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 ccident 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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SYNOPSIS

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

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

While hoving to prepare for take off runway 02, the student pilot scan the instument 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 trottle position and focus to ensure the trottle 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 trottle 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.

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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.

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' adjescent to trashold runway 02. It landed on the marker H unevenfully. (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 attemting 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 trottle was not in fully open position and immidiately tried to open the trottle 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 topled to the right and crashed nearby the helipad and the tail boom broken off from the fuselarge.

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 cought 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 forecat 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 intack and the tail boom was detached from the fuselarge on impacht. 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 tacho Meter 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 funcning 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 comleting the pre take off check, the helicopter was brought to a hover at LLH dispersal and hover taxy to helipad marker ' hotel' and landed there unevenfully. Acccording 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 furthur. She was nervous seeing the N2 splitting and checked the trottle 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 trottle. 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 trottle to idle position. This was consistant with the trottle 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 cought 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 apropriately 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 abnomality 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.

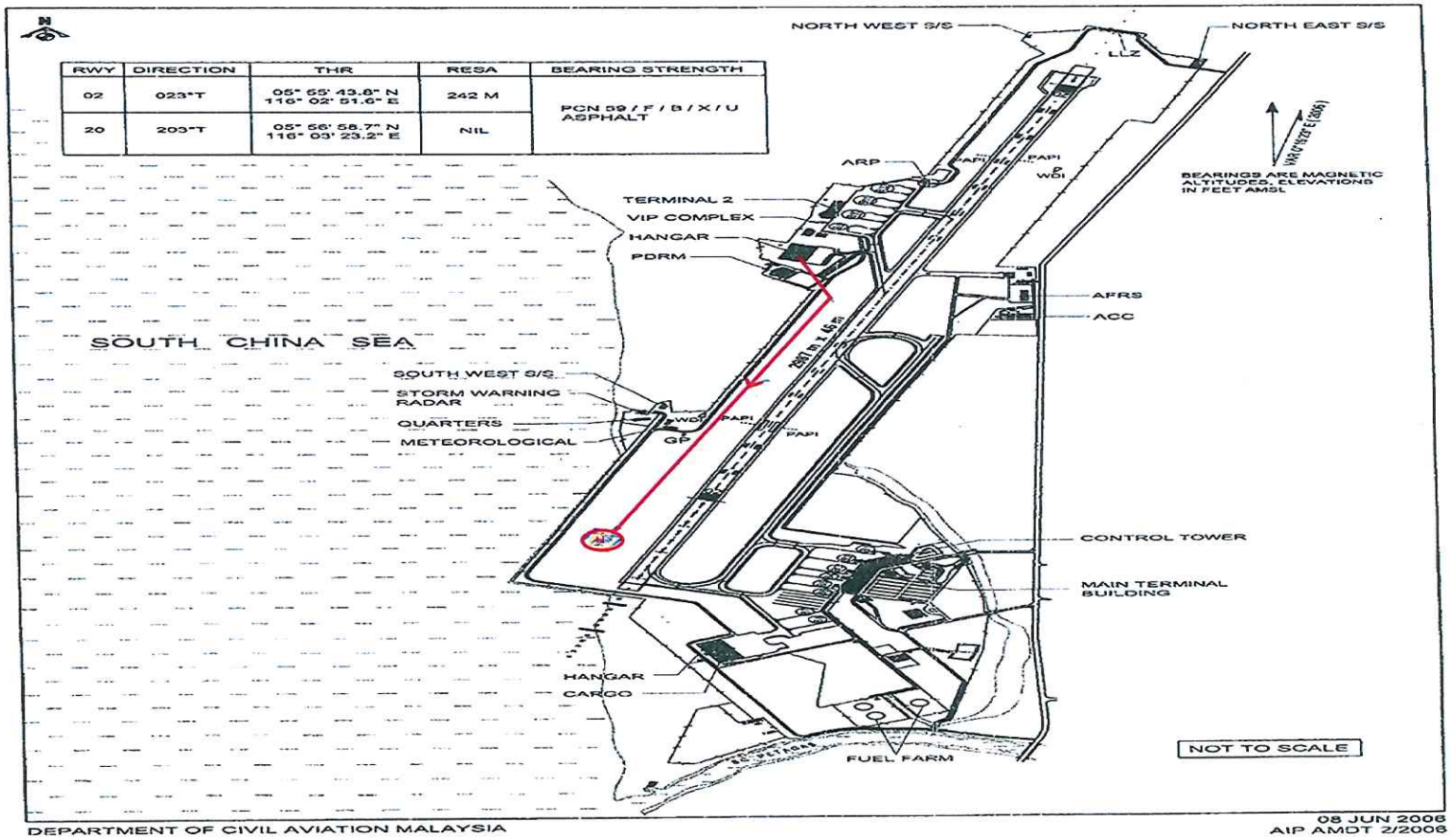
4. RECOMMENDATIONS

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



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

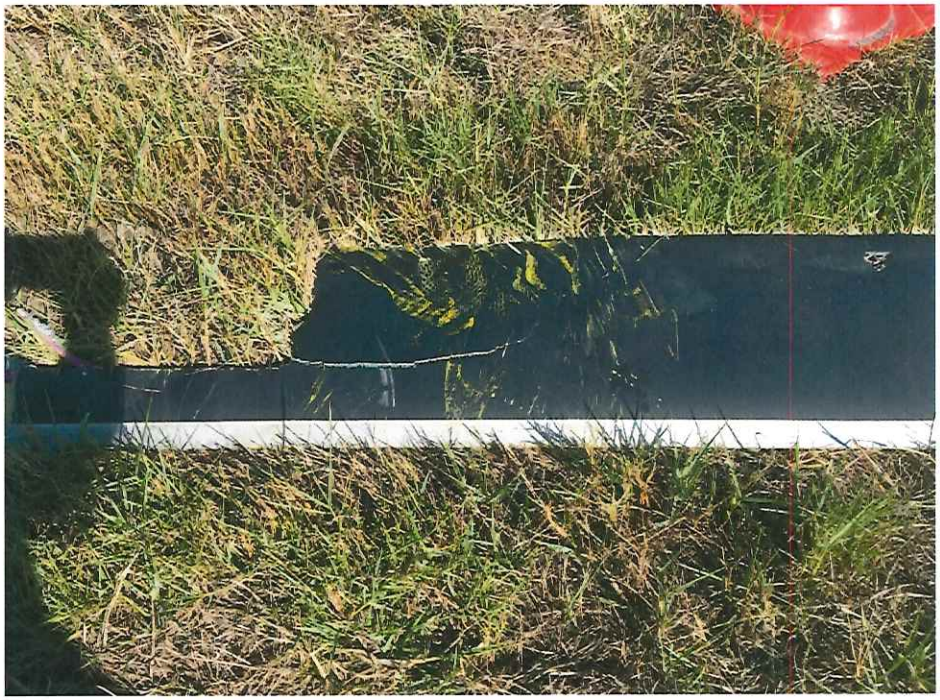
APPENDIX B, Fig.6
Helicopter instrumentations

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

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

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.

