



AIRCRAFT ACCIDENT REPORT AND EXECUTIVE SUMMARY

				Reference:	CA18/2/3/9585	
Aircraft Registration	ZU-JVR	Date of Accident	7 December 2016		Time of Accident	0900Z
Type of Aircraft	Van's RV 10		Type of Operation		Private (Part 91)	
Pilot-in-command Licence Type		Private Pilot License	Age	48	Licence Valid	Yes
Pilot-in-command Flying Experience		Total Flying Hours	1690.3		Hours on Type	Unknown
Last point of departure		Zebula Lodge Airstrip, Limpopo Province				
Next point of intended landing		Vaalwater private airstrip, Limpopo Province				
Location of the accident site with reference to easily defined geographical points (GPS readings if possible)						
Limpopo Province on the mountainous terrain 6nm north east of Zebula airfield on a place with GPS: S 24°38'36.25", E 027°58'54.47" and a field elevation of 4583ft.						
Meteorological Information		Wind direction: 220; wind speed: 04kt; Air temperature: 32; Visibility: CAVOK				
Number of people on board	1+0	No. of people injured	1	No. of people killed	1	
Synopsis						
<p>Aircraft registered ZU-JVR was reported missing following arrival overdue at Zebula Lodge airstrip (home base). The pilot initiated his took off preparations at approximately 08:55Z with intension to visit two of his farms in the area of Vaalwater, Limpopo Province and Delmas in the area of Mpumalanga province. Take-off was at approximately 0900Z with intensions to visit Vaalwater farm first. At approximately 1300Z, a family member tried calling the pilot to advise him about the adverse weather conditions in the area around home base however was unsuccessful. Further contacts were made to both headmen in both farms whereby they were informed that the pilot never made it either one of the farms.</p> <p>The search and rescue team was activated the same day and was unsuccessful due to day light fading. The aircraft wreckage was then discovered the next morning 6nm north east of Zebula airstrip on the mountains at approximately 03:58Z as the search and rescue continued. The pilot was fatally injured and the aircraft was destroyed.</p> <p>Investigation revealed that the aircraft impact with terrain at a high speed and a high angle of impact as a result of the undetermined loss of control</p>						
Probable Cause						
<p>The aircraft impact with terrain at a high speed and a high angle of impact as a result of the undetermined loss of control during flight.</p>						
SRP Date	November 2017		Release Date	21 May 2018		

AIRCRAFT ACCIDENT REPORT

Name of Owner : Bur Lanka Boerdery (PTY) LTD
Name of Operator : Bur Lanka Boerdery (PTY) LTD
Manufacturer : Van's Aircraft
Model : RV-10
Nationality : South African
Registration Marks : ZU-RVJ
Place : Limpopo Province (6nm North East of Zebula airfield
GPS: GPS S 24°38'36.25", E 027°58'54.47" with a field
elevation of 4583ft.)
Date : 07 December 2016
Time : 0900Z

All times given in this report are Co-ordinated Universal Time (UTC) and will be denoted by (Z). South African Standard Time is UTC plus 2 hours.

Purpose of the Investigation:

*In terms of Regulation 12.03.1 of the Civil Aviation Regulations (2011) this report was compiled in the interest of the promotion of aviation safety and the reduction of the risk of aviation accidents or incidents and **not to establish blame or liability.***

Disclaimer:

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1. FACTUAL INFORMATION

1.1 History of Flight

- 1.1.1 The pilot initiated his take-off preparation at approximately 08:55Z from Zebula airfield on his daily routine to visit two of his farms, one in Vaalwater in the area of Limpopo Province and the other in Delmas in the area of Mpumalanga Province. Take off run was at approximately 0900Z, with intentions to visit Vaalwater farm

first. Fine weather conditions prevailed in the surrounding area of Zebula at the time of take-off. At around 13:00Z which was the time when the pilot was expected to take off for his return flight from either one of the farms, the weather in the area of Zebula changed with signs of heavy thunderstorms. A family member tried to contact the pilot to alert him about the situation and to also stop him from flying back but was unsuccessful.

