



AIRCRAFT ACCIDENT REPORT 02/15

AIR ACCIDENT INVESTIGATION BUREAU MINISTRY OF TRANSPORT, MALAYSIA

Report on the accident to Helicopter Bell 206BIII Registration 9M-LLM,
On the grass near helipad 'H' at Kota Kinabalu International Airport



INTRODUCTION

The Air Accident Investigation Bureau of Malaysia

The Air Accident Investigation Bureau (AAIB) is the air accidents and incidents 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 incidents.

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

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.

AIRCRAFT ACCIDENT FINAL REPORT 02/15

Aircraft Type : Bell Jetranger III

Model : B 206 B III

Operator : Layang-Layang Helicopter Academy

Nationality : Malaysian

Year of Manufacture : 1981

Aircraft Registration : 9M-LLM

State of Registration : Malaysia

State of Manufacture : USA

State of Operator : Malaysia

Place and State of Occurrence : On the grass near Helipad H, Kota Kinabalu International Airport, Malaysia

Date and Time of Accident : 28th May 2015 at 1151 Hours (Local Time)

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

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)

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Engine tear down report from Heliholland
Technics

SYNOPSIS

During a solo training flight, a female student pilot crashed the helicopter during hover before attempting a take off for a circuit work.

The helicopter was hover taxiied from Layang Layang Helicopter Academy (LLHA) hangar to helipad marker H adjacent to Kota Kinabalu treshold runway 02, to position for the solo circuit work. It landed on marker H uneventfully.

While hovering to prepare for take off runway 02, the student pilot scan the instrument panel for temperatures and pressures which were within limits. Suddenly she noticed the rotor RPM (Nr) and Free Power turbine RPM (N2) indicators were splitting and reducing. She was uncertain of the throttle position and focus to ensure the throttle was fully open position. She was distracted and the helicopter started to drift to the right and started to lose height. She did not noticed the helicopter descended too low until the right rear skid hit the ground. The helicopter subsequently bank to the right and the main rotors strike the ground. She closed the throttle while the helicopter crashed to the right side near the helipad.

The helicopter diisintegrated and caught fire. The student pilot escaped through the front perpextive with minor injuries. The helicopter caught fire and destroyed beyond repair.

An investigation team was formed comprising of Captain Dato Yahaya bin Abdul Rahman as Investigator In-charge from flight Operations and Mr. Amiruddin from the Engeneering. The Investigation begun on site on the 29th May 2015.

INTRODUCTION

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1. FACTUAL INFORMATION

1.1 History of the flight.

On 28th May 2015, a female student pilot was ready for a solo flight after being examined by her instructor for 1 hour assessment 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 normal condition. The helicopter was lifted off from Layang-Layang Helicopter Academy (LLHA) hangar and hover taxi to the Helipad Marker 'H' adjacent to threshold runway 02. It landed on the marker H unevenly. (See Appendix A, for the flight path to marker H)

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

She claimed that the throttle was not in fully open position and immediately tried to open the throttle to fully open position. Meanwhile the helicopter was not maintaining a steady hover and started to lose height as well as drifting to the right. The helicopter descended unchecked until the right skid hit the ground. The excessive right bank helicopter caused the the main rotor blades to strike the ground. The helicopter topped to the right and crashed nearby the helipad and the tail boom broken off from the fuselage.

The helicopter caught fire starting from the baggage compartment area towards the passenger cabin. The pilot escaped from the helicopter with minor injury. The helicopter damaged extensively beyond repair.

1.2 Injuries To Persons

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

| Injury | Crew | Passenger |
|--------|------|-----------|
| 0 | 0 | NIL |

1.3 Damage To Aircraft

The helicopter was totally damaged and caught fire.

1.4 Other Damages

NIL

1.5 Personnel Information

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

| Status | Instructor Pilot | Student Pilot |
|---------------------------------|------------------|---|
| Age | 59 Years | 21 Years Old |
| Gender | Male | Female |
| Licence Type | ATPL/H 1502 | SPL 12522/H |
| Medical Examination | 31 May 2015 | 17 October 2014 |
| Aircraft Rating | Bell 206 B | SPL |
| Certificate of test valid until | 09 June 2014 | Nil |
| Instructor Rating valid until | 08 January 2017 | |
| Flying Experience | | Fixed wing total 270 Hours Rotary Dual : 31.00 Hours Solo : 0.4 Hours |

1.6 Aircraft Information

Aircraft : Bell Jetranger III (B206 B III)
Owner : Layang Layang Helikopter Academy
Sdn. Bhd
Registration : 9M LLM
Type : B 206 B 3
Serial No. : 3488
Air Operator Cert. expiry : 05 September 2015
Certificate of Airworthiness expiry : 29 June 2011
Certificate of Registration issued : 29 June 2011
Year of manufacture : 1981
Operations : Training
Engine Type : Allison 250-C20B (Rolls Royes)
Engine Serial No. : CAE-833211
Engine Total Time : 11975.3

1.7 Meteorological Information

1.7.1 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=

1.7.2 Weather is not the main factor on this accident.

1.8 Navigation Aids

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 the last transmission when she was ready for lift off for marker Hotel at 1143 LT . It crashed shortly after that last radio communication when the helicopter arrived at marker Hotel.

1.10 Aerodrome Information

The helipad is measured 40 feet by 40 feet with a layer of hard tarmac. It has a yellow circle for the helicopter to land. It has been in operation for several years.

The picture of the Helipad is at Appendix B , Figure 11.

1.11 Flight Recorders

There is no flight recorder fitted in this helicopter

1.12 Wreckage and Impact Information

The helicopter crashed close to the helipad. The tail rotor was still intact and the tail boom was detached from the fuselage on impact. The main rotor blades strike the helipad and broke into pieces indicating rotating with high energy. The main gearbox came out of its attachment and thrown away about 10 meters from the main wreckage. The engine was removed and sent to Heli Holland Technics for a tear down examination. (see detail report at Appendix B)

1.13 Medical and Pathological Information

Nil

1.13.1 Student Pilot,

The Student Pilot sustained a minor injury

1.14 Fire

There was fire after the impact which started from the baggage compartment.

1.15 Survival Aspects

The accident was survivable.

1.16 Test and Research

The dual tachometer P/N; 206-075-681-3 S/N; T 1722 was removed from the wreckage and is tested using 9M LLH during engine run and hover check on 9th June 2015 and found functioning 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 Later

Nil

2 ANALYSIS

2.1 Introduction

The fatal flight of 9M LLM was taken place on the 28th May 2015. 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 on helicopter. She had her Philippines helicopter Commercial Pilot License (CPL) on aeroplane with 250 hours of aeroplane experience. She joined Layang Layang Helicopter Academy on 24th May 2014 and started her training since then she had accumulated 13 hours of training on helicopter Bell 206B and did her first solo flight on the 12th February 2015.