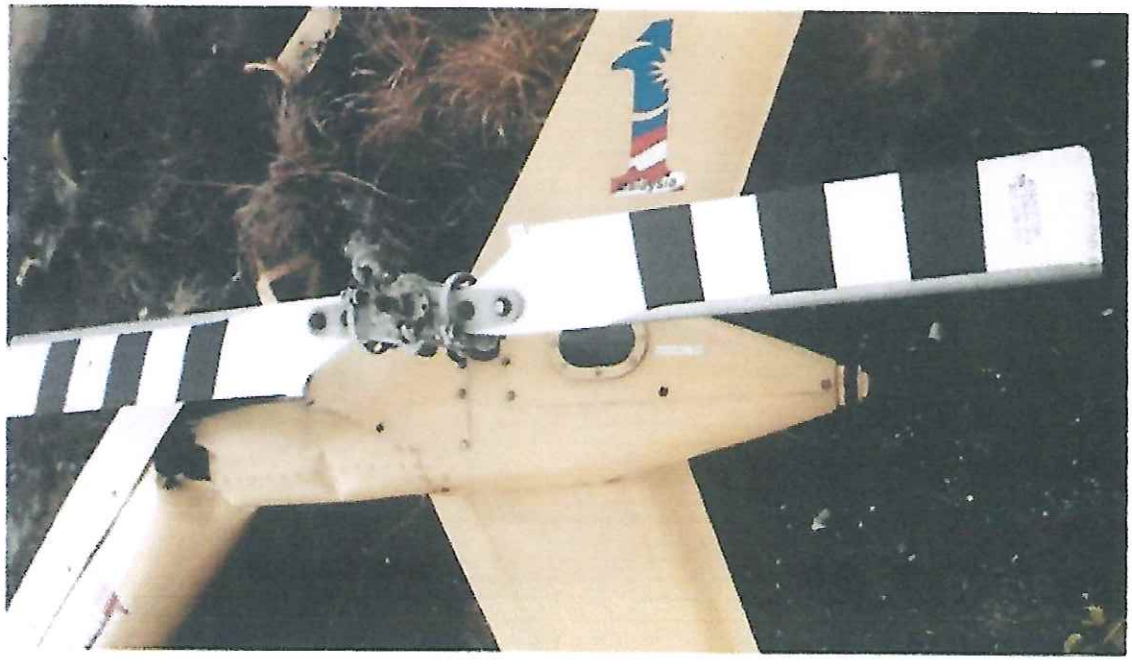
Engine assembly RR250-C20B S/N CAE 833211 was removed and sent to Heli-Holland Technics to put on test rig to determine the engine functional as requested by BSKU. Heli-Holland Technics teardown report is enclosed herewith.

