



Directorate of Aircraft Accident and Incident Investigations

Accident Reference: ACCID/01292023/01-01/

Aircraft Accident Investigation Final Report

AIRCRAFT TYPE: ULF-1E, Ultralight glider (D-NEQR)

RELEASE DATE: 7 February 2024



Aircraft Accident Report

DESCRIPTION OF OCCURRENCE: High-speed stall caused by a high angle of attack

TYPE OF OPERATION: Private.

AIRCRAFT TYPE: ULF-1E, (D-NEQR)

LOCATION: GPS: 23° 25' 3.94" S 12° 49' 52" Rehoboth

DATE: 29/01/23



Foreword

This report presents the factual information, data analysis, conclusions, and safety recommendations reached during the investigation. The purpose of the investigation was to establish the circumstances surrounding this occurrence.

In accordance with the provisions of Annex 13 to the Convention on International Civil Aviation Organization, the accident's analysis, conclusions, and safety recommendations contained therein are intended neither to apportion blame nor to single out any individual or group of individuals. The main objective was to identify the systematic deficiencies and draw lessons, from the occurrence, which might help to prevent accidents and incidents in the future. To this end, many a time, the reader may be interested in whether or not an issue was a direct cause of the accident (that has already taken place), whereas the investigator is mainly concerned with the prevention of future accidents/incidents.

As a result, the usage of this report for any purpose other than (the letter and spirit of Annex 13 and other relevant statutes) prevention of similar occurrences in the future might lead to erroneous interpretations and applications.

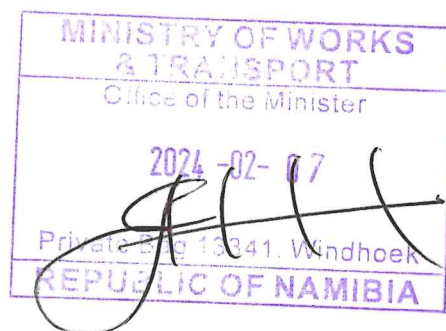


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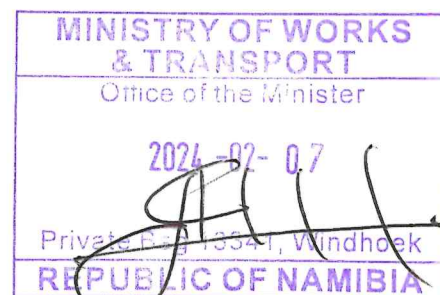
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ABBREVIATION

AD	-	Airworthiness Directives
AMO	-	Aircraft Maintenance Organization
AME	-	Aircraft Maintenance Engineer
AIP	-	Aeronautical Information Publication
AOC	-	Air Operating Certificate
ATPL	-	Airline Pilot License
BFU	-	German Federal Bureau of Aircraft Accident Investigation (Bundesstelle für Flugunfalluntersuchung)
CPL	-	Commercial Pilot License
DAAII	-	Directorate of Aircraft Accident and Incident Investigation
ELT	-	Emergency Locator Transmitter
FMS	-	Flight Management System
ICAO	-	International Civil Aviation Organization
NCAA	-	Namibia Civil Aviation Authority
NAMCARs	-	Namibian Civil Aviation Regulations
NCAA		Namibian Civil Aviation Authority
PPL	-	Private Pilot License
MPI	-	Mandatory Periodic Inspection
SB	-	Service Bulletins
UTC	-	Universal Time Co-ordinated
VHF	-	Very Higher Frequency