Record shows that there was no flying from 12th February 2015 until the 27th May 2015, whereby she flew dual flight for duration of one hour. The dual flight on the 27th May 2015 was 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 can go for the second solo flight. The dual sorties was carried out on the 28th 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 portable VHF radio and listening out on Kinabalu ground and subsequently 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 pre take off check, the helicopter was brought to a hover at LLH dispersal and hover taxi to helipad marker 'hotel' and landed there unevenly. According to the SP, after approximately two minutes on ground to allow one aeroplane on final to land, she pick up the helicopter back to hover. She did her hover check and did a 180 degrees turn to face runway 02 for take off. At that juncture she noticed the rotor RPM (Nr) was reducing

and the N2 needles were splitting and appeared to be reducing further. She was nervous seeing the N2 splitting and checked the throttle position again. Meanwhile her focus was at the instrument and as she turn the helicopter on its spot clockwise direction, the helicopter was moving sideway to the right. The pilot revealed that she was focussing on the throttle position and tried to open the throttle. While doing so she did not realised that the helicopter was drifting to the right and losing height. The helicopter right skid hit the ground and bank excessively to the right. The main rotor blades strike the ground and topple to the right. Uncontiously she closed the throttle to idle position. This was consistant with the throttle position upon inspection at the wreckage. She could not remember the sequence clearly and the investigation belief that at this juncture the pilot was panic and not able to hover the helicopter steadily. The helicopter descended unchecked to the ground with excessive right bank initiated by the right aft skid hit the ground, followed by the main rotor blades strike the ground. The helicopter crashed and rested on its right side not far from the helipad. She manage to exit the helicopter throught the front perspex by breaking it open for the access out. The helicopter subsequently cougth fire at the baggage compartment area and the SP escaped through the helicopter perspective with only minor injury.

2.3 Engine bench test report

The engine was taken to Heliholland Technics and was put on the test rig to determine the engine functionaityl. The report revealed that the visual inspection was found satisfactorily. There was serious freewheel coupling damage. This indicates that there was power on the engine output shaft during the accident. The FOD damage is another indication the engine was running during the impact..

3. CONCLUSIONS

(a) Findings

- 3.1 The helicopter was properly maintain and airworthy to fly for VFR training sortie.
- 3.2 The student pilot was properly licenced and appropriately satisfactory to sent for solo flight,
- 3.3 The instructor pilot was properly licenced and experienced to conduct the instructional flight,
- 3.4. 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 happen,
- 3.5 The student pilot admit that she was concentrating on the trottle position after noticing the Nr/Nf needle start to split, the helicopter drifted and decended with right bank unchecked consequently the main rotor striking the ground.
- 3.6 The student pilot did overcontrol the helicopter as she was new on type and did not perform the EOL technique properly.

4. RECOMMENDATIONS

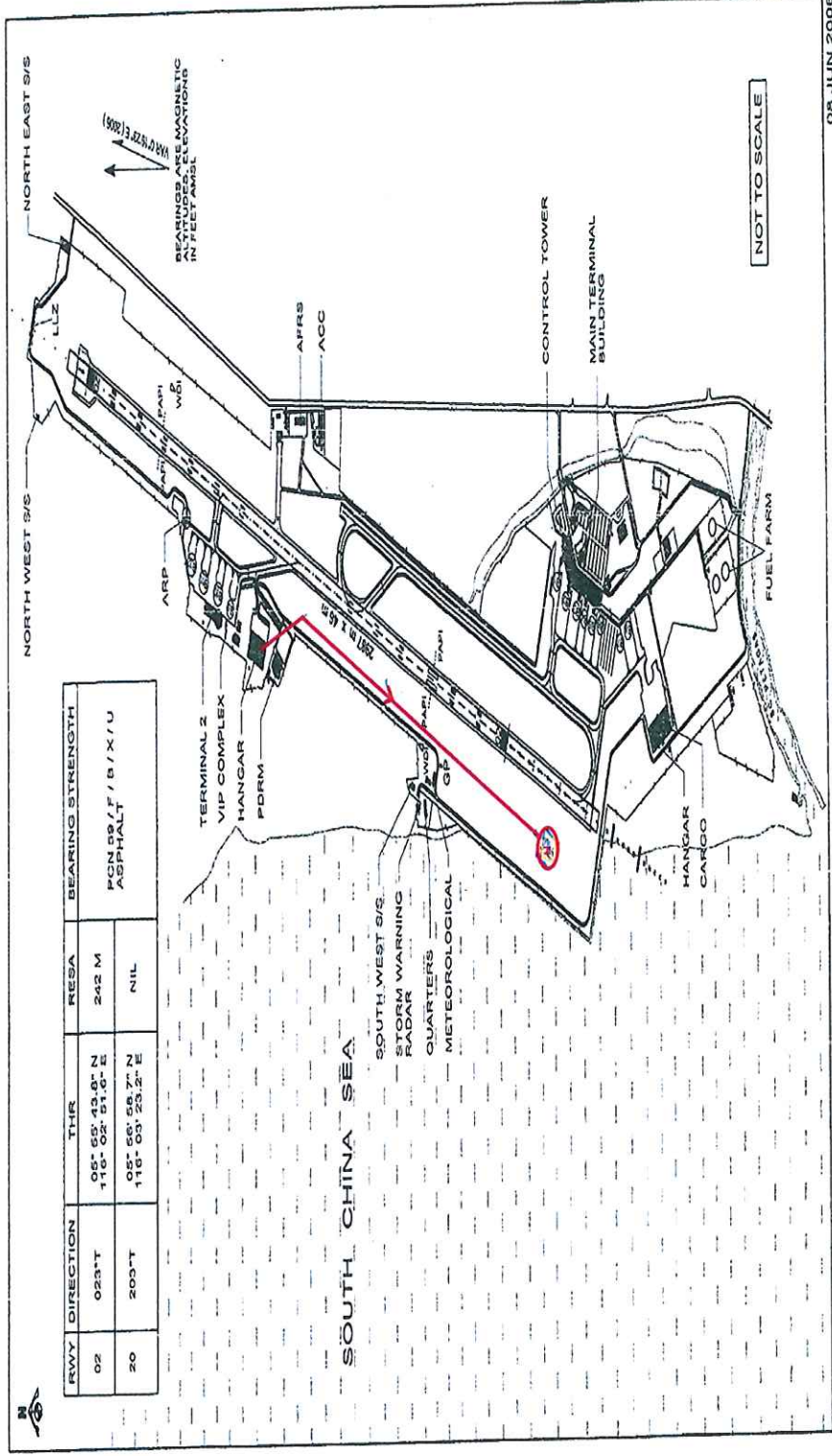
- 4.1 DCA to ensure the teaching technique in handling trottle especially for trainee student pilot to include the opening and closing of trottle procedure correctly applied.
- 4.2 Flying Training School not to lay off student pilot for too long before the subsequent training flight especially solo flying.

