
# AIRCRAFT ACCIDENT INVESTIGATION BOARD

## FINAL AIRCRAFT ACCIDENT REPORT FOR A TANARG NEO MICROLIGHT, 9J – YVT THAT OCCURRED IN LIVINGSTONE, ZAMBIA ON 10th JANUARY, 2020.

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## INTRODUCTION

On Friday 10th January, 2020, an accident involving a Microlight operated by Batoka Sky Limited was reported to the Director General, Civil Aviation Authority (CAA) who immediately relayed the information to the Aircraft Accident investigation Board (AAIB). The aircraft involved was a Tanarg Neo Microlight, National Registration Marks 9J-YVT, Manufacturer's Serial Number T19028. It was reported to have crash landed away from Maramba Aerodrome.

The interim Director Aircraft Accident Investigation Board immediately constituted an investigation team made of 2 staff pertaining to the domains of operations and airworthiness to travel to the accident scene.

## SYNOPSIS

On Friday January 10, 2020, a Tanarg Neo Microlight operated by Batoka Sky Limited departed from Maramba aerodrome with the intention of conducting a performance check flight below the special rules area (SRA). At about 05:42 Hours UTC the Pilot tried to make an emergency landing on the road leading to Baobab Ridge helipad with the Microlight in a simulated engine failure mode. However, during the process of emergency landing, the Microlight right hand main landing gear hooked up in the 11kV ZESCO powerline causing the microlight to lose control and crash about 15 meters from the power lines. One Crew member on board died on impact while the other survived. The microlight sustained substantial damage. No post-crash fire broke out. The investigation team concluded that the cause of the accident was due to executing of simulated emergency landing in hazardous conditions. Further, other possible contributory and latent factors were identified.

## 1. FACTUAL INFORMATION

### 1.1 History of Flight

The Microlight took off from Batoka Sky airfield for a performance check in emergency situations with two (2) Batoka Sky limited staff [Pilot in command (P1) and observer pilot (P2)]. Weather observed at Harry Mwaanga Nkumbula International Airport at the time of the accident was as follows:

METAR FLHN 100700Z VRBO1KT

CAVOK 23/21, Q1016 AT 0600Z, QFE WAS 902.9 and QNH 1016

Batoka Sky's Tanarg Neo Air Creation Trike (Microlight), Registration number 9J-YVT, and Manufacturer's Serial Number T19028 was on a line Check flight as well as Performance check in Emergency Situations. Having completed the line checks around the Batoka Sky Airfield, the Microlight headed for the performance check in emergency situations away from the airfiled. During an attempt to perform a simulated emergency landing off road, a decision was made to overshoot due to sudden sighting of 11 kV ZESCO cables crossing in close proximity.

The Microlight rear right wheel ended up hooking in the power lines (Fig.2, Fig 4.2) pitching the aircraft forward and simultaneously swinging the nose end to the right, initiating an uncontrolled spin. It crashed into the bushes 15 meters ahead of the Power lines on the left-hand side of the gravel road leading to Baobab Ridge Helipad (Fig 6.1 – Fig. 6.4).

Maintenance log books state that no anomalies were found in the pre-flight check done by the Pilots and the technical crew at Batoka Sky Airfield. There was no flight plan filed to Harry Mwaanga Nkumbula International Airport Office.

TABLE 1: Factual Information

| | |
|---|---|
| **Flight Rules** | Visual Flight Rules (VFR) |
| **Departure Aerodrome** | Maramba Aerodrome (Batoka Sky Airfield) |
| **Estimated Off Block Time** | 05:15 UTC |
| **Cruising Speed** | 60 Knots |
| **Cruising Altitude** | 4500FT |
| **Route Of Flight** | Batoka Sky Airfield-Victoria Falls-Batoka Sky Airfield |
| **Destination Aerodrome** | Circuit Flight terminating at Batoka Sky Airfield |
| **Endurance** | 2 Hours |
| **Persons On Board** | 2 |

The progress of the flight up to the accident after take-off from Batoka Sky Airfield was stated by the Pilot (P2) as follows;

*"The Pilot and myself set out to Complete his 6 monthly Line Check and at the same time review the Air Creation Tanarg Neo performance in Emergency Situations.*

*It was discussed, beforehand, the decreased performance of the Air Creation Trike compared to the Delta Tryke Aviation (DTA) Microlight. So, our goal was to determine the Emergency Handling Characteristics of the Aircraft in Simulated Conditions.*

*After the line check was completed around Batoka Sky Airfield, the Pilot and I set out to do Emergencies off field. We discussed the main road as the Emergency Landing Zone after take-off when a return to FLMR (Maramba Airfield) is not possible. At first, we made a practise approach to the main road and commenced go-around when it was deemed possible to safely land on the main road that leads towards the Avani / Royal Livingstone Hotels. All the time my job at the back was to take mental notes of the Microlight's decent rate from the back seat and record its glide speeds and characteristics, so as to compare the characteristics with the other microlight. The pilot's responsibility as Front Pilot was to control the Microlight as the Tanarg Neo Microlight has no Dual Controls.*

*It was at that point that a question was raised in conditions not favourable to land on the road, such as too much traffic, wind direction and speeds. It was selected by the pilot and myself that the Dirt road leading from the main road towards United Air Charter (UAC) might be an option at last resort. The obstacles on the ground such as the Baobab tree and Electric Poles on the overshoot and shallow trees on the undershoot were noted. The initial touch down point on the road was also discussed. This was acknowledged by the Pilot in the front. We climbed back out towards Maramba.*

*We then returned to the height of around 400-500ft Above Ground Level (AGL) and positioned above Maramba River. At this point it was determined to be unable to safely return to FLMR for a safe Emergency Landing on Runway 29, we then commenced a simulated emergency as if we were on route to the Victoria Falls for a standard Flight.*

*We analysed the initial decent rate and recovery from loss of power. A very big nose down attitude was observed before the aircraft stabilised around 58kts decent speed and about 600-700" per minute decent rate and determined an approach to both options were within Glide Distance. I was in the back noting the approach path and speeds/decent rate. We continued the approach towards the dirt road, and planned our approach.*