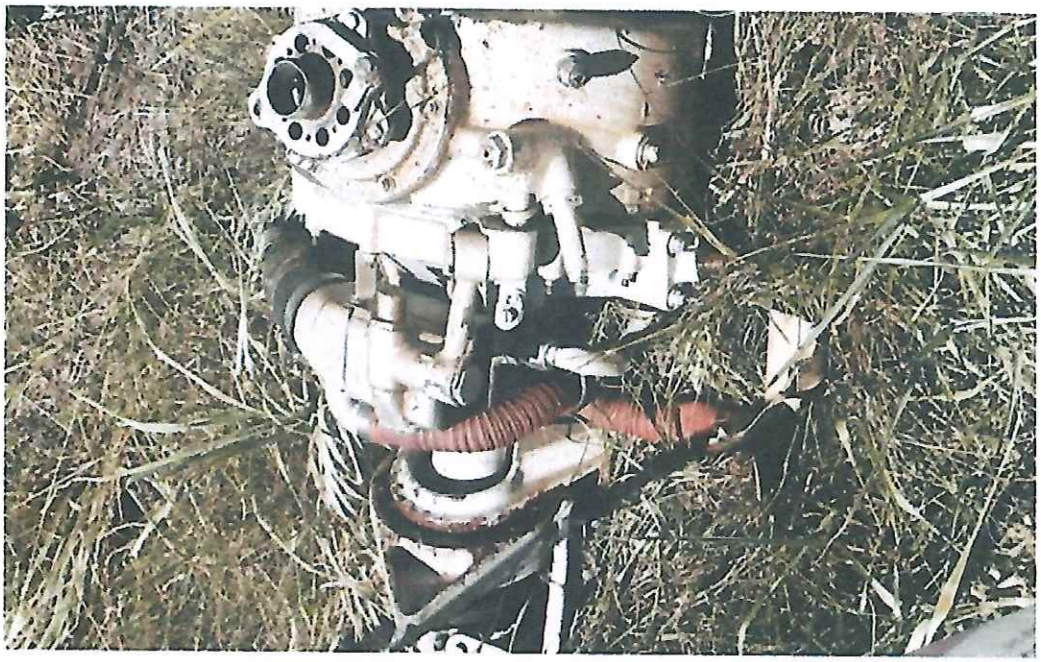
Salvage Report compiled by,

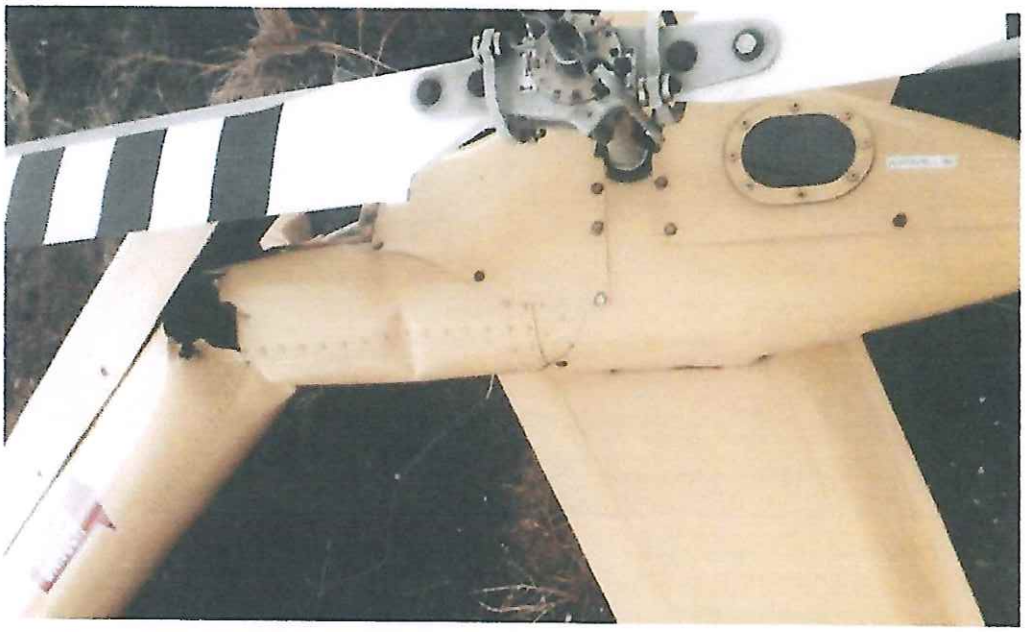
.....

Eric Lee
Quality & Safety Manager

☐ 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







Heli Holland
TECHNICS

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

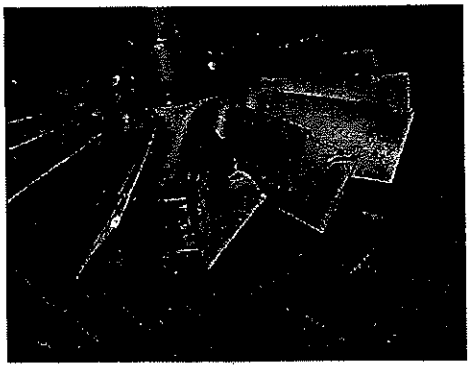
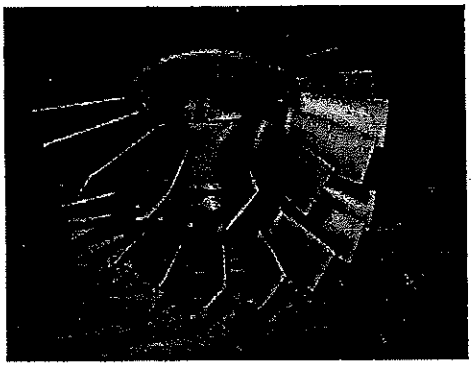