**Chief Inspector,
Air Accident Investigation Bureau**

APPENDIX A

LLM hover taxi route from hangar to marker H

AIP MALAYSIA WBK AD 2 - 23
 AERODROME CHART - ELEV: 10FT (3.05 M) KOTA KINABALU / KOTA KINABALU SABAH
 ICAO ARP: 05° 56' 41" N 116° 03' 11" E



DEPARTMENT OF CIVIL AVIATION MALAYSIA
 03 JUN 2006
 AIP AMDT 2/2006

APPENDIX B Fig 1
Collective lever and throttle position

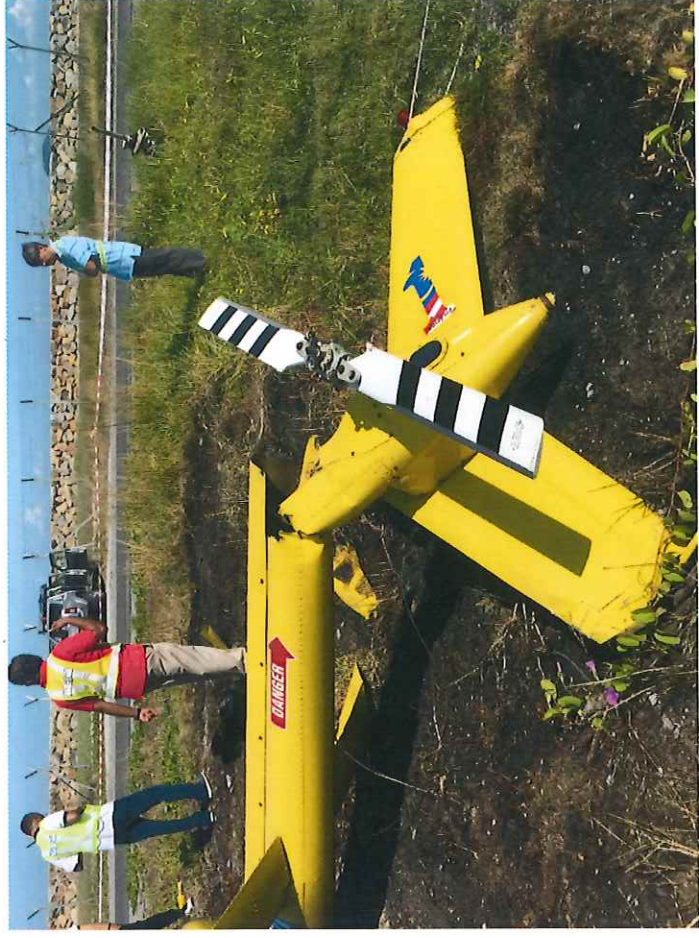


APPENDIX B, Fig. 2

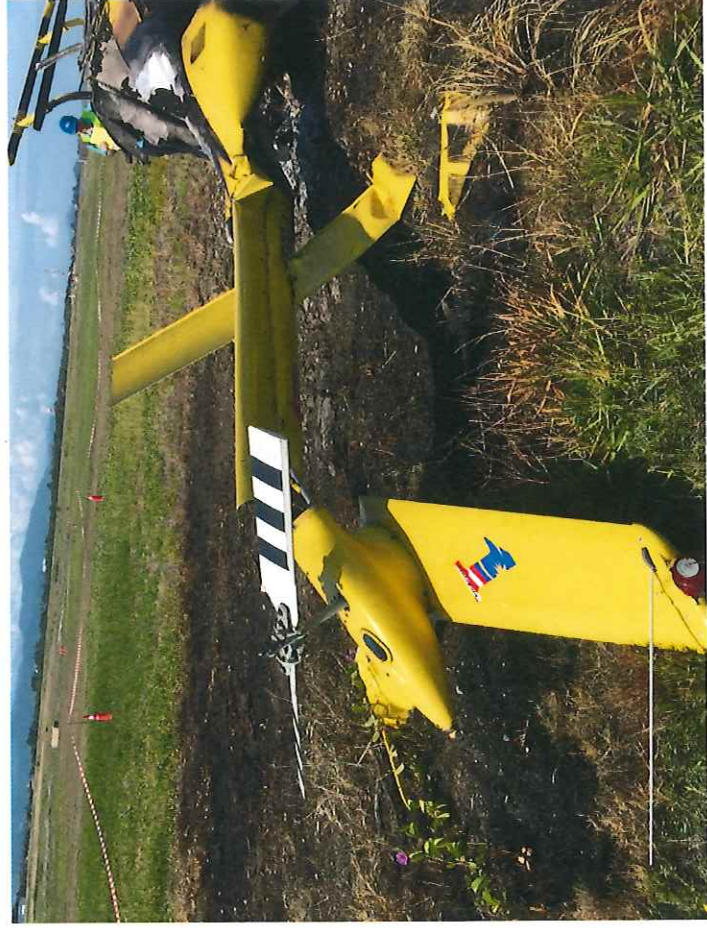
Fuselage rested on its right side



APPENDIX B, Fig.3 Tail rotor and tail boom condition



APPENDIX B, Fig. 4
Wreckage from the tail



APPENDIX B, Fig 5
Fire started from the baggage compartment

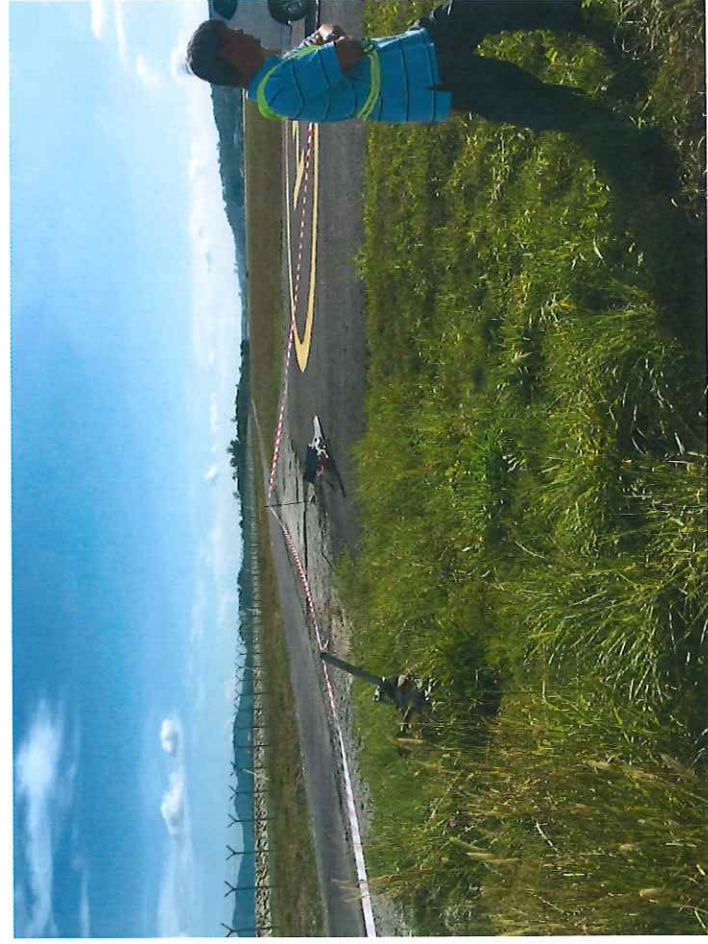
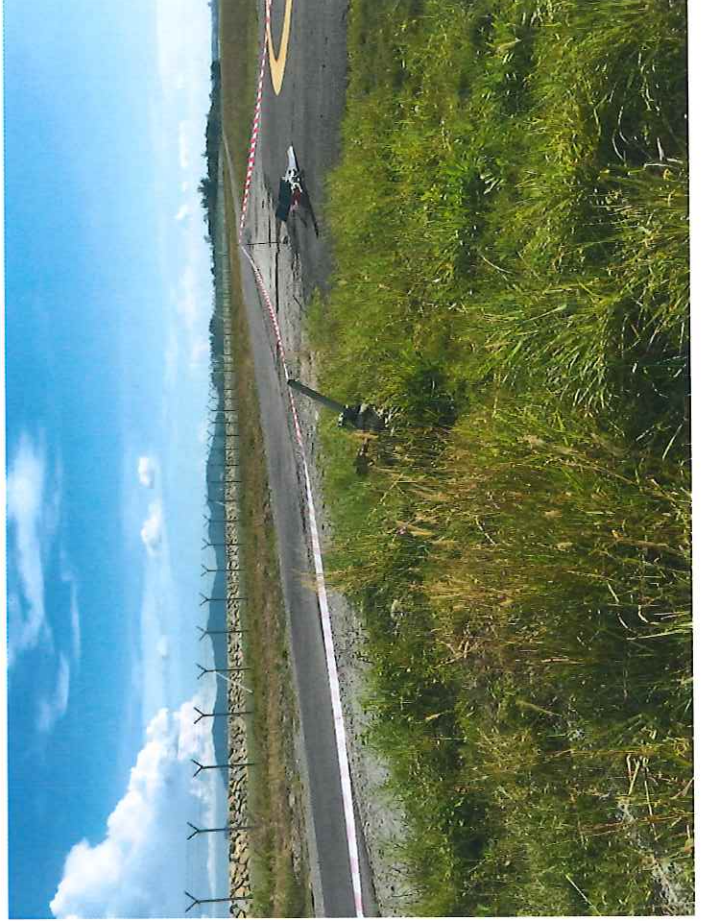


APPENDIX B, Fig.6

Helicopter instrumentations



APPENDIX B, Fig.7
The main gearbox detached from the fuselage



APPENDIX B, Fig. 8
Main rotor broken off due to high rotor energy



APPENDIX B, Fig. 9
Main rotor blades damage



APPENDIX B, Fig 10
Close look at the main rotor blade tips



APPENDIX B, Fig 11
Helipad



APPENDIX C

Engine tear down report from Heliholland



Layang Layang Aerospace Sdn. Bhd. (243883-V)

Our Ref. No. : LLA/L/16/1256
Date : 09th December 2016