*Our approach brought us from Maramba River 90 degrees' perpendicular to the main road. With a left hand turn toward the dirt road. It was decided that a left towards the road would lead us to a satisfactory height on Low Key which is final point before committing to land.*

*As we descended lower, I looked at the approach to make sure the width of the road would be sufficient to harbour the width of the wings in case of any trees. It was at that*

*point we were now at glide speed and on Idle with less than 200ft AGL. I advised the pilot that the landing looks too confined for a safe landing and that we should leave. His response was that "Let's get lower to confirm." It was then that I looked up to assess where the Baobab Tree was and we were slightly left side of the road and at eye level with the Baobab Tree but would avoid it. It was at this point that I noticed to my dismay the power lines across the road. I yelled "Full Power" to which a delayed reaction was apparent. This I can only attribute to surprise by the pilot wanting to confirm for himself. Time in which I feel was crucial enough to possibly have a result in the avoidance of the Lines.*

*The inertia and weight of the Microlight in Glide performance coupled with the delay of application of full power resulted in 9J-YVT not being able to gain sufficient speed and altitude to avoid the Power Lines.*

*End result was our back-right wheel making contact with the power lines pitching the aircraft in a dive and ending in the crash. The exact orientation of which way the aircraft pitched after making contact with the wires is not known to me. I regained orientation on the ground and found myself pinned under the weight of the Microlight upside down. I freed myself from the wreckage and was immediately blinded by the presence of blood in my eyes.*

*It was then that a Pilot from United Air Charters who happened to be on his way to work, found us and started the emergency contacting of appropriate people."*

### 1.2 Personal Information

Pilot (P1): Male, age 49 at the time of the accident
Pilot's License (Microlight)
Date of issue: 05/11/2002
Type Ratings: Land, Single engine
Class 1 Airman Medical Certificate
End of validity May 21, 2020

TABLE 2: Personal Details

| | |
|---|---|
| Total flight time | 8471 hours 00 minutes |
| Flight time, last 30 days | 00 hours 00 minutes |
| Total flight time on Microlight | 8471 hours 00 minutes |
| Flight time, last 30 days on Microlight | 00 hours 00 minutes |

## 1.3 Aircraft Information

### 1.3.1 Microlight

TABLE 3: Microlight Details

| | |
|---|---|
| Type | Air Creation Tanarg Neo |
| Serial number | T19028 |
| Date of manufacture | August 28 2019 |
| Certificate of airworthiness (Permit To Fly) | No. 863 |
| End of validity | November 28, 2020 |
| Airworthiness category | Special Aircraft (g) |

| | |
|---|---|
| Total time in service | 23 hours 30 minutes |
| Flight time since last scheduled 12-month maintenance check (November 10, 2019) | 00 hours 30 minutes |

### 1.3.2 Engines

Type: Rotax 912 Series UL

TABLE 4: Engine Details

| Serial No. | Date of manufacture | Total time in service | Hours on installation (after ground Runs) | Single |
|---|---|---|---|---|
| 9580618 | August 20, 2019 | 35 Hours 15 Minutes | 00 hours 30 minutes | |

The engine, Serial number **9580618** was installed with ZERO hours on 1st November, 2019.

The engine total time run at the launch of the line check flight as well as performance check in emergency situations flight was 35 hours and 15 minutes.

### 1.3.3 Weight and Centre of Gravity

The weight of the aircraft at the time of the accident was estimated to be approximately 475 kg, with the position of centre of gravity at 137.2 cm, both being within the allowable limits.

### 1.3.4 Fuel and lubricating oil

The fuel on board was AVGAS 100LL 40 litres. Oil was also on board.

### 1.4 Injuries to Persons

The pilot (P2) suffered minor injuries to the face and left leg. The pilot in command (P1) was fatally injured.
A report of post-mortem examination was obtained from Livingstone Central Hospital.

### 1.5 Damage to the Aircraft

#### 1.5.1 Degree of damage

The aircraft was substantially damaged. (Fig 6.1)

#### 1.5.2 Aircraft damage by part

(1) Trike Damaged

(2) Fairings Damaged (Fig. 2)

(3) Propeller blades Damaged (Fig. 5.5)

(4) Wing Structure Damaged (Fig. 11)

### 1.6 Meteorological Information

Weather observed at Harry Mwaanga Nkumbula International Airport at the time of the accident was as follows:

METAR FLHN 100700Z VRBO1KT

CAVOK 23/21, Q1016 AT 0600Z, QFE WAS 902.9 and QNH 1016

There was no active weather on the morning of 10th January, 2020.

### 1.7 Aids to Navigation

There were no aids to navigation at Batoka Sky Airfield.

### 1.8 Wreckage and Impact Information

#### 1.8.1 Accident site

The accident site was on the west of Mosi-O-Tunya road which is about 500 meters on the road leading to United Air Charter (Baobab Ridge Helipad) which was targeted as the emergency landing airfield. Impact marks grooved on the shrubs by the Microlight trike were left around the spot where the Microlight dropped upside down. Wheel fairing pieces of broken fibre were found about a radius of 15 to 20 meters around the point of contact of the microlight and the 11 kV ZESCO cable lines.

Broken pieces of the propeller blades were strewn along the path the microlight took during the resulting spin after the right main wheel had contact with the ZESCO cables. The aircraft rested upside down orienting to about 090° to its original flight path.

### 1.8.2 Detailed information of the microlight damage

(1) Trike:

Its upper frame and front tube and control tube were damaged and bends and cuts were found in upper rear portion and wing attaching point. Fuel and oil leaked out of the tank and engine completely.

(2) Landing gear:

Forward and aft cross gears were in place with the lower right main leg clearly showing where the 11kV ZESCO cables had scratched. (Fig. 2)

(3) Propeller blades and Pilots seat frame:

One blade was damaged into the portion about 10 cm from its hub end and the forward Pilot's seat frame was deformed. Both seat pans were found about the original position.