Ministry of Works and Transport

DIRECTORATE OF AIRCRAFT ACCIDENT INVESTIGATION

ACCIDENT REPORT – EXECUTIVE SUMMARY

Aircraft Registration	D-NEQR	Date of Accident	29 th January 2023			Time of Accident	11:30 UTC
Type of Aircraft	ULF-1E (GLIDER)		Type of Operation			Private	
Pilot-In-Command License Type		PA 70185	Age	54	License Valid	Not Valid	
Pilot-In-command Flying Experience		Total Flying Hours	63.1		Hours on Type	Unknown	
Last point of departure		Camp 15 of Bahnoff town land area (15 km southeast of Rehoboth)					
Next point of intended landing		Camp 15 of Bahnoff town land area (15 km southeast of Rehoboth)					
Location of the accident site with reference to easily defined geographical points (GPS readings if possible)							
GPS: 23° 25' 3.94" S 12° 49' 52" Rehoboth NAMIBIA							
Meteorological Information		CAVOK					
Number of people on board		1+0	No. of people injured		0	No. of people killed	
						1	

Synopsis

On the 29th of January 2023, an ULF-1E glider, with the registration D-NEQR and serial number 122, crashed shortly after take-off from Camp 15 in the Bahnoff townland area, located approximately 15 kilometers southeast of Rehoboth.

The pilot, who was the sole occupant, sustained fatal injuries, and the glider, a home-built aircraft launched via winch system, was destroyed.

The pilot was aided by a friend setting up the glider, while his wife was responsible for towing the glider, and two farm assistants were also involved. The initial stages of the launch appeared to be proceeding smoothly as the glider gained altitude. However, after roughly 20 seconds into the launch, an abrupt descent ensued, resulting in the glider plummeting to the ground. This occurrence was visually documented in video footage recovered from a witness, showing a sudden and sharp dive followed by a collision with the terrain.

The Directorate of Aircraft Accident and Incident Investigation (DAAII) was promptly notified by the police. The Minister of Works and Transport Ministry was responsible for the release of the official final accident report. Additionally, an accredited representative from the German Federal Bureau of Aircraft Accident Investigation (BFU), associated with the glider's State of Manufacturer was contacted and subsequently traveled to participate in the investigation of the wreckage at the DAAII facilities.

The pilot was a Danish citizen holding a Namibian Private Pilot License (PPL). Notably, he did not possess a valid medical certificate, which is a requirement to keep the PPL valid.

Maintenance and repair performed on the glider's fuselage and flight controls, utilized procedures and components that had not been approved by the relevant authorities.

Probable Cause: High-speed stall due to high angle of attack caused by exceeding designated airspeed. (Flight envelope).

Contributing factor (s):

1. Non-approved parts
2. Insufficient Training and skills
3. Unapproved maintenance practice.
4. Disregard for standard /safe Regulatory Operating Procedures





AIRCRAFT ACCIDENT REPORT



Name of Owner/Operator : Joern Steinbuck
Manufacture : Selfbuild
Model : ULF 1
Nationality (pilot) : Danish
Registration : D-NEQR
Location : GPS: 23° 25' 3.94" S 12° 49' 52" Rehoboth NAMIBIA
Date : 29. January 2023

All times given in this report are in Co-ordinated Universal Time (UTC).

Disclaimer:

The report is given without prejudice to the rights of the Directorate of Aircraft Accident and Incidents Investigations, which are reserved.

Purpose of the Investigations:

In terms of the Namibia Civil Aviation Act (Act No. 6 of 2016) and ICAO Annex 13, this report was compiled in the interest of the promotion of aviation safety and the reduction of risk of aviation accidents or incidents and **not to establish blame or legal liability.**

This report contains facts relating to aircraft accidents or incidents that have been determined at the time of issue. The report may therefore be revised should new and substantive facts be made available to the investigator (s).