Capt. Dato Yahaya Abd Rahman
Kementerian Pengangkutan Malaysia,
Biro Siasatan Kemalangan Udara,
No.26 Jalan Tun Hussien, Presint 4,
62100 WP Putrajaya,
Malaysia.

Dear Capt.,

9M-LLM SALVAGE REPORT

Enclosed herewith the above with photos and Heli-Holland Technics teardown report for your kind perusal.

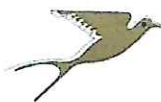
Thank you.

Yours Faithfully
For Layang Layang Aerospace Sdn Bhd


Johan Poong Abdullah
Managing Director

Nora

-
- Miri Office** : Layang Layang Hangar, Terminal 2, Miri Airport, P. O. Box 88, Morsjaya, 98000 Miri, Sarawak.
Direct Line: 6-085-430616 (OPS) Tel: 6-085-435668 or 435168 Fax: 6-085-426596 Email: lyglygmyy@gmail.com
- Kota Kinabalu Office** : Layang-Layang Complex, Terminal 2, Old Airport Road, Tanjung Aru, 88100 Kota Kinabalu, Sabah, Malaysia.
Tel: 6-088-484919, 484082 Fax: 6-088-484918 Email: lyglygmyy@gmail.com



Salvage Report

Aircraft Registration : 9M-LLM
Aircraft Type : Bell Helicopter Textron 206 BJR III
Aircraft Serial Number : 3488
Operator : Layang Layang Helicopter Academy Sdn Bhd

Bell 206 BJR III Helicopter, Registration: 9M-LLM suffered extensive damage in a flying accident/incident on 28 May 2015 at Kota Kinabalu International Airport helipad at the grass-strip beside runway 02L.