(4) Wing:

The whole assembly was completely damaged with most tubes either fractured or bent. (Fig.11)

### 1.9 Survival Aspects

A Pilot who was driving towards United Air Charter helped the surviving Pilot out of the wreckage. The first responder immediately contacted Speciality Emergency Services (SES), the Medical Insurers for the Pilots and notified them of the accident and need for emergency rescue around 07:50 hrs local time. SES Rescue Team was activated and an ambulance arrived to the scene about 30 minutes later to cope with the situation. Around 08:25 local time, the Rescue Team picked up the body of the deceased Pilot and sent the surviving Pilot to SES medical facility.

### 1.10 Recorded Image of the Emergency Landing

No sequence of the emergency landing was videotaped.

### 1.11 Examinations (Tests and Research)

To find the damage caused to the Rotax engine, it was sent to the Air Creation factory for internal examination. The analysis showed that the engine was repairable.

### 1.12 Additional Information

### 1.12.1 Wing

The damaged wing, Aeros Profi serial number 045/15 was fitted on 1st October 2019 and was to be replaced at 426:00 airframe hours. Its total time in service was 1,574 hours 00 minutes, with remaining service time of 426 hours 00 minutes.

## 2. ANALYSIS

### 2.1 Aircrew certificates and medical certificates

The Pilot had valid airman license and airman medical certificate in accordance with applicable regulations.

### 2.2 Certificate of airworthiness

The aircraft had a valid certificate of airworthiness and was maintained in accordance with applicable regulations.

### 2.3 Weather Condition

The weather condition at the time of the accident was such that weak wind was blowing.

It is considered that weather condition did not affect the aircraft spin before the hard landing on the side of the road leading to Baobab Ridge.

### 2.4 Reason for the Pilots failure to spot the 11kV ZESCO Power Lines

At the time the Microlight was in the process of simulated engine failure attempting to land, the Pilot was unable to see the power lines due to sun glare as he was flying into the rising sun.

### 2.5 Reason for engine stoppage

It is considered that the engine stopped due to the propeller hooking on the wing control cable and winding it on the propeller attachment flange. The engine is designed in such a manner that any impact on the propeller instantly stops the engine.

## 3. CONCLUSION

It was established that the Pilot (P1) was unable to see the 11kV ZESCO Power lines crossing the road ahead of him as he descended to carry out the emergency landing, this was due to the sun glare as he was flying direct into the sunlight.

The time lapse between the command to increase to full power and engine response to throttle increase was a contributing factor to the failure of the Microlight to gain sufficient height to clear the Power lines.

The Pilots did discuss the intended emergency landing field and the obstacles found around there, which included the Baobab tree on the right-hand side of the road, just before the power lines crossing the intended landing field.

**It can be concluded that the root cause of the accident was executing the simulated emergency landing in hazardous conditions. The contributory cause was the inability of the Pilot to spot the power lines due to the sun's glare.**

## 4. SAFETY RECOMMENDATIONS

It is hereby highly recommended that a **serious consideration be urgently** given to;

Batoka Sky

AAIB/SR/2022/001

Batoka Sky management is recommended to ensure that their pilots perform simulated emergency landings at designated aerodromes.

AAIB/SR/2022/002

Batoka Sky management is recommended to ensure that their Pilots maintain minimum flying Altitude required to execute a simulated emergency landing.

AAIB/SR/2022/003

Batoka Sky management is recommended to review their emergency procedures relating to Pilot emergency landing operations.

The Civil Aviation Authority

AAIB/SR/2022/004

The Civil Aviation Authority is recommended to carry out an ad-hoc audit of Batoka Sky to ensure that their policies and procedures are meeting adequate safety standards.