1. FACTUAL INFORMATION

1.1 History of Flight

- 1.1.1 On the 29th of January 2023, a ULF-1E, glider with registration D-NEQR, and serial number 122. Crashed shortly after take-off from camp 15 of Bahnoff townland area about 15 km southeast of Rehoboth, at around 12:24 UTC. The pilot was the sole occupant and sustained fatal injuries.
- 1.1.2 An eyewitness who was also his long-time friend (witness 1) and fellow aviation enthusiast. Witness 1 stated that, he, the pilot and his wife (witness 3) arrived at the camp; they went to a local resident (witness 2) where the trailer with the sailplane inside was parked. Witness 2 hooked up the trailer and brought it to the launch. Witness 1 stated that he planned to paraglide first then after he would assist the pilot to winch his sailplane so he could fly it, they laid out some nettings to the ground, and the pilot then drove the winching car and towed witness 1 in the air and released him.
- 1.1.3 Witness 1 flew around in the area landed and took a rest in the car, while the pilot and Witness 2 were still setting up the sailplane (glider). They laid out zinc sheets to make a slide for the sailplane. When they were done with the preparation of the sailplane witness 2 hooked up the rope to the plane. The pilot checked the sailplane to make sure all was fine.
- 1.1.4 The pilot made two failed attempts, they stopped and made adjustments to the winch.
- 1.1.5 On the third attempt he launched, everything was looking perfect on the launch and he was gaining height,

After about 20 seconds suddenly the plane plummeted out of the air and crashed into the ground. It was about 500 to 600 meters away and the height was maybe 70 to 100 meters.

- 1.1.6 Video footage recovered from Witness 1 showed a sudden steep dive and subsequent collision with terrain.

1.2 Injuries to Persons

Injuries	Pilot	Crew	Pass.	Other
Fatal	1	-	-	-
Serious	-	-	-	-
Minor	-	-	-	-

1.3 Damage to Aircraft

The glider was destroyed.

1.4 Other Damage

- 1.4.1 No other damage.

1.5 Personnel Information

- 1.5.1 Pilot-in-in command

Nationality		Danish			
Licence No	PA 70185	Gender	Male	Age	54
Licence valid		Not Valid	Type Endorsed	No records	
Type Ratings		Without Instruments Ratings			
Medical done		31 March 2019.			
Restrictions		Valid with corrective glasses.			
Previous Accidents		unknown			

Total Hours	63.1
Total Past 90 Days	No records
Total on Type Past 90 Days	No records
Total on Type	No records



1.6 Aircraft Information

Airframe:



Photo 1. File photo

The ULF-1 single-seat foot-launched sailplane was designed by Dieter Reich and constructed by Heiner Neumann of Germany. Designed for ridge soaring and marginal thermal currents (Microlift), it has full three-axis aerodynamic control.

The basic construction materials are spruce, birch plywood and balsa. The airframe is covered with doped fabric. For hinges, fasteners and fittings, aluminium, steel sheet and fibreglass/resin are used. Steel tubes are employed only for the control stick, control parts in the cockpit area and rudder drive.