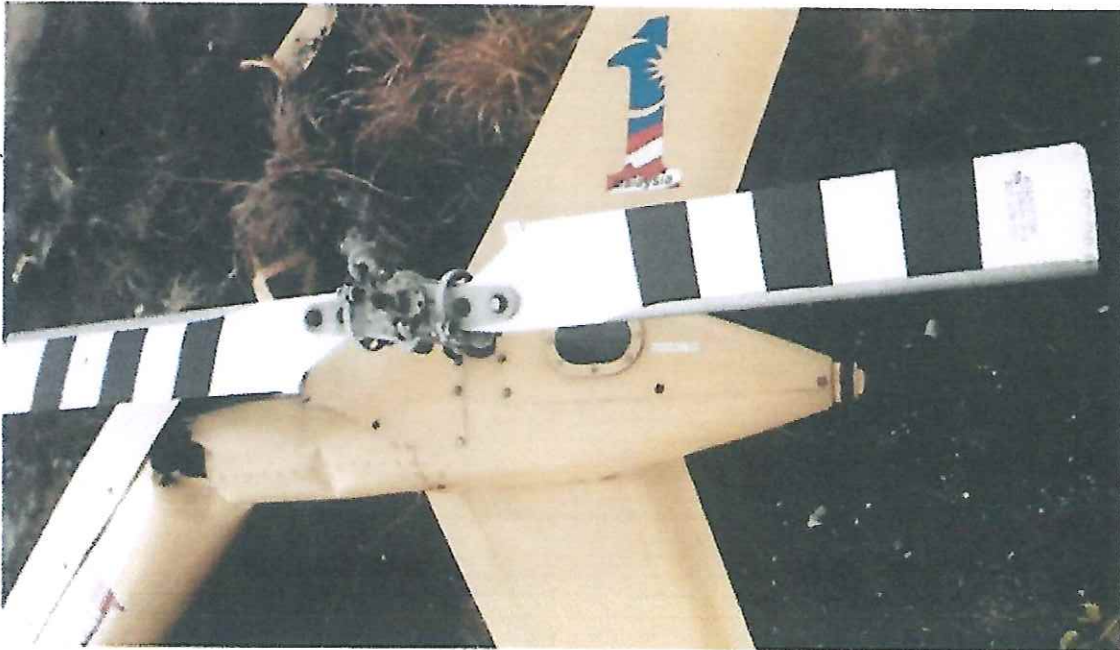
Biro Siasatan Kemalangan Udara concluded the on-site accident investigation on the wreckage on 30 May 2015. The investigators from BSKU had requested Layang Layang Helicopter Academy to proceed with the wreckage retrieval away from accident/incident site.

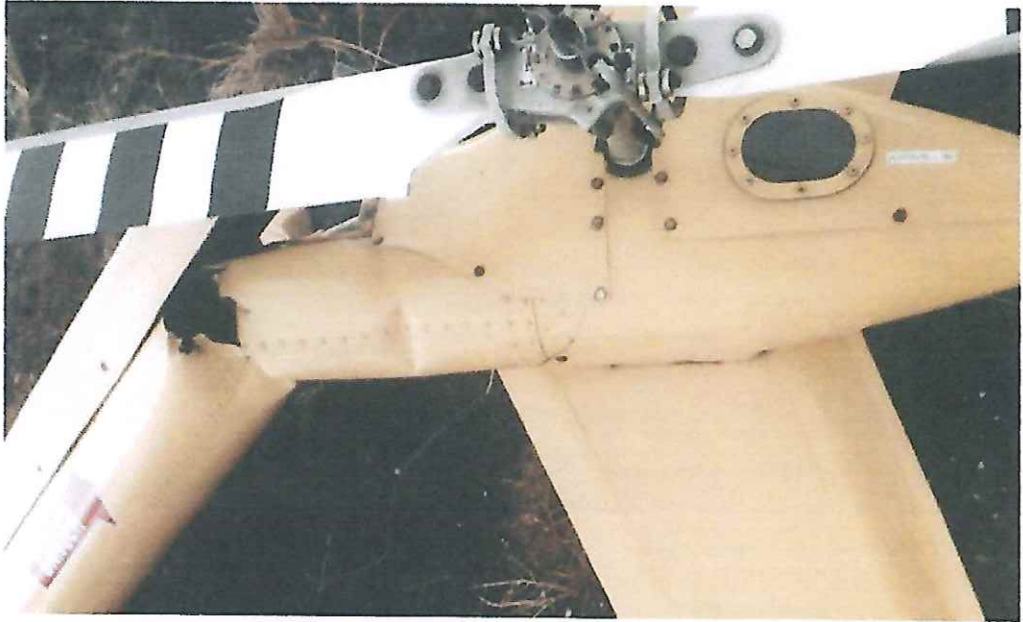
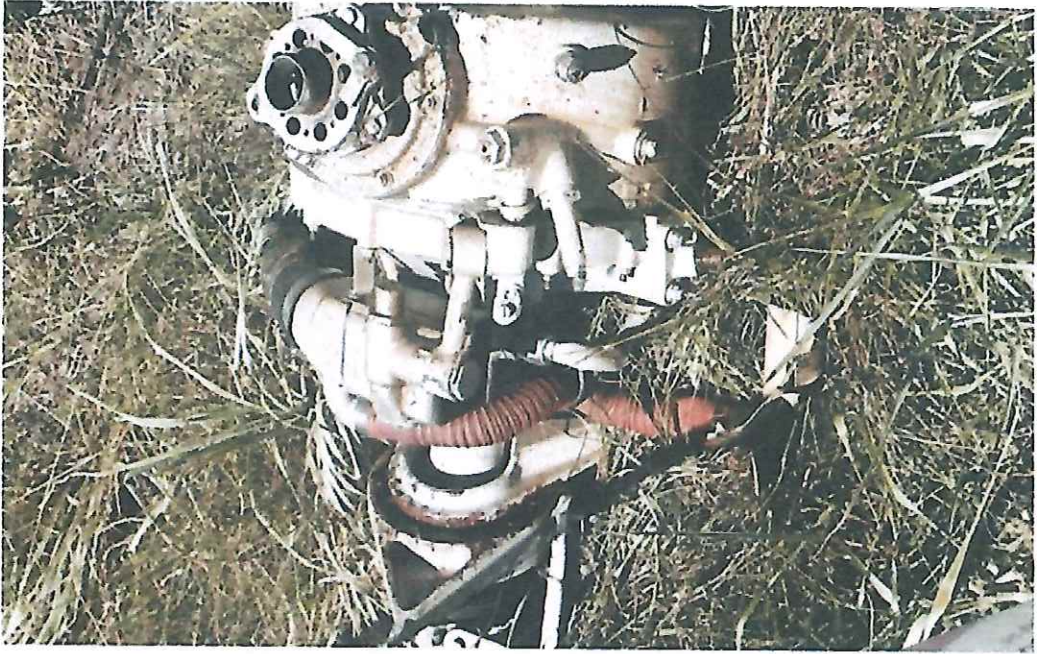
Layang Layang Aerospace Sdn Bhd was tasked for the wreckage retrieval. All components and parts that were disintegrated from the Helicopter around the accident site were fully recovered. The wreckage with all disintegrate parts were brought back to Layang Layang Aerospace Hangar in a lorry truck and covered with canvas and wreckage area was cordoned off with No Entry warning signs.