The engine was received in a steel engine container without apparent shipping damage. The original Engine logbook was not present within the shipment, so it might be possible some part numbers are incorrect or missing.

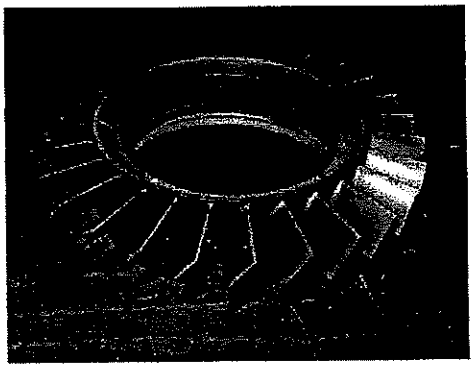
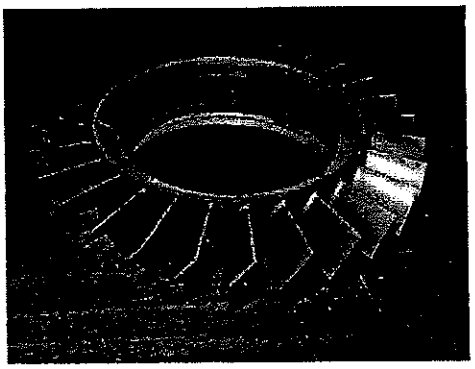
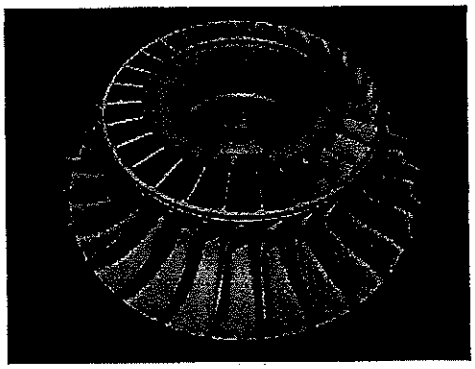
3.0 Disassembly and Inspection Findings