GENERAL ARRANGEMENT

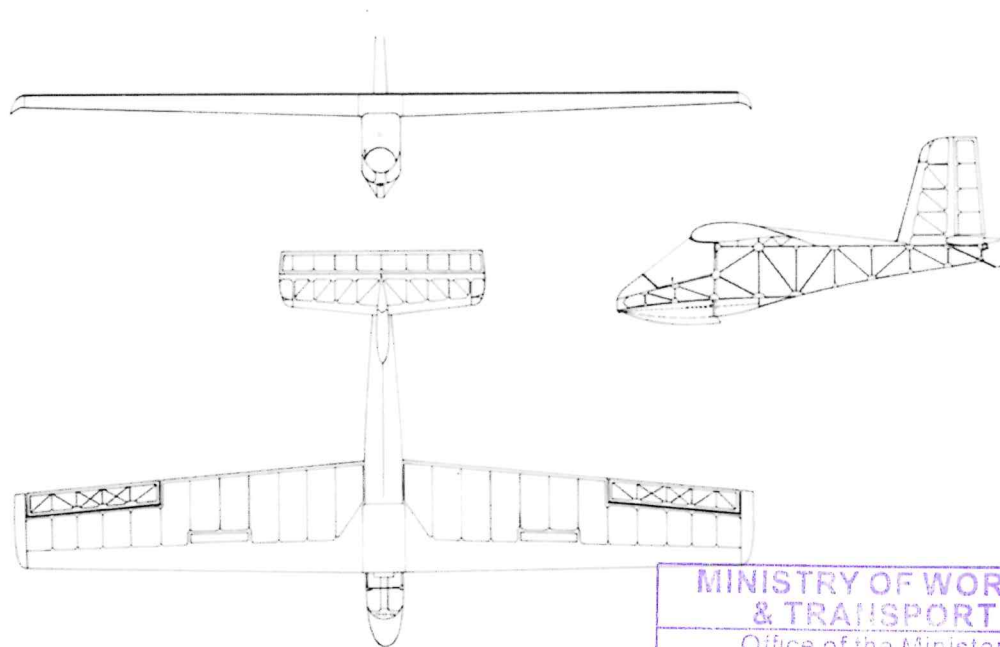


FIGURE 2. General arrangement (from aircraft manufacturer).



Type	ULF -1E Non-powered glider
Year build	1988
Manufacture	Dietmar Rebl
Total Airframe Hours (At time of Accident)	No records
Last MPI (Date & Hours)	No records
Hours since Last MPI	N/A
C of Airworthiness	No records

Engine:

Type	N/A
Serial No.	N/A
Hours since New	N/A

PROPULSION: Winch

The cable winch is mounted on a motor vehicle (car, motorcycle, boat). The tow rope is wound on the drum. At the end of the tow rope, the leader rope with the predetermined breaking point is attached to the tow latch and the aircraft.

After the start preparations and the communication between the winch driver, driver and pilot, the vehicle drives off on the instructions of the winch driver and the cable winch begins to unwind the cable without traction.

The winch driver begins to increase the pulling power in line with the pre-vailing conditions and to enable the pilot to start safely.

The rope is unwound from the braked rope drum more slowly than the vehicle is moving.

This transfers the desired pre-set drag force to the aircraft. The aircraft takes off and begins to climb.

The height that can be reached is determined by the length of the rope and the length of the passable route, as well as the climb rate of the aircraft and the wind force.¹

(Source: The manufacturer)

Used Winch at the accident site

A Quantum Paraglider winch in Compact Tow bar mount Pay-out configuration was installed on a car to launch the glider.

Drum Rotation Tension Alarm. The alarm "tweets" for every rotation. If the car is driving too slow, the drum will not rotate, and the driver can speed up. If the alarm goes very fast, then the driver is driving too fast and can slow down. There is no danger in driving too fast. You are just wasting energy and runway.

Tensioning Winding Mechanism. Allows you to preset the tension on the scale.

Tensioning Mechanism provides constant tension at all speeds in both (drum) directions

(Features from the manufacturer's website)

1.7 Meteorological Information

According to witnesses, at the time of the accident, visual meteorological conditions with visibilities of more than 10 km there were scattered cloud formations. These weather conditions were confirmed by the video recordings.

1.8 Aids to Navigation

- 1.8.1 The aircraft was equipped with standard navigational equipment for the type. There were no Ground-based navigation aids.

¹ (BFU, 2023)



1.9 Communications.

- 1.9.1 The pilot was in communication with the towing car operator via a two-way radio. A Go-pro camera recorded all the communications and there were no communications difficulties detected. The pilot was never in any contact with an air traffic control unit.

1.10 Aerodrome Information

The accident did not happen on an aerodrome.

1.11 Flight Recorders

- 1.11.1 The Aircraft was not equipped with a flight data recorder (FDR) or a cockpit voice recorder (CVR) nor was it required.

1.12 Wreckage distribution and Impact Information

- 1.12.1 The aircraft dived into the ground at a near-vertical angle and then broke apart. A small crater on the ground with protruding wooden splitters was evident. The dope and wood airframe was scattered over a small radius.