Engine assembly RR250-C20B S/N CAE 833211 was removed and sent to Heli-Holland Technics to put on test rig to determine the engine functional as requested by BSKU. Heli-Holland Technics teardown report is enclosed herewith.

Salvage Report compiled by,

Eric Lee
Quality & Safety Manager









TEARDOWN REPORT

AFTER INCIDENT

| | | | |
|----------------------|-------------------------|--------------------|------------|
| Customer: | Layang Layang Aerospace | Work Order: | 150729/1M |
| Order No: | N/A | TSN/CSN: | N/A |
| Discription: | Allison 250-C20B | TSO/CSO: | N/A |
| Part No: | 6887190 | Serial No: | CAE833211 |
| Inspected By: | Heli Holland | Date: | 25-09-2015 |

1.0 Introduction

The Allison 250-C20 Engine was received at Heli Holland Technics facility with reason for Removal: Inspection after accident.

2.0 Receipt Condition

The engine was received in a steel engine container without apparent shipping damage. The original Engine logbook was not present within the shipment, so it might be possible some part numbers are incorrect or missing.

3.0 Disassembly and Inspection Findings

Following receipt, the engine sections (Compressor, Turbine, Gearbox) were visually inspected. No MPI / FPI inspections were performed. All visual damage is caused by FOD. sustained as a direct result of the accident. Functional test of the engine was not permissible due to extensive FOD damage.

Compressor section

P/N 6890550

S/N CAC80643

Nomenclature / Part No / Discrepancy / Disposition

Photo

1st Stage Compressor Wheel

Part No. 23057111

S/N: KR115383

Damaged vanes due to the FOD.



2st / 3rd Stage Compressor Wheel

Part No. 23057112

S/N: KR109564

Damaged vanes due to the FOD



4th Stage Compressor Wheel

Part No. 23057114

S/N: KR78634

Damaged vanes due to the FOD

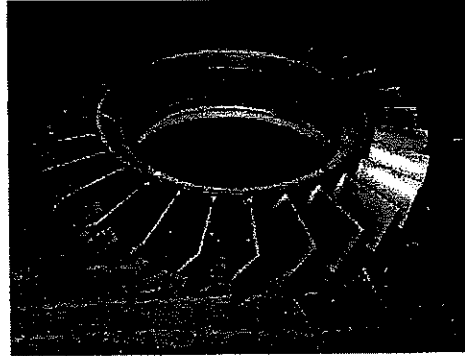


Nomenclature / Part No / Discrepancy / Disposition

Photo

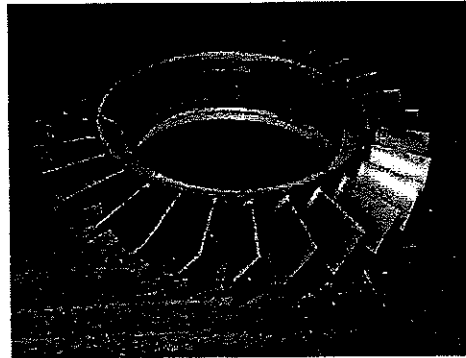
5th Stage Compressor Wheel
Part No. 23057115
S/N: E60099

Damaged vanes due to the FOD



6st Stage Compressor Wheel
Part No. 23057116
S/N: KR58292

Damaged vanes due to the FOD



Impeller Assy
Part No. 23058147
S/N: KR96571

Damaged due to the FOD

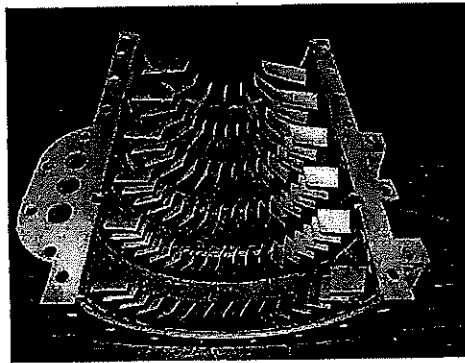


Nomenclature / Part No / Discrepancy / Disposition

Photo

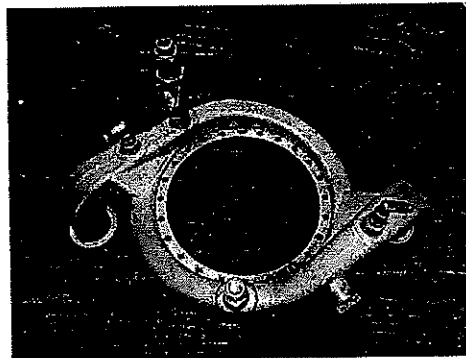
Half cases
Part No. 23057142
Set 25003

Damaged coating due to the FOD



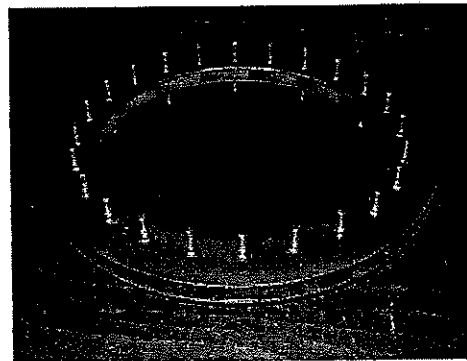
Scroll
Part No. NOT READABLE

Visual Inspected and found serviceable.



Vane Diffuser
Part No. Not readable
S/N: AV015

Visual Inspected and found serviceable.

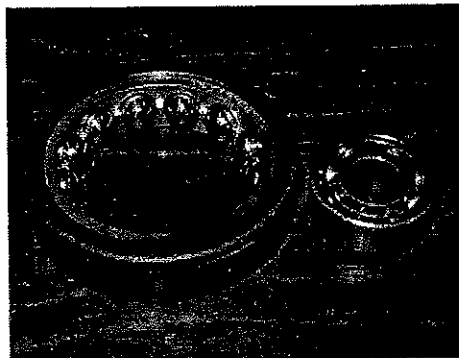


Nomenclature / Part No / Discrepancy / Disposition

Photo

Bearings

#2 bearing Part No. 6889093
 S/N: FAG124658
Small #1 bearing Part No. 6898607
 S/N: J309



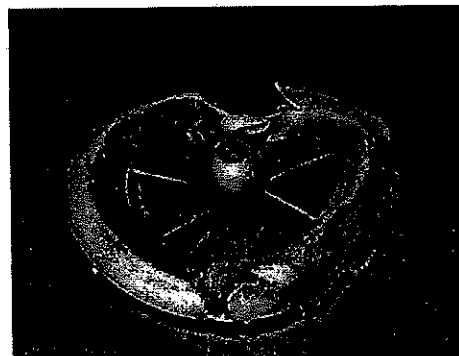
Visual Inspected, no cause for failure.



