal Chip Detector and the Electro Metal Chip Detector did not reveal any evidence of contaminants or deposits of an abrupt engine failure.
- Oil filter appeared normal and clean.
- The manufacturer's alignment marks which coupled the power transfer shaft to the spline at the reduction gearbox - Module 5 did not indicate of any signs of excessive engine over-torqued.
- Boroscope inspections around the impeller section revealed slight traces of aluminium deposits due to sudden scrapping under impact load.
- The compressor blades had totally seized.
- There was evidence of slight nicks on the compressor blades due to ingestion of debris.

No. 2 Engine.

Serial Number : 4272

- Inspections on the Metal Chip Detector and the Electro Metal Chip Detector did not reveal any evidence of contaminants or deposits of an abrupt engine failure.
- Oil filter appears normal and clean.
- Fuel filter appears normal and no evidence of contaminants.
- The manufacturer's alignment marks which coupled the power transfer shaft to the spline at the reduction gearbox - Module 5 did not indicate of any signs of excessive engine over-torqued.
- Boroscope inspections around the impeller section revealed traces of solidified aluminium deposits due to sudden scrapping under impact load and intense heat.
- The compressor blades were found jagged and severely bent due to foreign objects damage (FOD) from ingress of wooden branches. The compressors were totally seized.
- There was evidence of post impact fire on the engine.

1.12.3 Main Rotor Hub and Main Rotor Blades.

- All four main rotor blades had separated from the attachment of the main rotor head.
- One of the main rotor blades had evidence of severe damage on the main rotor tip. This would suggest that it could have struck the fenestron leading edge.
- Two of the main rotor blades had evidence of red paint marks on the leading edges of the centre section of the main rotor blades.
- The fragments on the main rotor blades suggest that the damage could be attributed to high impact force with the tail boom structure and subsequent post impact damage after separation from the main rotor head.

1.12.4 Fenestron - Tail Rotor Section.

- The preliminary findings on the fenestron revealed that extensive damage was caused by high impact force which caused it to separate from the tail boom structure.
- The breakage of the tail rotor blades revealed that there was evidence of sudden impact against the fenestron casing whilst under high rotational speed. There were severe scrubbing marks on the internal side of the fenestron casing.
- There was also evidence of some cutting marks on the leading edge of the fenestron which could indicate contact with the main rotor blades.

1.13 Medical and Pathological Information.

1.13.1 Evacuation and Identification of Remains.

The total number of persons onboard the helicopter were 6, including the pilot. The bodies were recovered from the crash site and transferred to Kuala Lumpur Hospital for post-mortem examination and identification purposes.

The identification of the bodies was performed by the Disaster Victim Identification Team which comprised of forensic pathologists, forensic odontologists and DNA experts.

1.13.2 Injuries to victims.

Based on the post-mortem examinations findings, all 6 victims sustained severe multiple injuries and charred bodies. The nature of these injuries

was consistent with impact trauma from high altitude and post-crash burns.

The toxicology results of the pilot is negative for alcohol and common drugs of abuse.

There were no post-crash survival signs for all victims based on the severity of injuries sustained.

1.14 Aircraft Commander

TBA

1.15 Passengers

TBA

1.16 Fire

There was extensive fire that consumed most of the components after impact.

1.17 Survival Aspects

The accident was non survivable.

1.18 Test and Research

To be incorporated

1.19 Organisational and Management Information

Aircraft Owner : Orion Corridor Sdn Bhd.
Level 32, The Gardens South Tower
Mid Valley City
Lingkaran Syed Putra
59200 Kuala Lumpur.
Malaysia.

Aircraft Operator : Chempaka Helicopter Corporation Sdn Bhd
Solaire Hangar, Skypark Terminal
Sultan Abdul Aziz Shah Airport
47200 Subang, Selangor
Malaysia

1.20 Additional Information

The following additional informations are required to determine the most probable cause of the accident:

- Detail observation of the last landing zone to confirm on the possible damage to the horizontal stabiliser and the tail section
- Intensive search on the missing left hand horizontal stabiliser in order to examine the breakage pattern,
- Detailed weight and balance of the helicopter at the time of the accident,
- Information concerning the weather condition at the time and location of the accident,
- Witnesses statements on accident sequence,
- Mapping on distribution of the wreckage,
- A detailed analysis of the CVR with BEA to identify and characterise all the relevant noises recorded.
- A detailed analysis of the FDR with BEA and Airbus Helicopters to identify flight and performance characteristics of the helicopter.