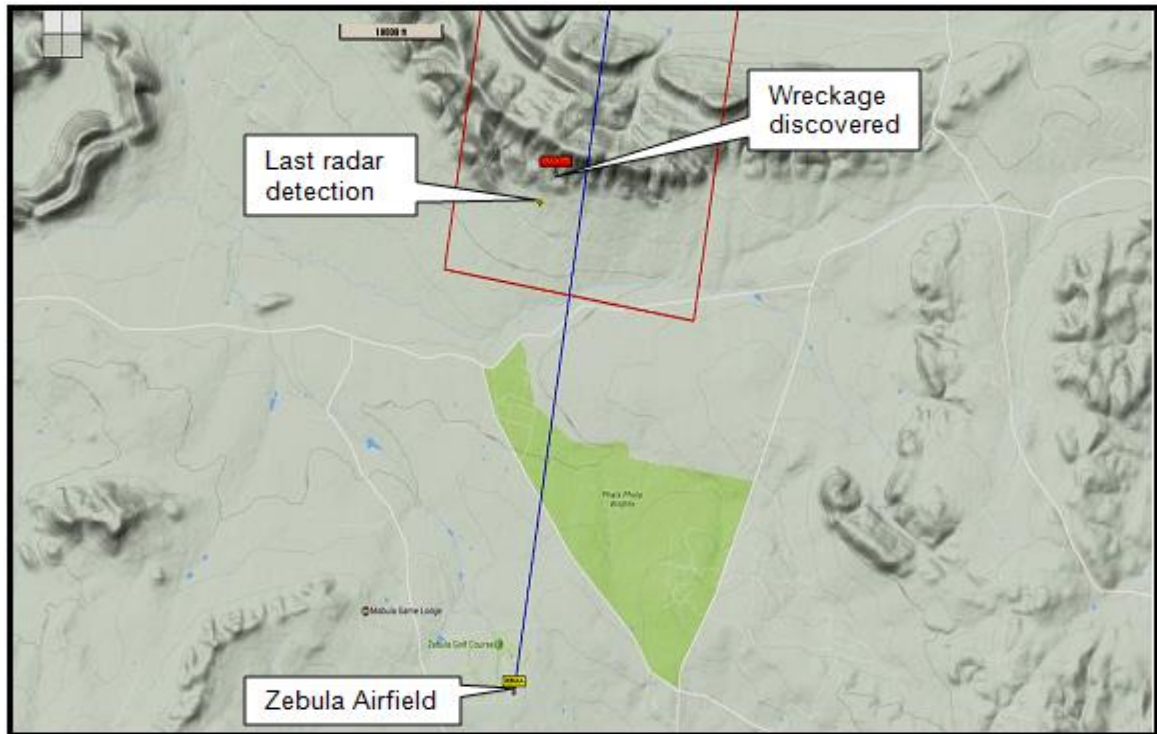


Figure1: Satellite view of where the aircraft wreckage was found

- 1.1.2 They then contacted each head men on each farm and in return were informed that the pilot never arrived in either side. A missing aircraft was reported to ARCC who initiated a preliminary investigation. It was then established that ZU-JVR was overdue at his home base. The electronic locating transmitter (ELT) investigated with Telkom radio was conducted and no alert was received on frequency 406 Mhz. The South African Air Force, South African Police Service, MCSA were subsequently put on standby for deployment. The radar investigation was initiated whereby a track which was only visible for 30 seconds at 5800ft was detected at the time 09:03Z in the direction north towards the mountains at approximately 6nm. The search was then initiated at a formulated area of 100Nm with 2Nm in each side.
- 1.1.3 The aircraft wreckage was discovered the morning of the next day at approximately 7nm north, north east of Zebula airstrip on the mountains. The aircraft was found destroyed at a place with GPS S 24°38'36.25", E 027°58'54.47" with a field elevation of 4583ft.