Compressor Front Support

Part No.
S/N: 20729

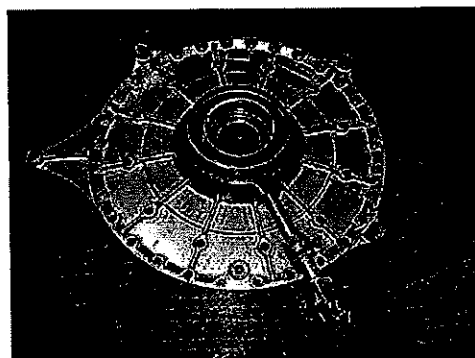
Damaged due to the FOD.



Rear Diffuser

Part No. not readable
S/N: not readable

Visual Inspected and found serviceable



Turbine section

P/N 6894171

S/N CAG37465

Nomenclature / Part No / Discrepancy / Disposition

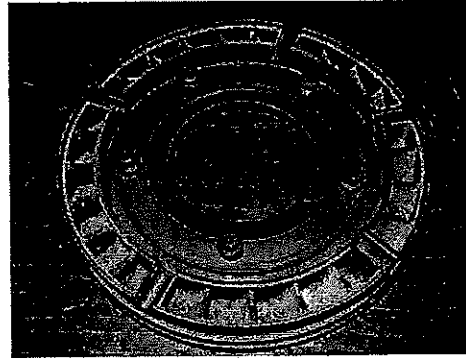
Photo

No. 1 Nozzle

Part No. 23062753

S/N: 245158

Visual Inspected, no damaged notified.

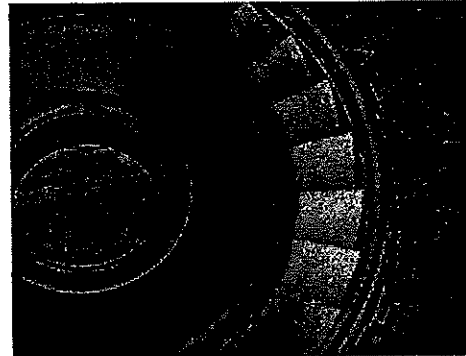


No 2 Nozzle

Part No. 23031938

S/N: SAAP 1534

Visual Inspected, No damage notified

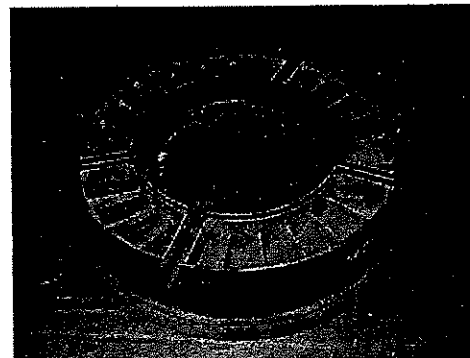


No. 3 Nozzle

Part No. NOT READABLE

S/N: C-31759

Visual Inspected, no damage notified.



Nomenclature / Part No / Discrepancy / Disposition

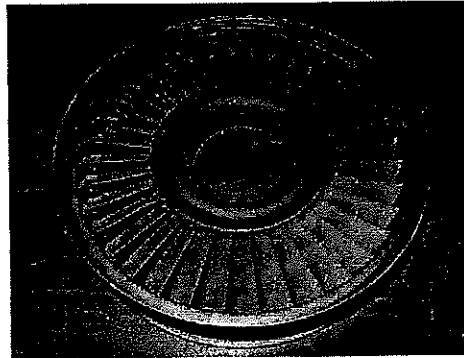
Photo

No. 4 Nozzle

Part No. 23061922

S/N: H24910

Visual Inspected, No damage notified.

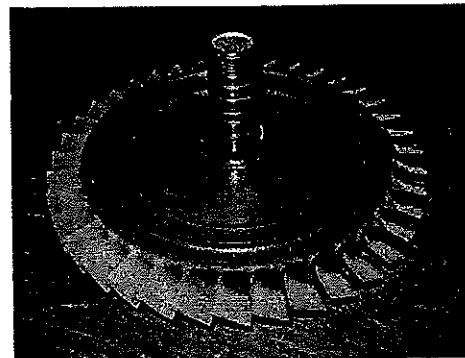


No. 1 Turbine Wheel

Part No. 6886407 AP

S/N: X143668

Visual Inspected, no damage notified.

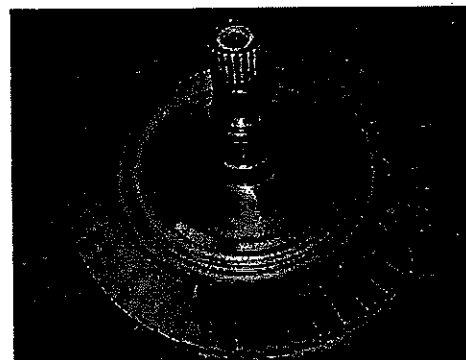


No 2 Turbine Wheel

Part No. NOT READABLE

S/N: HX121626

Visual Inspected, no damage notified.