1.21. Useful or Effective Investigation Techniques

The investigation will be conducted in accordance with the standards and recommended practices of Annex 13 of the Chicago Convention.

2. FINDINGS.

- 2.1 SSCVFDR information and inspection of the last landing area before the accident revealed that the helicopter had its left landing gear sunk into soft ground while attempting a landing at a football field of Sekolah Rendah Ladang Kota Bahagia. The left landing gear had sunk to approximately 20 inches deep into the soft ground causing the helicopter to tilt more than 13 degrees to the left. The left main landing gear and the tail section below the tail rotor fenestron was suspected to have impacted the ground.
- 2.2 There was also evident of excessive fluid leak in the sink hole as well as on the grass about 10 meters forward of the landing point. Further investigation is being carried out to determine the fluid type and its specification.
- 2.3 The pilot was seen by a witness to have exited the helicopter and accompanied the disembarked passenger clear of the main rotor area. However, he did not carry out any inspection of the helicopter.

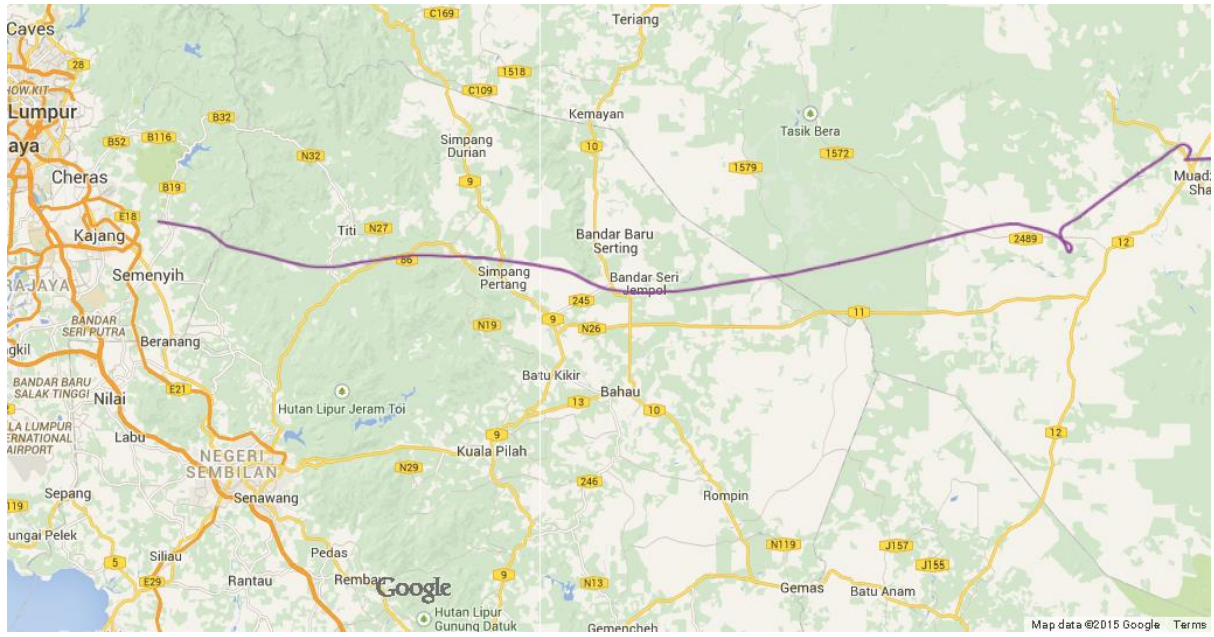
- 2.4 The main wreckage was concentrated at one area in a ravine. The 4 main rotor blades were found at different places from the main wreckage. The tail rotor and the right horizontal stabiliser was found about 200 meters away from the main wreckage.
- 2.5 Inspection on the reconstruction of the wreckage revealed that the main rotor blades had struck the cowling, tail boom, fenestron and the left cabin door while the helicopter was still in the air. This action is considered consequential and there was no indication that the helicopter had struck terrain or any trees in flight prior to the impact. It was observed to have vertically descended to the main wreckage area.
- 2.6 The preliminary analysis of the FDR by BEA revealed that the impact of the main rotor blades on the structure of the helicopter was consequence of the extreme load factor encountered several seconds before the end of the recorded data associated with extreme attitude. The extreme attitude was due to negative load factor by very fast pitch down motion consistent with the result of loss of left horizontal stabiliser without any pilot action.
- 2.7 Investigation is being assisted by BEA and Airbus Helicopter as State of Manufacture from France and as Accredited Representative under the Annex 13 of the ICAO Convention. Detailed analysis of the SSCVFDR will be carried out with their expert assistance.