1.2 Injuries to Persons

Injuries	Pilot	Crew	Pass.	Other
Fatal	1	-	-	-
Serious	-	-	-	-
Minor	-	-	-	-
None	-	-	-	-

1.3 Damage to Aircraft

1.3.1 The aircraft was destroyed during the accident sequence



Figure 2: Shows the aircraft remaining wreckage

1.4 Other Damage

1.4.1 None

1.5 Personnel Information

- 1.5.1 The pilot was a frequent flyer who daily visited two of his farms. According to his flight folio recordings, he flew two of his aircrafts (Sling II or RV10) frequently between Zebula, Vaalwater and Delmas for daily visits on his farms.

Nationality	South African	Gender	Male	Age	48
Licence Number	0272441791	Licence Type	Private Pilot License		
Licence valid	Yes	Type Endorsed	Yes		
Ratings	None				
Medical Expiry Date	30 November 2016				
Restrictions	None				
Previous Accidents	None				

Flying Experience:

Total Hours	1690.3
Total Past 90 Days	Unknown
Total on Type Past 90 Days	Unknown
Total on Type	Unknown

- 1.5.2 The pilot's medical investigation was conducted and nothing according to the medical history was noted which could be attributed to the cause of this accident. According to the available information, both the pilot and the aircraft logbooks were not up to dated. The aircraft logbook was last updated on 26 October 2016 following the annual inspection service. The pilot logbook was last updated on 15 September 2016 when he was doing the Sling PPL renewals. The investigation also revealed that the pilot in several occasion recorded unusual flying hour exceeding the both aircraft capabilities and which are unpractical to execute. The pilot has recorded 52.4, 26.2, 22.9 and 27.8 flying hour in daily basis in the years between January 2014 and January 2015.

1.6 Aircraft Information

Airframe:

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Figure 3: Shows the aircraft type

- 1.6.1 The aircraft is a four seater equipped with one front engine (Lycoming IO-540-D4A5 with six cylinder, direct drive. The landing gear legs are spring steel to which fibre glass fairing have been fitted to reduce drag. The nose wheel is a castoring type wheel. According to the available information, the flight folio records were last updated on 31 September 2016. According to the available records, the aircraft was last refuelled on 30 November 2016 at Kitty Hawk Deport aerodrome with approximately 106.865 litres of avgas fuel type.

Flight Control System

Flight control integrity is essential for safe flight. At installation of after maintenance it should be confirmed that all controls are connected, secured and safely tied and that they all operate smoothly and in the correct direction. Full travel should be confirmed prior to each flight. No play should be permitted in the control hinges; sloppiness may induce flutter. Similarly trim tabs must be free of play.

Dual controls are fitted. Elevator and ailerons are operated through a system of adjustable push rods. The rudder is operated through a cable system to the rudder pedals. Pitch trim is by dual tabs on the elevators actuated by an electric servo. Roll trim is by a spring system actuated by an electric servo located in the left wing at

the most inboard access panel. Pitch and roll trim are selected by a set of four switches on the pilot's stick grip. Trim positions are depicted on LCD indicators located on the lower left portion of the instrument panel. Flaps are operated electrically and are controlled by a switch mounted on the pilot stick grip. A flap positioning system selects Reflex, 10, 20 and 33 degrees (need to confirm with measurements) of flap automatically with a temporary press of the flap actuation switch. The up position of the switch is used to select intermediate values of flap or to fully retract the flaps.

Stall Warning

The stall warning is triggered by a vane located on the left wing. The angle of attack which activated this warning is adjustable by changing the switch position and banding of the vane. The buzzer for the stall warning is located on the sub-panel.

Type	RV-10	
Serial Number	41361	
Manufacturer	Van's Aircraft	
Date of Manufacture	2013	
Total Airframe Hours (At time of Accident)	Unknown	
Last MPI (Date & Hours)	26 October 2016	288.2
Hours since Last MPI	Unknown	
C of ATF(Expiry Date)	25 October 2017	
C of R (Issue Date) (Present owner)	08 May 2013	
Operating Categories	Standard Part 94 NTCA	

NOTE: According to the available information, both the pilot and the aircraft logbooks were not up to dated. The aircraft logbook was last updated on 26 October 2016 following the annual inspection service. The pilot logbook was last updated on 15 September 2016 when he was doing the Sling PPL renewals.