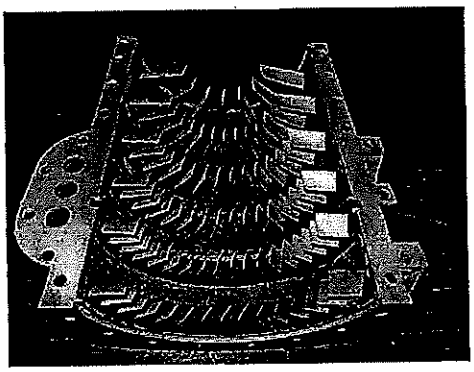
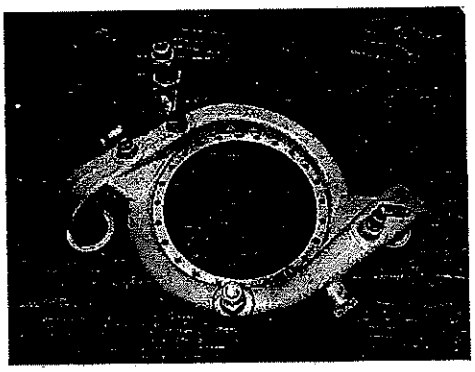
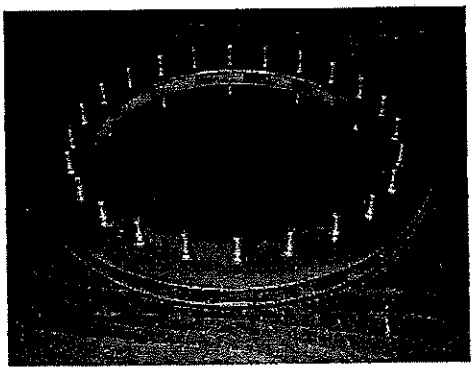
Following receipt, the engine sections (Compressor, Turbine, Gearbox) were visually inspected. No MPI / FPI inspections were performed. All visual damage is caused by FOD. sustained as a direct result of the accident. Functional test of the engine was not permissible due to extensive FOD damage.

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	

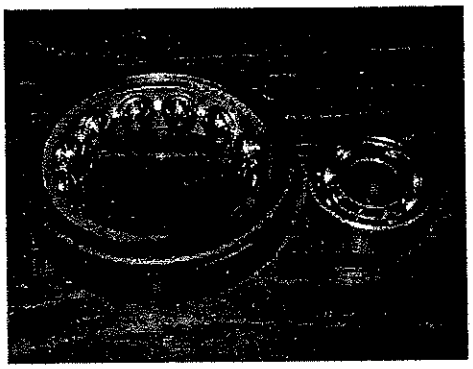
Nomenclature / Part No / Discrepancy / Disposition	Photo
5th Stage Compressor Wheel Part No. 23057115 S/N: E60099 Damaged vanes due to the FOD	
6st Stage Compressor Wheel Part No. 23057116 S/N: KR58292 Damaged vanes due to the FOD	
Impeller Assy Part No. 23058147 S/N: KR96571 Damaged due to the FOD	

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

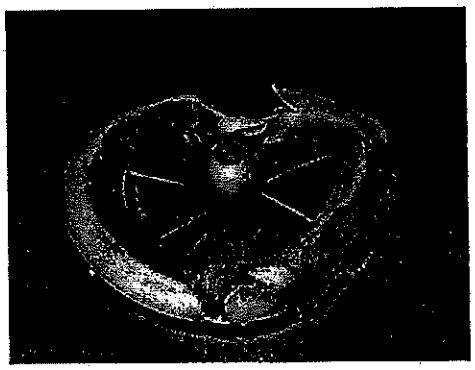
Bearings
#2 bearing Part No. 6889093
S/N: FAG124658
Small #1 bearing Part No. 6898607
S/N: J309

Visual Inspected, no cause for failure.