3. RECOMMENDATIONS

- 3.1 Detailed analysis of the CVR/FDR is vital to determine the root causes of the accident. A flight simulation is being planned with the assistance of Airbus Helicopters at their facilities,
- 3.2 DCA to ensure that Private Category operators observe flight operations limitations in their respective category.
- 3.3 Pre flight preparation for every flight has to include risk assessment on the route and destination of landing points before the flight commences. Pilot is to avoid landing at any location on discretion of the passenger.
- 3.4 DCA to determine the necessity for flight manifest for all private flights.
- 3.5 A review on the non-activation of ELT emergency beacon during crashes.

- 3.6 A review on the procedure for single pilot helicopter operation to facilitate passenger embarkation or disembarkation with the engine and main rotor running.

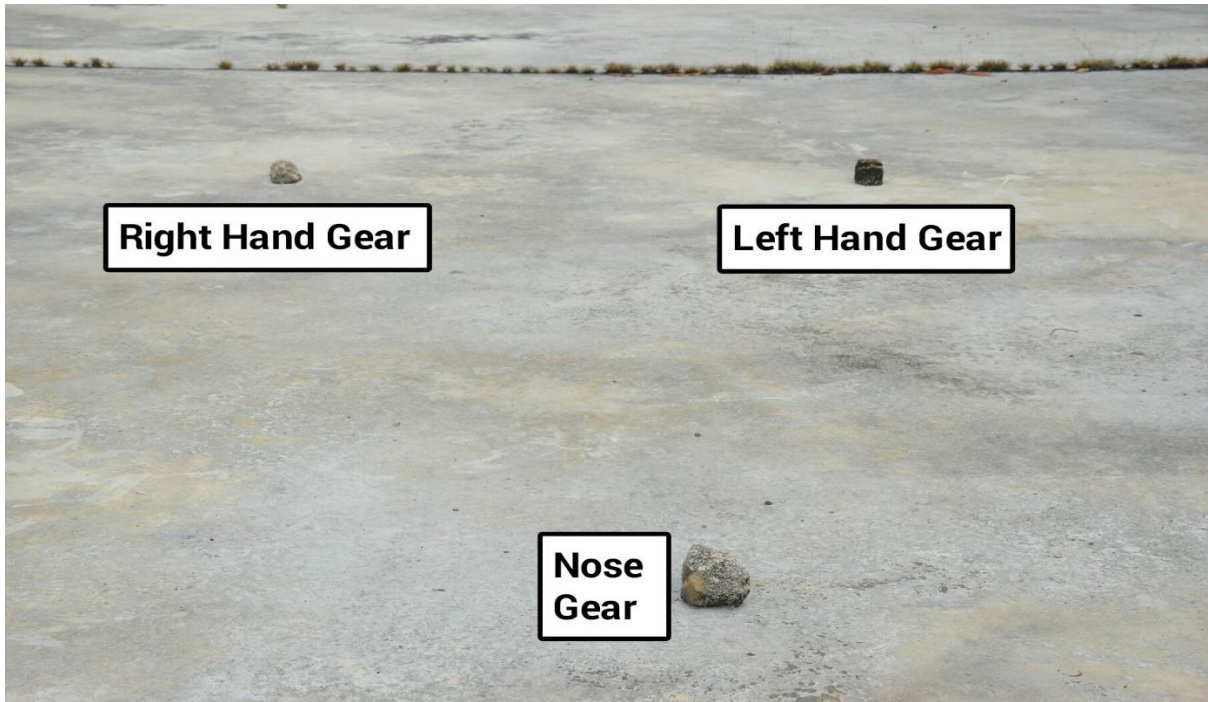
ATTACHMENTS



Flight Routing



Cemented area of abandoned factory



Landing spot at the abandoned factory



Direction of approach before landing



Sky view of the football field



First landing area



First landing area with suspected hydraulic oil spot



Picture of port holes



The port hole of the LH landing gear



Crash site from the air



Broken/ burnt trees



Crash site