Engine:

Type	Lycoming [YIO-540-D4A5]
Serial Number	EL-35621-48E
Hours since New	288.2

Hours since Overhaul	TBO not yet reached
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Propeller

Type	Hartzell [CY2R-1BFP]/ F8068D
Serial Numbers	NS1467B
Hours since New	288.2
Hours since Overhaul	TBO not yet reached

1.5.2 Aircraft maintenance records were studied and review. According to the available information, the aircraft was equipped and maintained by a regulator approved AMO and personnel in accordance with the manufacture's prescribed procedures. The aircraft was released from service on the 26 October 2016 following an annual inspection. All service bulletin and service letters published by the manufacture were adhered by both maintenance organisations and the owner.

1.7 Meteorological Information

1.7.1 Meteorological information as obtained from the official weather service.

Wind direction	220°	Wind speed	04kt	Visibility	CAVOK
Temperature	32°C	Cloud cover	Unknown	Cloud base	Unknown
Dew point	14°C				

1.8 Aids to Navigation

1.8.1 The aircraft was equipped with the standard factory-fitted navigational equipment that meets the regulator's requirement. No defects to this equipment were recorded prior to the flight.

1.9 Communications

1.9.1 The aircraft was equipped with one VHF (very high frequency) radio that meets the regulator's requirements. No defects were recorded with it before the flight.

1.10 Aerodrome Information

1.10.1 The aircraft accident occurred at approximately 7nm north, north east of Zebula airfield at an area with GPS: GPS S 24°38'36.25", E 027°58'54.47" with a field elevation of 4583ft.

1.11 Flight Recorders

1.11.1 The aircraft was not equipped with a flight data recorder or cockpit voice recorder. Neither was required by the relevant aviation regulations.