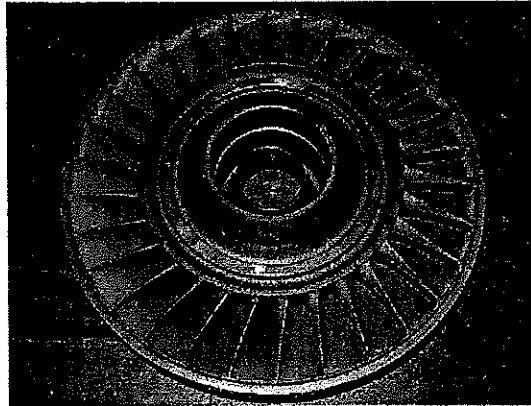
Nomenclature / Part No / Discrepancy / Disposition

Photo

No. 3 Turbine Wheel

Part No. NOT READABLE
S/N: HX82932

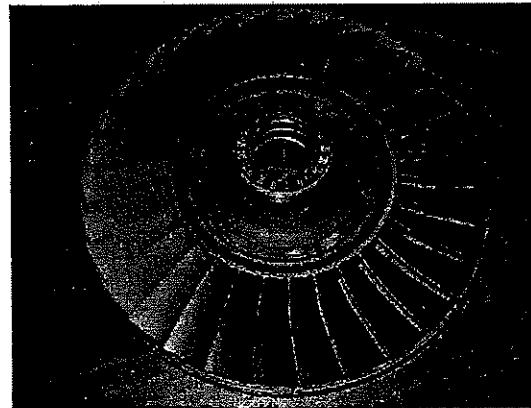
Visual Inspected, no damage notified



No. 4 Turbine Wheel

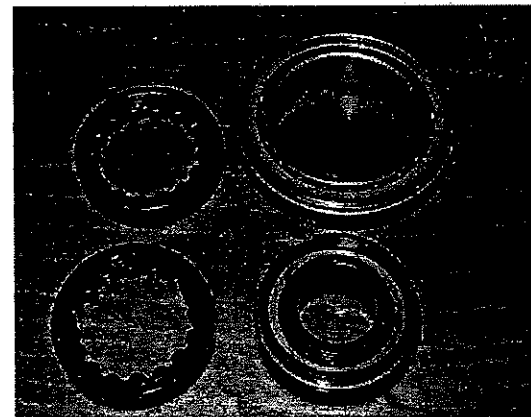
Part No. NOT READABLE
S/N: HX70462

Visual Inspected, no damage notified



Bearings Turbine Assy

Visual Inspected, no damage notified



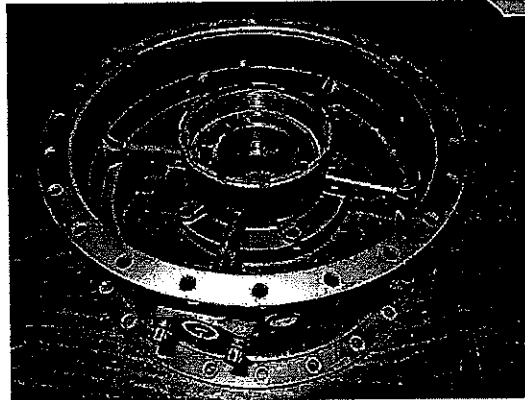
Nomenclature / Part No / Discrepancy / Disposition

Photo

GP Support

Part No. 23038118
S/N: DW32300

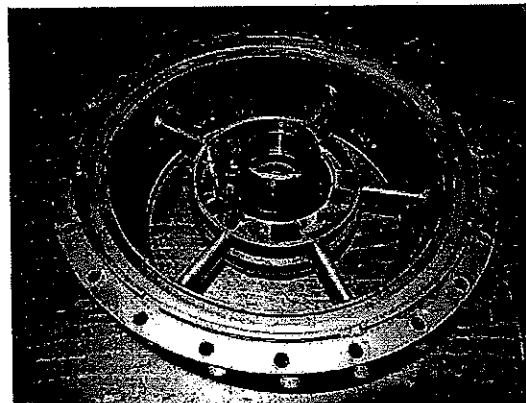
Visual Inspected, no damage notified



PT Support

Part No. 6898731
S/N: DW26282

Visual Inspected, no damage notified



Engine Gearbox

P/N 6894171

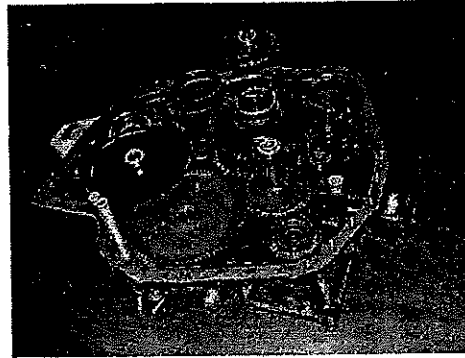
S/N CAG37465

Nomenclature / Part No / Discrepancy / Disposition

Photo

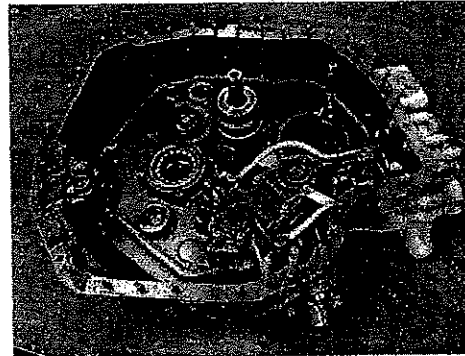
Gearbox Gears

Visual inspected. No damaged teeth.



Gearbox Bearings

Visual Inspected, no cause for failure.



Gearbox Housings

Damaged due to heat but no cause for failure

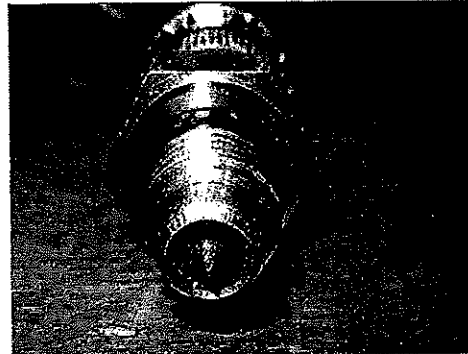


Nomenclature / Part No / Discrepancy / Disposition

Photo

Chip plugs

Visual inspected, cleaned and found OK.



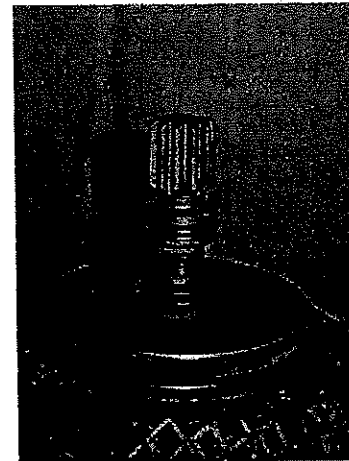
Starter Generator

Part No. 23032-027

S/N: 22977

Shaft not broken, so no seizure.

No cause for failure.





Heli Holland TECHNICS

4.0 Summary

After visual inspection no cause was found for the incident. The engine was damaged due to FOD collected after the incident, but there was no reason found for an engine failure.

The engine – to – freewheel coupling was seriously damaged. This indicates that there was power on the engine output shaft during the incident. The FOD damage is another indication that the engine was running during impact.

If there are any questions on this report, don't hesitate to call
Mr. R. van der Haring

+31 591 351 251

Or email

Ceo@heliholland.nl