Figure 3 Accident scene

- 1.12.2 The fuselage was broken about halfway. The front fuselage was separated from the bandage. The right rudder the pedal was broken and had a repair point.

The glider wreckage was transported to the wreckage hanger for further inspection.

Fuselage;

The fuselage was broken about halfway. The front fuselage was separated from the bandage.





Figure 4: Wreckage at the Hangar

The control cables and linkages were connected. The elevator control linkage was bent approximately 80 degrees. The drive rod was compressed about 30 cm in front of the main bulkhead. The control cables for the elevator drive were undamaged but showed signs of corrosion. The turnbuckles were secured. The elevator drive rod from the rear bulkhead was not compressed. External signs of corrosion were visible on the screw connections and ball head.

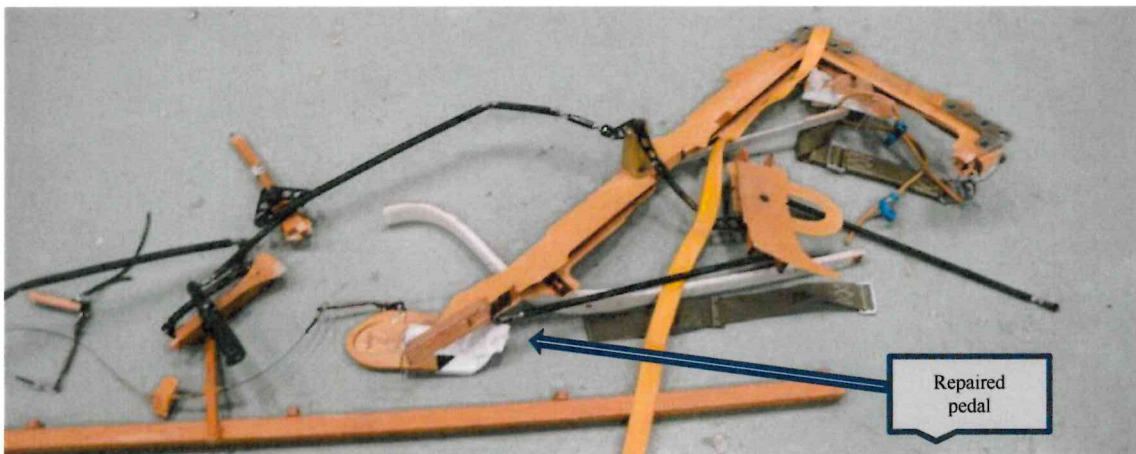


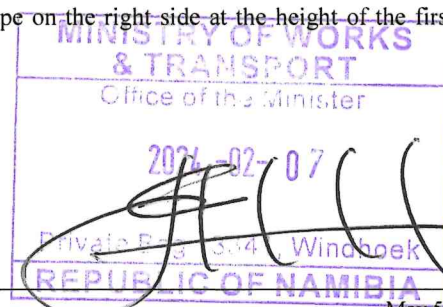
Figure 5: Steering system showing the repaired (unapproved) rudder pedal

The aileron drive was without findings. The control cables to the aileron were intact on both sides. The turnbuckles were secured. The airbrake cables were free to move and the airbrakes could be actuated. The winch rope clutch could be opened and closed.

Left-wing

The left wing was dented in the area of the wing nose. The wing was compressed several times. Ribs 1-3 were broken. The wingtip had a repair point. The aileron control cables showed signs of corrosion.