Fig.1 Microlight type Tanarg Neo

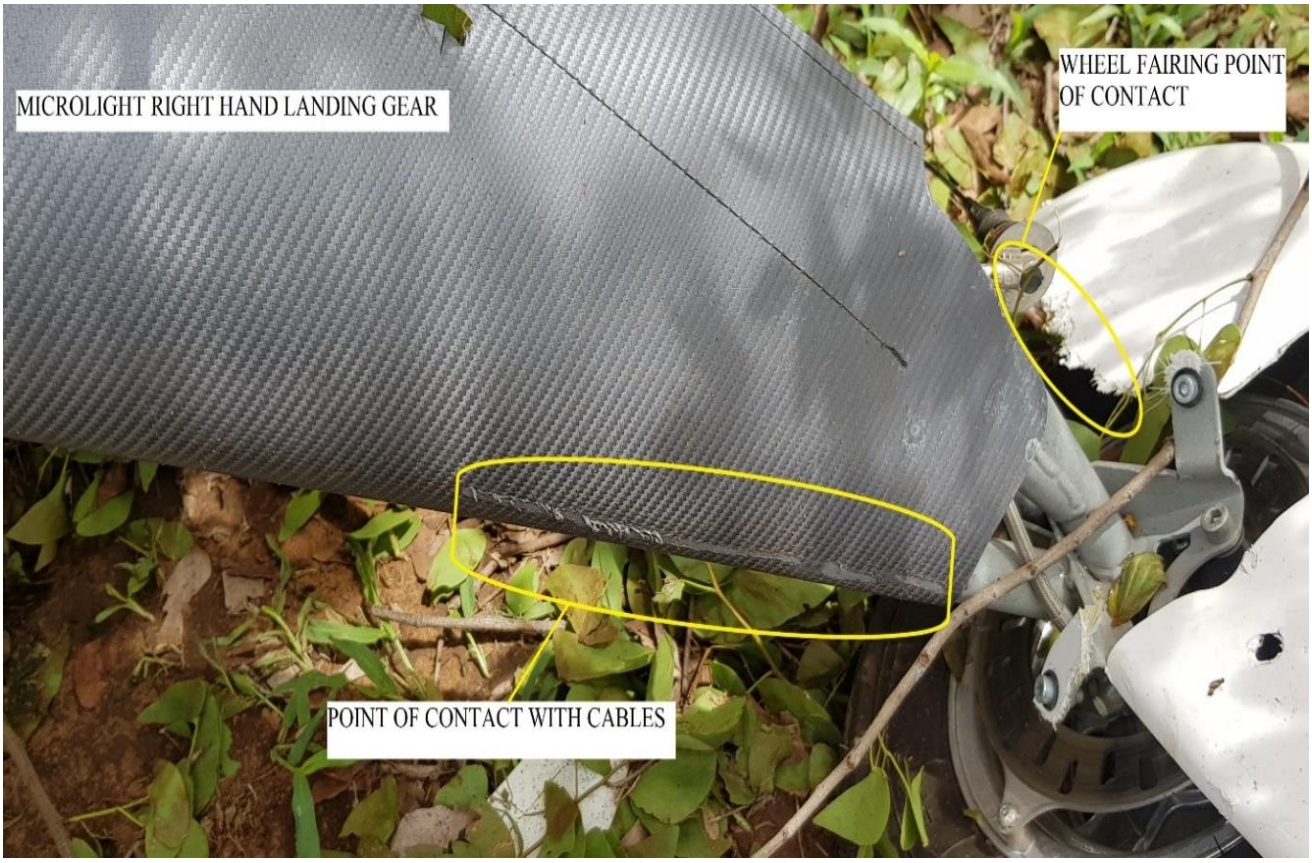

Fig 2: First point of contact and breaking of fairing

Fig. 3 Power Cable in Shrub

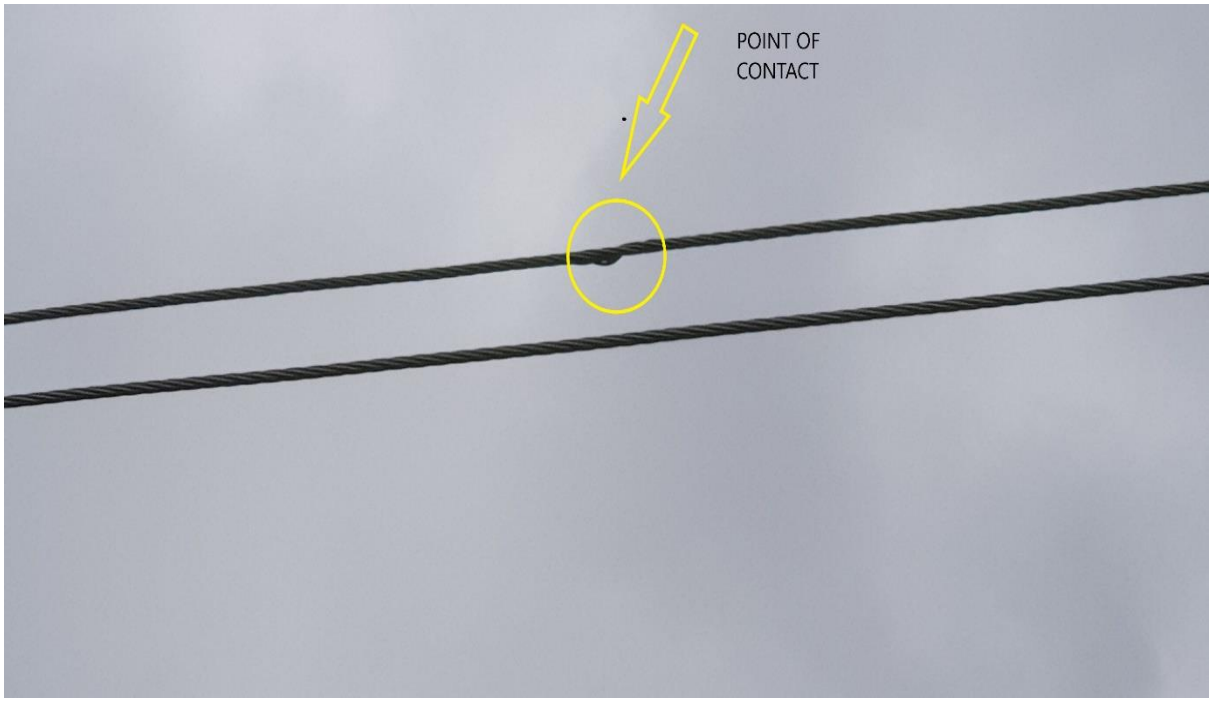

Fig.4.1 Point of Contact on Power Cable