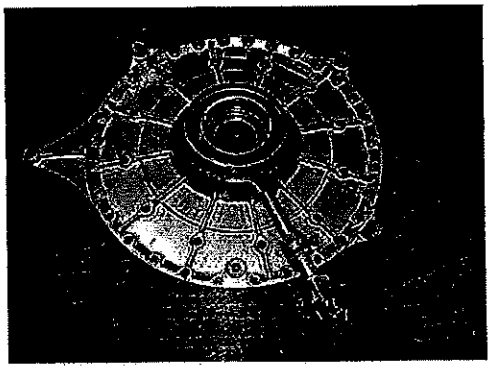
Compressor Front Support
Part No.
S/N: 20729

Damaged due to the FOD.



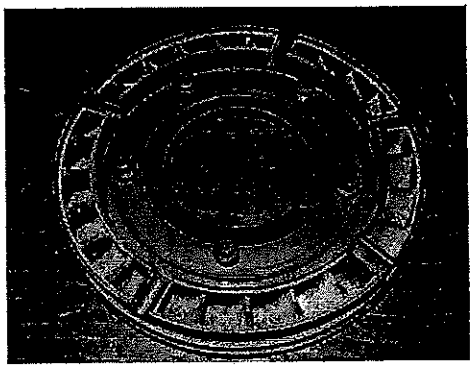
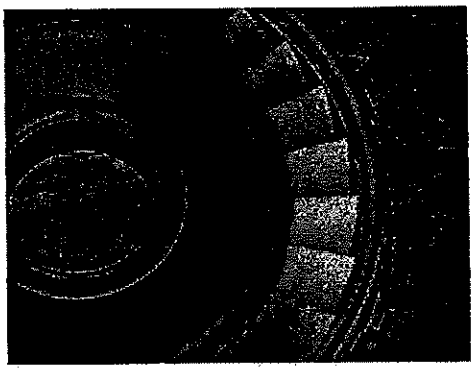
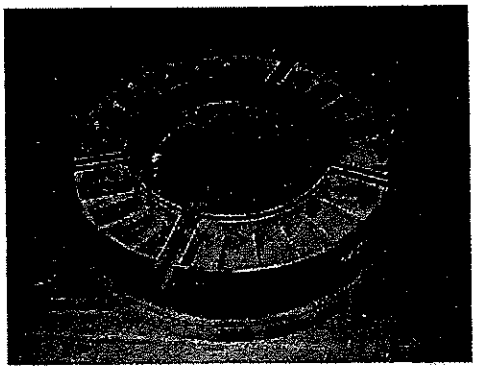
Rear Diffuser
Part No. **not readable**
S/N: not readable

Visual Inspected and found serviceable



Turbine section

P/N 6894171 S/N CAG37465

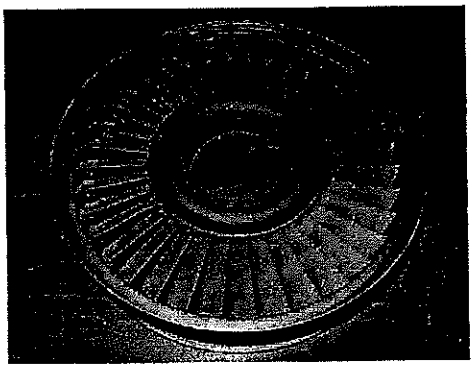
Nomenclature / Part No / Discrepancy / Disposition	Photo
No. 1 Nozzle Part No. 23062753 S/N: 245158 Visual Inspected, no damaged notified.	
No 2 Nozzle Part No. 23031938 S/N: SAAP 1534 Visual Inspected, No damage notified	
No. 3 Nozzle Part No. NOT READABLE S/N: C-31759 Visual Inspected, no damage notified.	