1.12 Wreckage and Impact Information

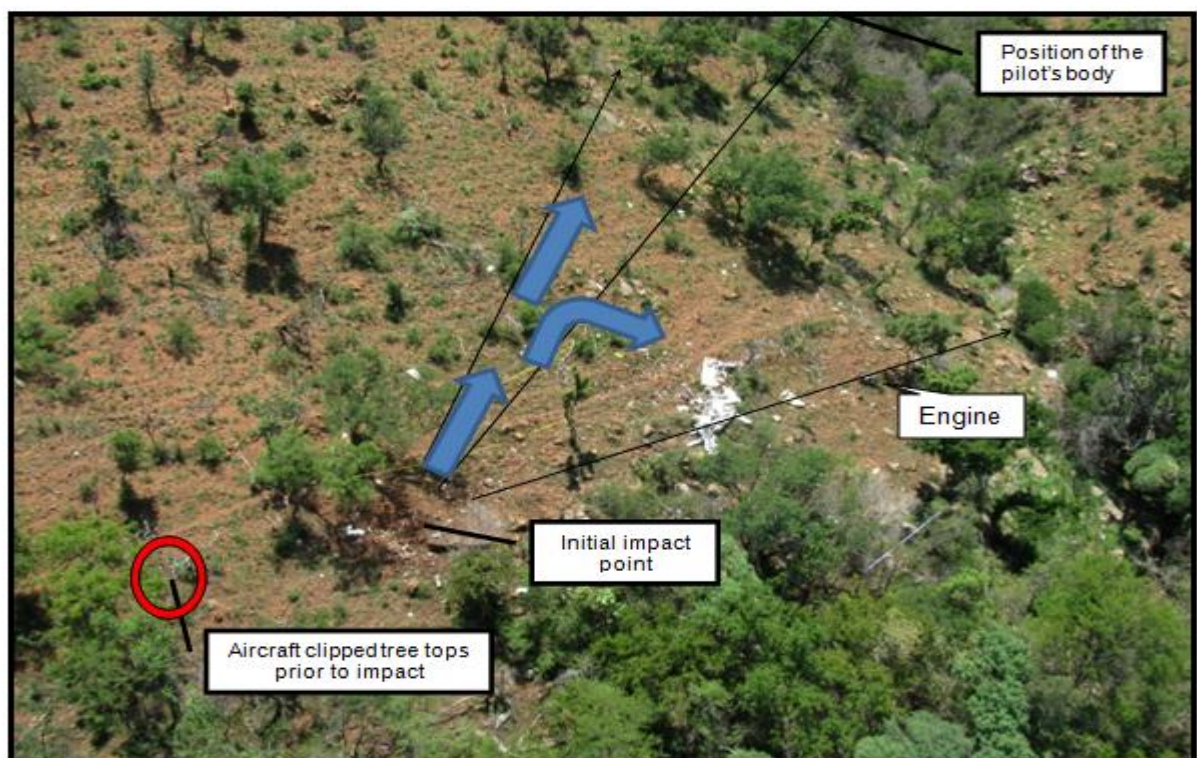


Figure 4: Shows the accident site

1.12.1 The aircraft was found on the mountainous terrain destroyed 6nm north east of Zebula airfield at a place with GPS S 24°38'36.25", E 027°58'54.47" and a field elevation of 4583ft AMSL. Zebula airfield is situated at an elevation of approximately 4194ft AMSL. The highest point of the mountain peak is approximately 5400ft AMSL. The aircraft's initial impact point was with the nose first

on a rocky surface and was followed by the left wing outer leading edge with the tree. A wreckage trail (blue arrows) shown by the on-site ground marks observation is indicative with the aircraft that continued moving uphill following the impact however lost momentum and settle on some trees few metres down the slope. The wreckage pattern is indicative of the aircraft that impacted at a high speed and high angle of impact. This was also indicated by one of trees next to the initial impact point which was clipped on top.



Figure 5: Shows the remains of the wreckage

1.12.2 Both propeller blades were discovered damaged at the accident site within five meters from the initial impact point. One blade was located in the bushes towards bottom of the mountain on the right hand side of the initial impact point in relation with the aircraft initial direction whereas the other one was at close proximity to the initial impact point and was destroyed. The damages are indicative of an object that got damaged while it was driven at high engine power. The engine was found at a distance of approximately 20m from the initial impact point leaning against the tree. The aircraft cockpit top was found 80 metres next to the pilot remaining body. The main wreckage was destroyed and was folded together.



Figure 6: Shows the wreckage damages

1.12.3 Wreckage examination

- The wreckage inspection indicated that the aircraft was configured correctly for the flight. This was also indicated by elevator trim tab wheel which was in a correct position.
- The propeller hub damages were indicative with direct impact with a rocky surface at a high angle of impact.
- All landing gear separated from the main wreckage.
- According to the position of the tree and the point at which the aircraft clipped the branch in reference to the impact point, the induced angle of impact was determine to be at approximately 40°.
- The damages of the propeller hub are indicative with the aircraft that impacted first with the nose.



Figure 7: Shows damages on both propeller blades

- There was evidence of fuel spillage with a great smell around the area where the aircraft crashed and along the wreckage trail and also on the wreckage.

1.13 Medical and Pathological Information

1.13.1 The pathological report does not entail much about the cause of the death of the pilot due to the limited body parts which were remaining. The cause of the death was due to multiple injuries during the accident sequence.

1.14 Fire

1.14.1 There was no sign of pre or post impact fire.

1.15 Survival Aspects

1.15.1 The accident was not considered survivable. The aircraft cockpit top was found 80m next to the remains of the pilot's body. The aircraft harness which the pilot was making use of during flight failed during the accident sequence. According to the pilot family and friend, he did not like using the shoulder harness rather he will wear the bottom straps during flight. They stated that he always found them irritating and uncomfortable during flight. Due to the severity of the impact forces, the aircraft cockpit section was destroyed. The aircraft structure was destroyed and folded from front to back squashing everything in between (Refer to Figure 5). The search and rescue was dispatched late and was not successful on the first day due to light conditions fading. The aircraft was discovered the morning of the next day. The aircraft electronic transmitting locator was never activated on this aircraft.