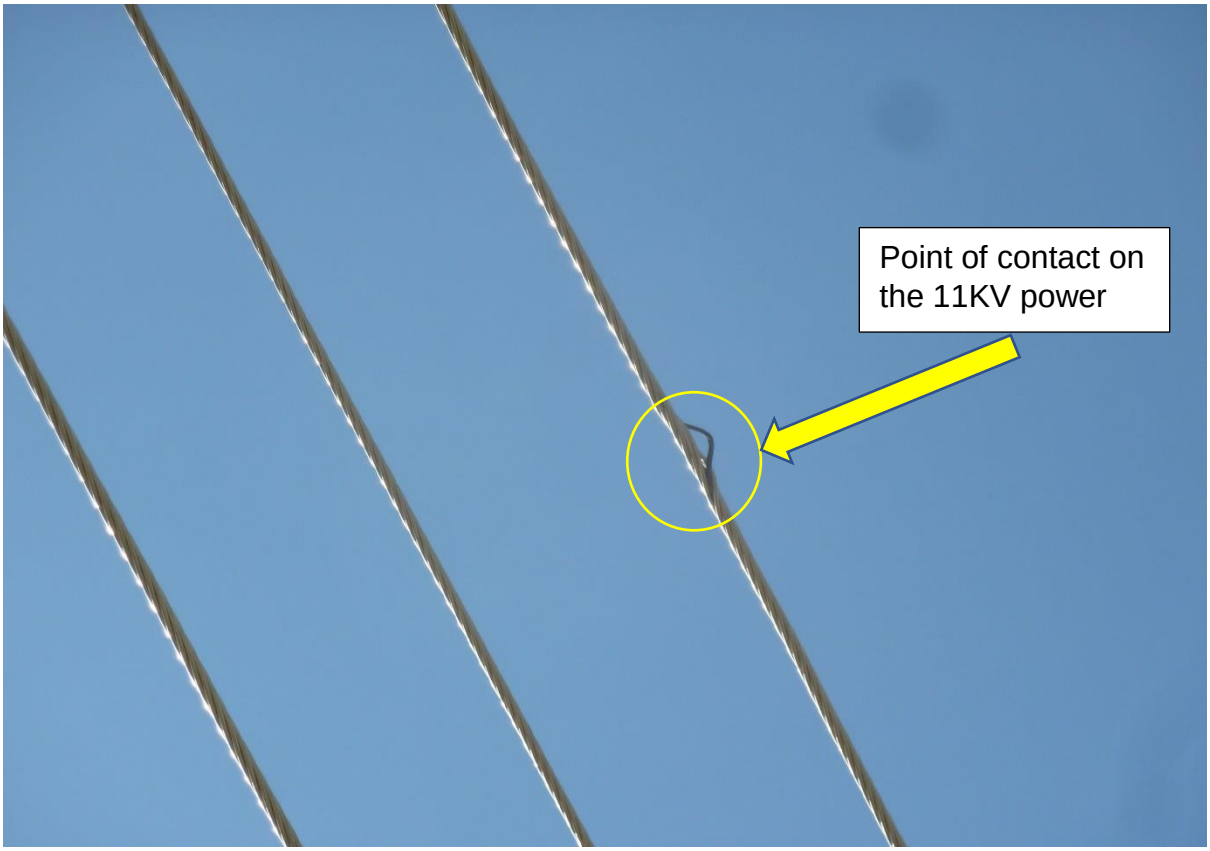

Fig.4.2 Point of Contact on Power Cable

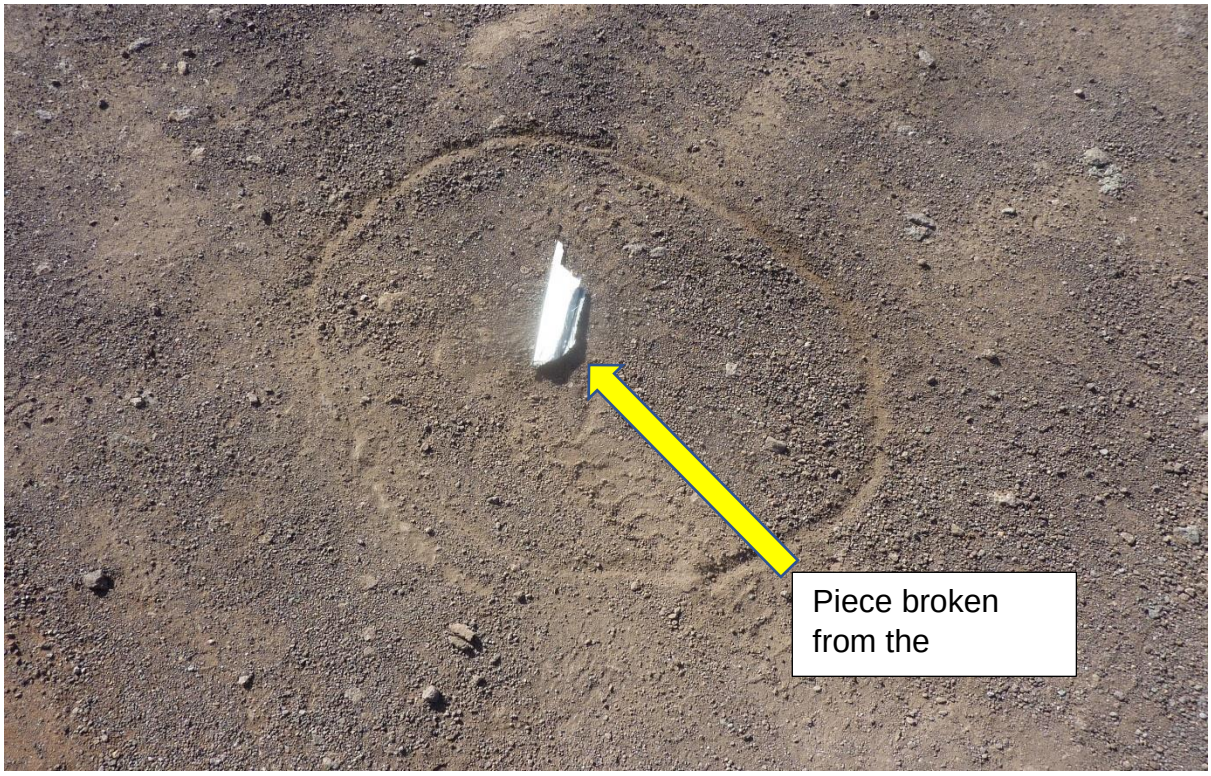


Fig. 5.1: Broken Propeller Piece

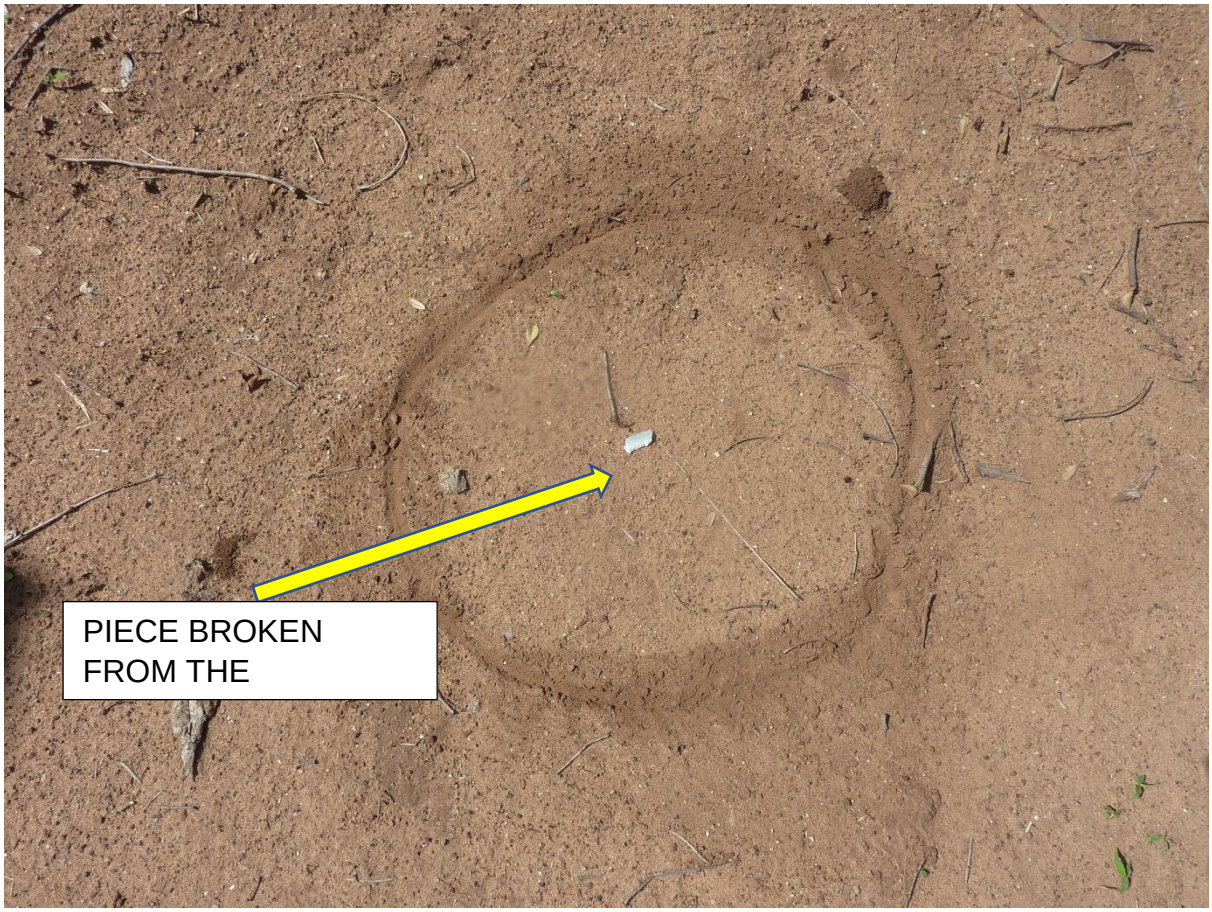


Fig. 5.2: Broken Propeller Piece