Nomenclature / Part No / Discrepancy / Disposition	Photo

No. 4 Nozzle

Part No. 23061922
S/N: H24910

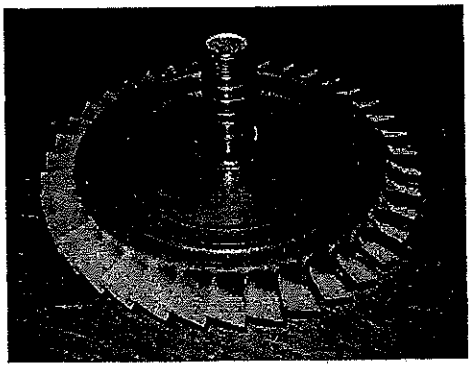
Visual Inspected, No damage notified.



No. 1 Turbine Wheel

Part No. 6886407 AP
S/N: X143668

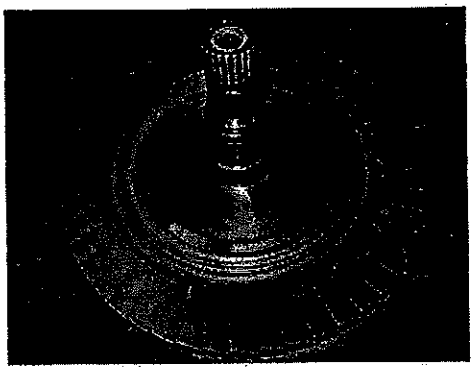
Visual Inspected, no damage notified.

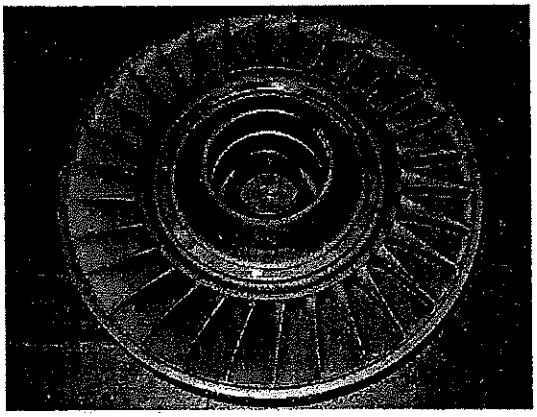
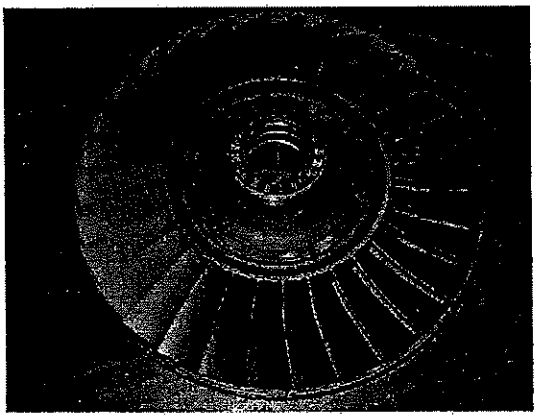
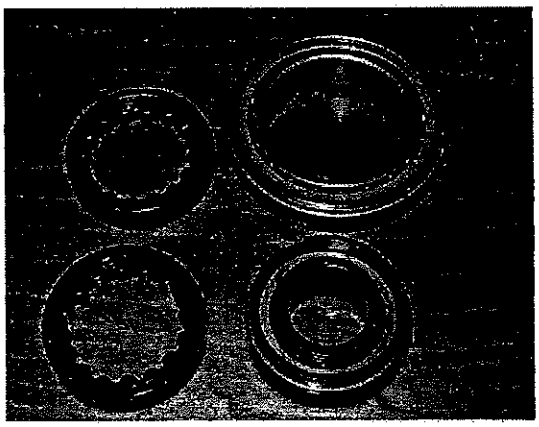