1.16 Tests and Research

1.16.1 The aircraft engine was recovered for further investigation tests and no anomalies were noticed. The condition of wreckage damages could not allow us to remove any of the airframe and control system components for testing. All damages on both the

flight controls and power-plant were accounted for and were attributed to as the results of the impact forces during the accident sequence.

1.17 Organizational and Management Information

1.17.1 The aircraft was operated by a PPL pilot under private capacity with the provision of standard Part 94 of the Civil Aviation Act as Non Type Certified Aircraft.

1.17.2 The AMO that maintained the helicopter was a regulator approved and it maintained the helicopter in accordance with approved procedures. The last Annual Inspection (MPI) on the aircraft was on 26 October 2016 at 288.2 airframe hours.

1.18 Additional Information

1.18.1 According to the statement given by both family and friends, they all had an experience of flying with the pilot. One thing which they are certain was that the pilot did not like wearing the shoulder straps during flight. According to the pilot he find them irritating to wear rather he will wear the waist straps instead. In overall flying everyone expressed that it was enjoyable flying with him due to his experience and passion for flying. Also they stated that besides flying the pilot had passion for food and he really loved his food more especially preparing them. Apart from cooking the pilot was involved in sport like golf and he also liked fishing.

1.18.2 According to a family member, the pilot on the night before the accident date complained about stomach pains before he slept however in the morning upon waking-up he informed them that he was feeling better. The pilot loved his family more especially his elder son whom he often played golf with. There was no financial constrain which the family was aware of. However they knew that the pilot's business partner (his father) use to put him under pressure when things don't go accordingly with the business. In most occasions the pilot was able to overcome the stress and coped with the circumstances.

1.18.3 According to a close friend who is also a type rated stated that, following this accident he took time during his research of what might have happened based on the observation of the accident site judging by the distance of were the airstrip was based. Considering the possible angle of impact and the distance of were the

aircraft was coming from. Knowing his friend (accident pilot) and the conditions that he usually finds himself in relation to the daily operations as they have similar daily operations of been in charge of their own business. The only reason he could establish was if the pilot was not in control of the aircraft due to incapacitated caused by either any other measure that could cause pilot incapacitation during flight. Although he did not know of any medical history diseases relating to the pilot's health, this was the only valid reason he could think of that might have caused the pilot to crash that way. Societal thoughts were never an option for the accident pilot as far as they know him due to the passion he had for his business and everything he was involved with. The friend also stated that he learned a lot from the pilot and he was always very encouraging person and courageous.

Also the pilot's friend stated that he did take time to make a simulated flight experiment for the incapacitation condition without wearing the shoulder straps. According to his experience he would not want to find himself in the same induced conditions again. The aircraft nosed down and increased speed rapidly at an angle between 40 and 45 degree.

1.19 Useful or Effective Investigation Techniques

1.19.1 None

2. ANALYSIS

2.1 The pilot was licensed and qualified for the flight. He held a valid medical certificate that had no waves. No medical history was found in the pilot's file that can be attributed to the cause of this accident. The pilot's experience on the aircraft type was sufficient. He was a frequent flyer who used either one of his aircrafts as his transport mode to visit his two farms.

2.2 According to the available information, the aircraft was maintained and equipped for the flight accordingly. No were in the aircraft logbooks was denoted of any of the defect that could have contributed to this accident. The maintenance organisation and personnel who maintained the aircraft were approved by the regulator and have maintained the aircraft in accordance with manufacturer's approved procedures. No anomalies were observed during wreckage examination regarding the aircraft's

flight controls and the power-plant that could be attributed to the cause of this accident.