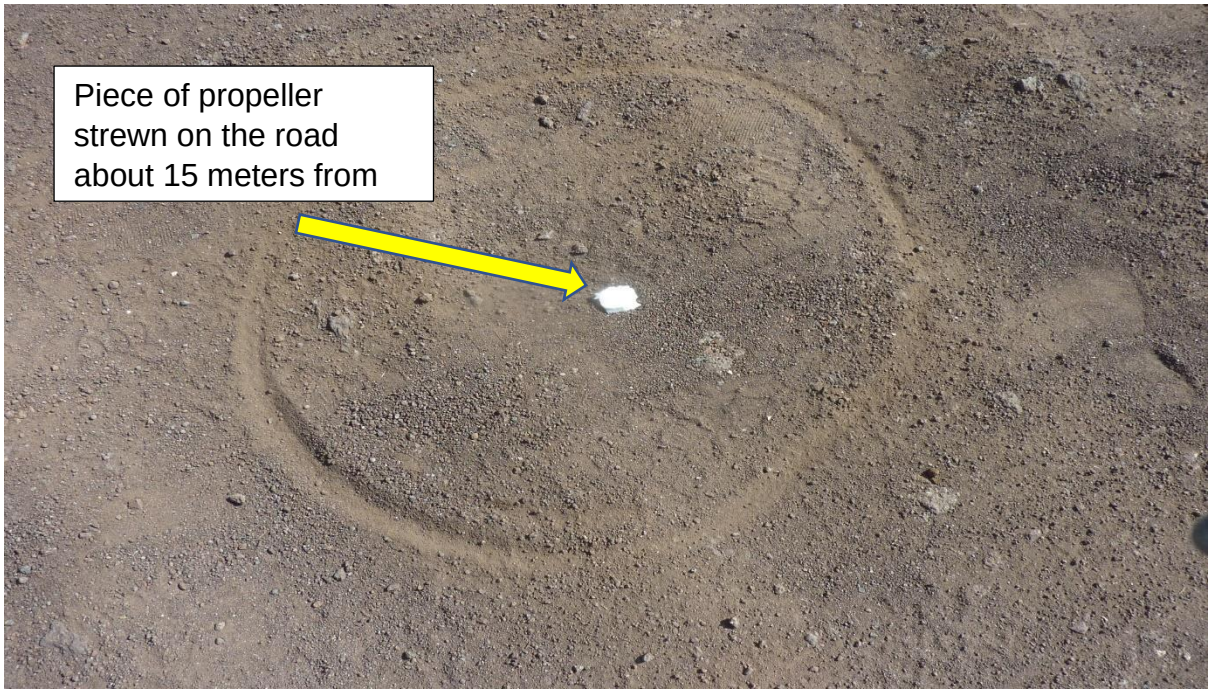

Fig. 5.3: Broken Propeller Piece on the Road

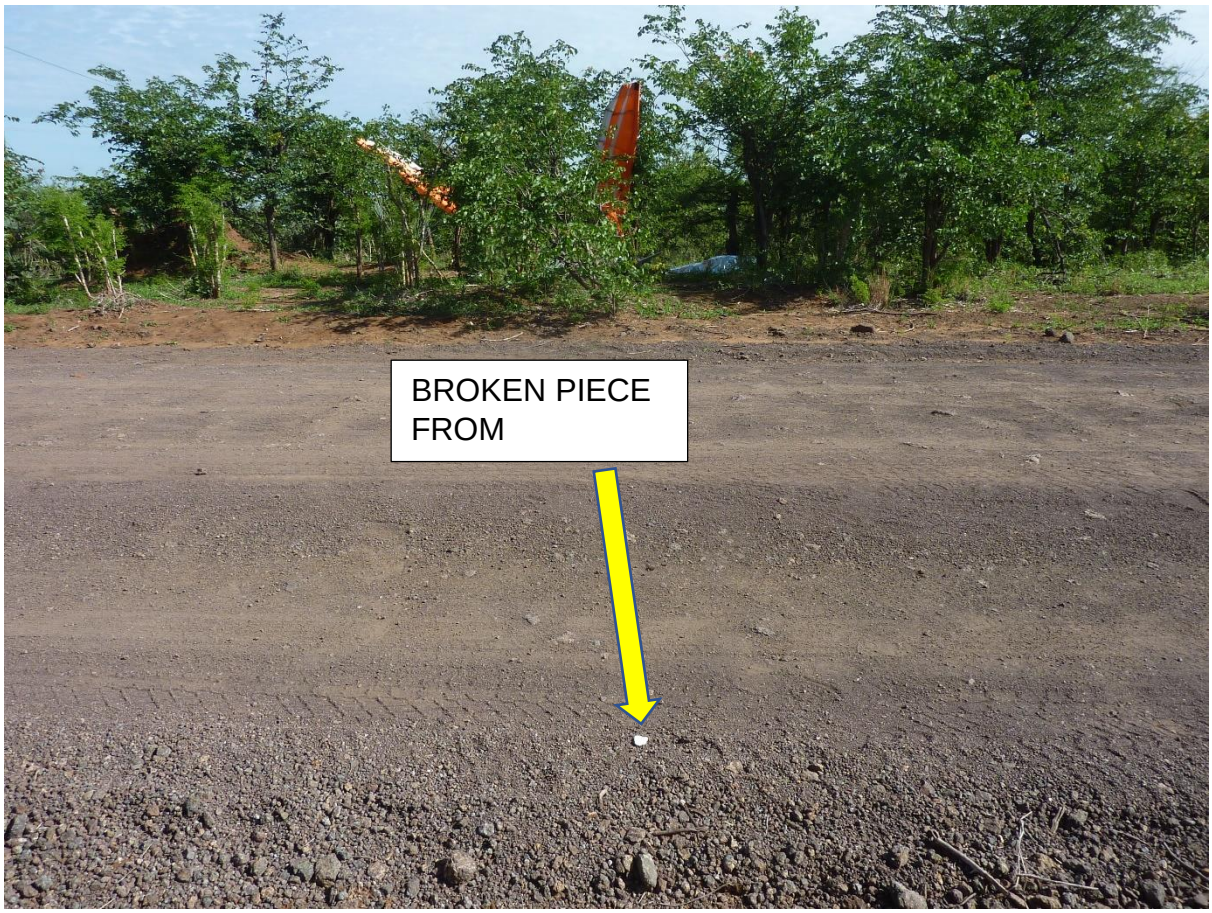

Fig.5.4: Broken propeller piece on the Road

Fig.5.5: Propeller Piece among branches


Fig 6.1: Microlight at Point of Ground Impact