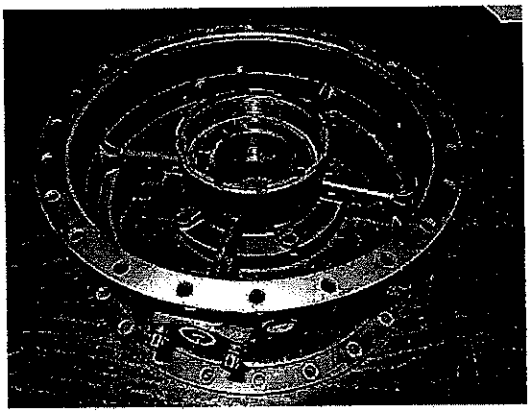
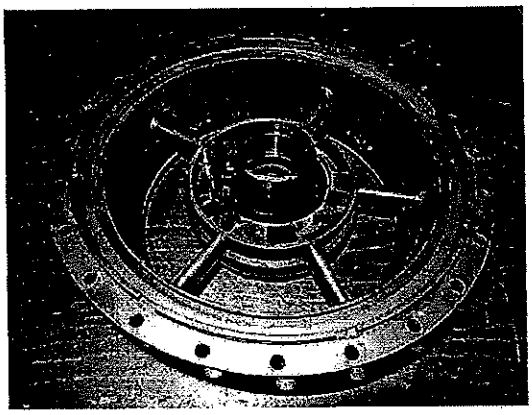
No 2 Turbine Wheel

Part No. NOT READABLE
S/N: HX121626

Visual Inspected, no damage notified.

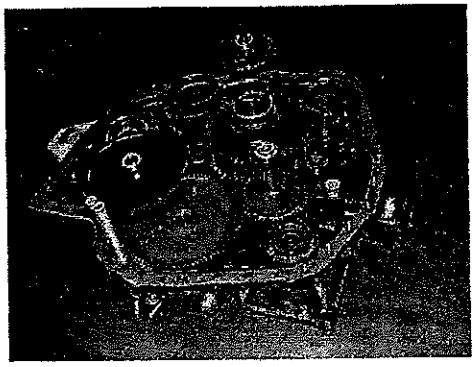
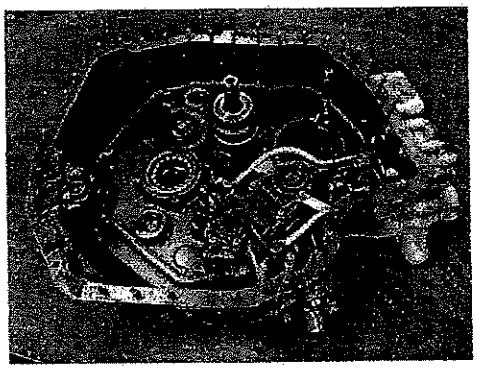


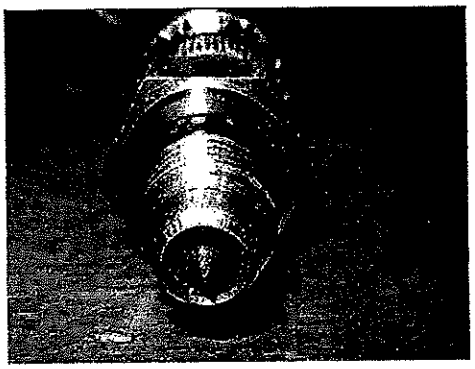
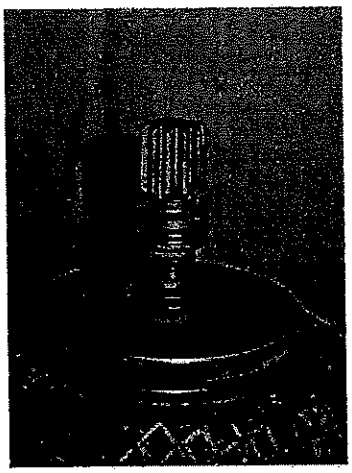
Nomenclature / Part No / Discrepancy / Disposition	Photo
No. 3 Turbine Wheel Part No. NOT READABLE S/N: **HX82932** Visual Inspected, no damage notified	
No. 4 Turbine Wheel Part No. **NOT READABLE** S/N: **HX70462** Visual Inspected, no damage notified	
Bearings Turbine Assy Visual Inspected, no damage 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
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Or email

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