- 2.3 Good weather conditions prevailed on the day at the time of the accident. Although there was bad weather later in the day, it could not be considered a contributory factor to this accident.
- 2.4 The pilot took off from Zebula airstrip on a private flight to his farm in Watervaal as reported. The aircraft wreckage was found 7nm in the direction north, north east of Zebula airfield. The impact marks and the position where the aircraft wreckage was found shows that the aircraft crashed moment after take-off. This also was attested by the family member as they tried to contact him and made follow-ups at the farm but were un-successful. The pilot never reached the planned destination.
- 2.5 According to the details of the wreckage distribution and impact pattern. The aircraft impacted the terrain at a high speed and a high angle of impact. The angle and the attitude at which the aircraft impacted with the terrain is indicative of the aircraft that was not under the pilot's control prior to impact. The radar investigation was initiated whereby a track which was only visible for 30 seconds at 5800ft was detected 6nm at the time 0903Z (refer to figure 1). The aircraft is known to have took-off at 0900Z. The highest point of an obstacle to be cleared along the aircraft route was at approximately 5400ft AMSL at a distance of approximately 7.5nm north, north east of Zebula airstrip which was the same mountain where the aircraft crashed.

It is the investigator's opinion that based on the radar investigation the pilot was able to climb to the safe flight level preparing to clear the obstacle (mountain highest point) however something happened that caused the aircraft to loss height and collided with terrain.

1. According to the aircraft maintenance record and the engine tests conducted, no anomalies were observed on the aircraft. Although the aircraft wreckage was destroyed due to the impact damages, no anomalies could be noticed during the wreckage examination which could be attributed to the cause of this accident. All damages of the aircraft systems and structure were attributed to the impact sequence. The aircraft was destroyed extensively. It could be possible that something went wrong with the aircraft controls that led to this accident; however it could not be established due to the condition of the damages of the wreckage.

2. Also due to the unknown conditions relating to medical of the pilot at the time of the accident that could relate to any chronic and the limited information from the pathological tests, it could be possible that the pilot was incapacitated in-flight and was not in control of the aircraft during the accident sequence. According to his friend and family, there is nothing that they can relate to that could have contributed to this accident except for when he was not in control of the aircraft due to possible in-flight incapacitation. Due to the fact that the pilot was known not to use his shoulder straps during flight, it could be that he had experienced an in-flight incapacitation and fell onto the flight control pushing them forward. The aircraft then nosed down losing height and increased speed rapidly due to an induced attitude until the point of impact with terrain.
3. The investigation concludes that the aircraft accident was due to collision with terrain at high speed and high angle of impact which can be related to either one of the above conditions in discussion. However the exact cause of the accident could not be determined.

3. CONCLUSION

3.1 Findings

- 3.1.3 The pilot was licensed and qualified for the flight. He held a valid medical certificate.
- 3.1.2 The aircraft was equipped and maintained in accordance with the manufacturer's recommended procedure by the regulator approved maintenance organisations.
- 3.1.3 The weather conditions at the time of the accident prevailed with good conditions and could not be considered a contributory factor.
- 3.1.4 The aircraft's wreckage pattern was indicative of the high speed and a high angle of impact.
- 3.1.5 The attitude at which the aircraft impacted the ground is associated with the aircraft which was not under the pilot's control.
- 3.1.6 The pathological information could not reveal any other significant finding that could have contributed to this accident due to the limited body parts during the tests.

- 3.1.7 According to the pilot's friend and family, he was known not to use the shoulder straps during flight as he found them irritating.
- 3.1.8 According to the on-site examination and the available maintenance records there was no defect noted relating to aircraft systems and controls that can be attributed to this accident.
- 3.1.9 The cause of the accident can be attributed to incapacitation e.g heart attack which could have caused him to fell on the flight controls causing the aircraft to nose down and increase speed rapidly until the point of impact.

3.2 Probable Cause/s

- 3.2.1 The aircraft impact with terrain at a high speed and a high angle of impact as a result of the undetermined loss of control during flight.

3.3 Contributing Factors

- 3.3.1 The loss of control could not be determined.

4. SAFETY RECOMMENDATIONS

- 4.1 None

5. APPENDICES

- 5.1 None