Fig 6.2: Microlight at Point of Ground Impact

Fig.6.3: Microlight at Point of Impact

Fig.6.4: Microlight at Point of Impact from road side


Fig.7: Material Torn From the Wing

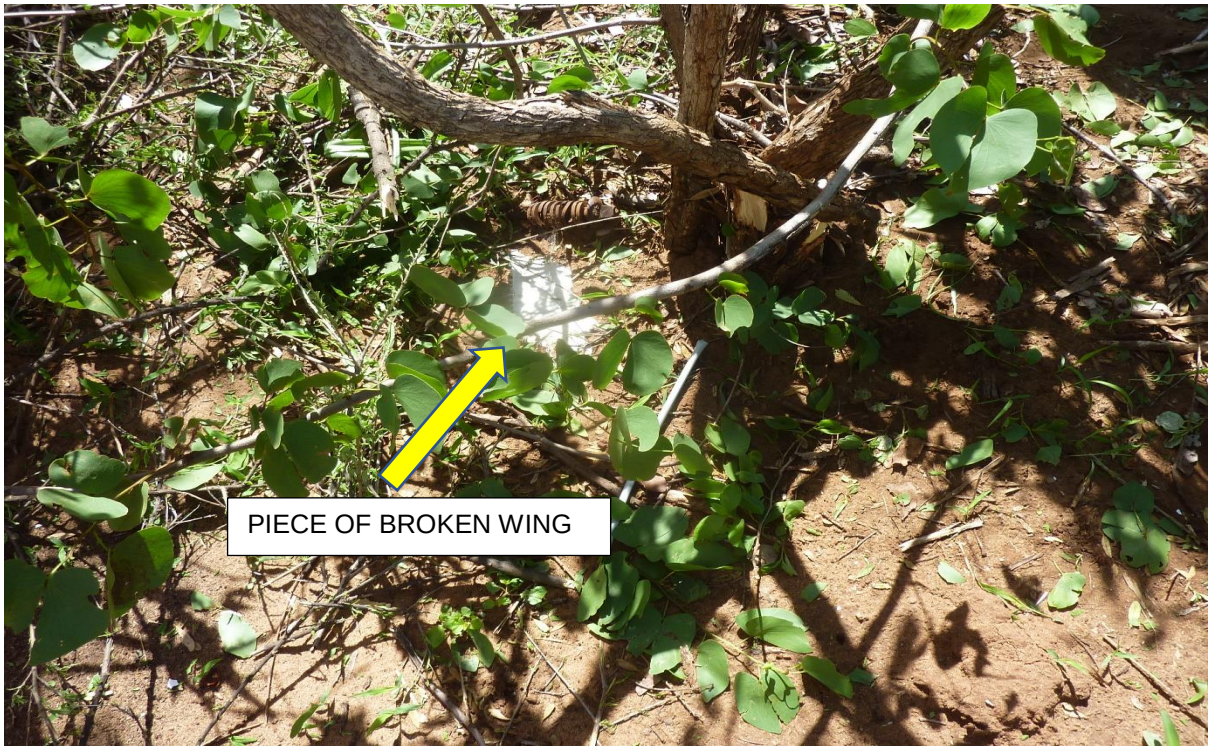

Fig.8 Piece of Broken Wing

Fig.9 Piece of Torn Wing

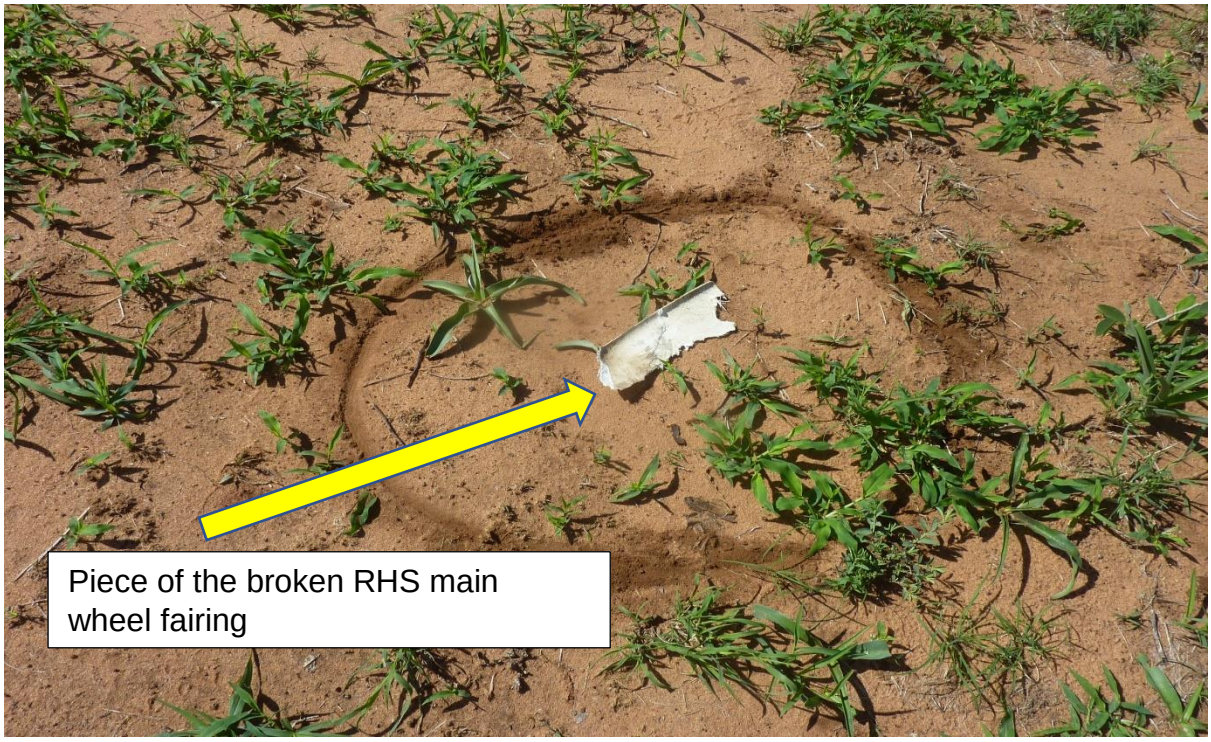


Fig.10 Piece of Broken RHS Main Wheel-Fairing

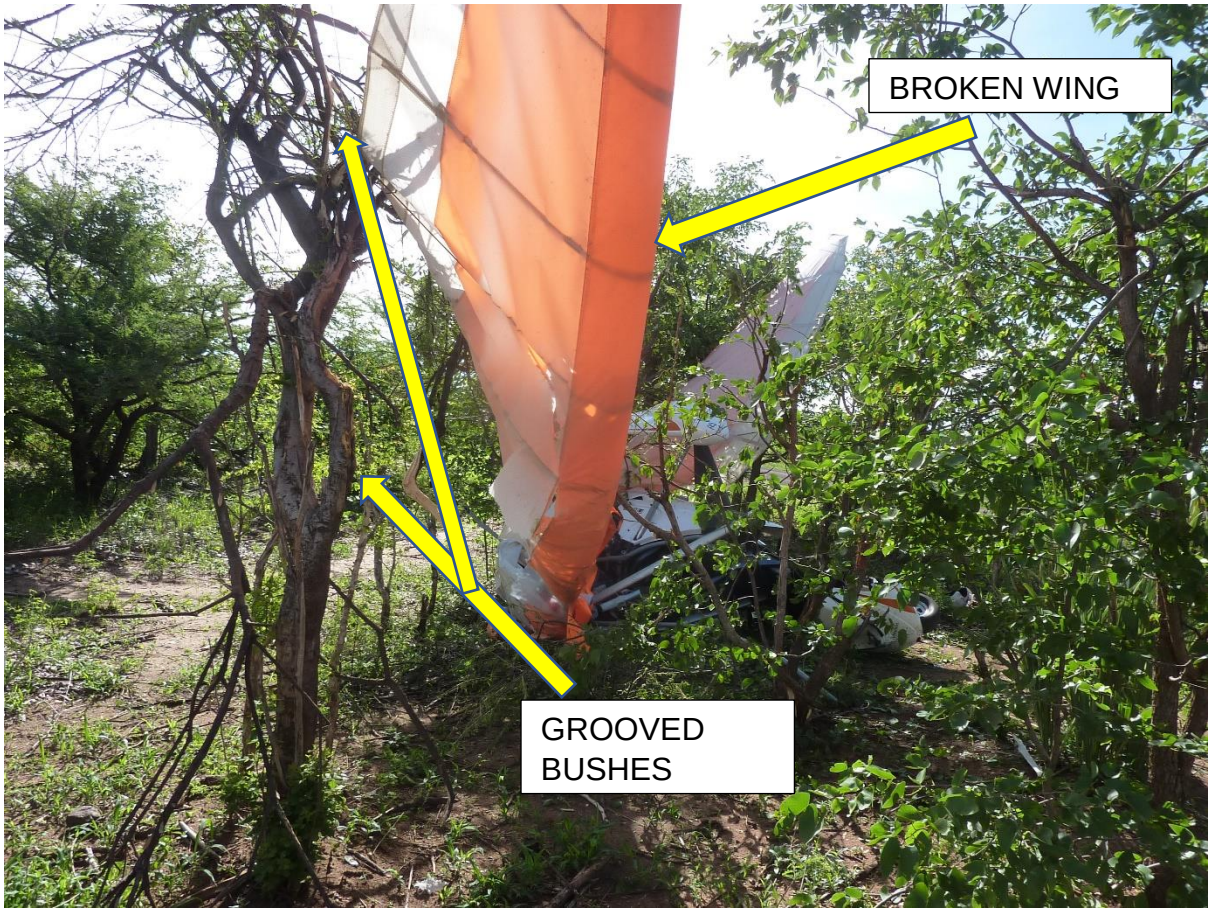


Fig.11: Microlight showing Broken Wing and Grooved Bushes