The leading edge of the wing had a repair area with ducktape on the right side at the height of the first and third rib after the middle



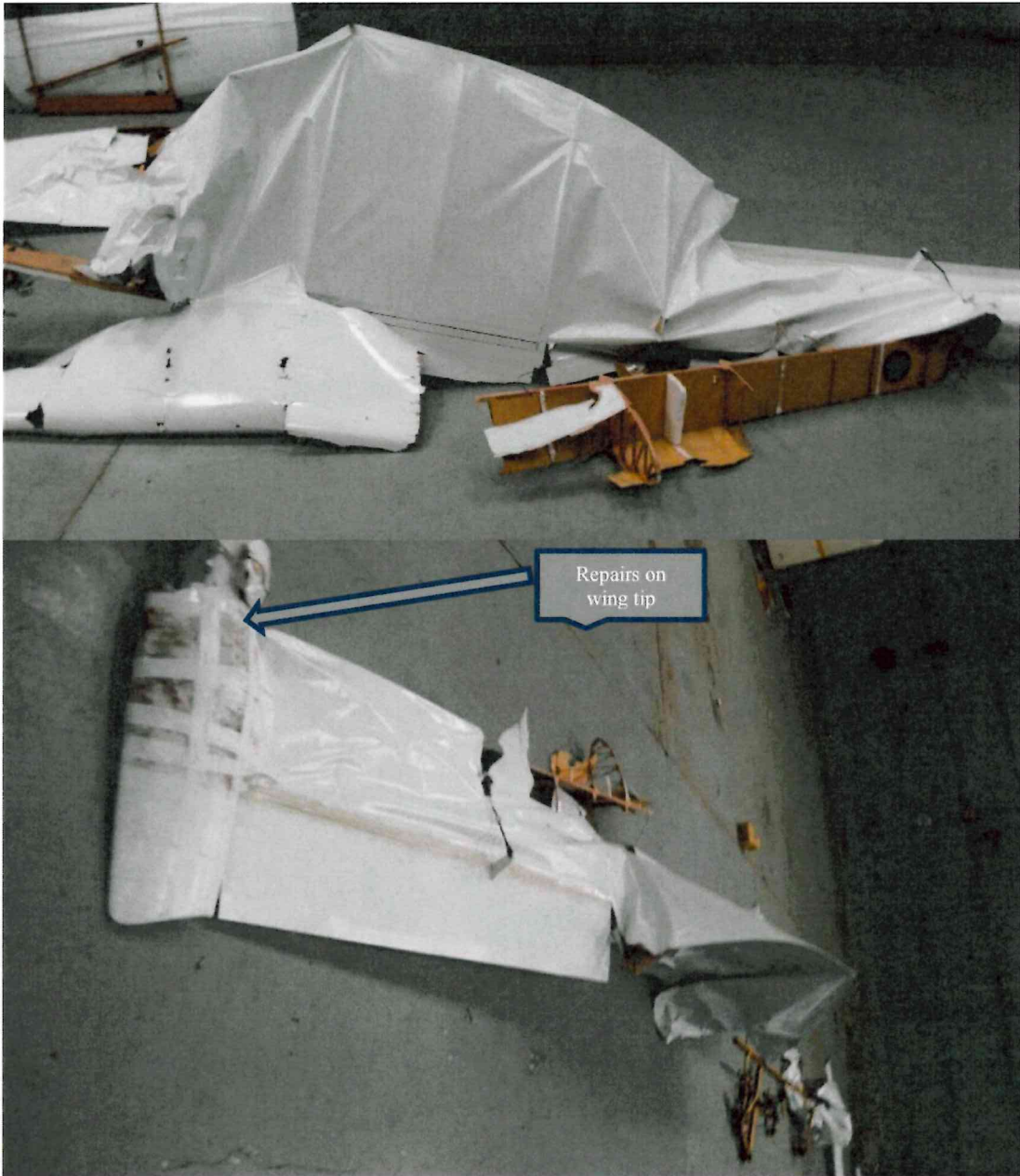


Figure 6-7 Depicting the left wing damage and the unapproved repairs on the wing tip.

Elevator

The left elevator fitting was compressed.

The drive fitting had traces of corrosion.

The ball socket and ball head of the elevator linkage showed corrosion. The ball connection requires little manual force to loosen.



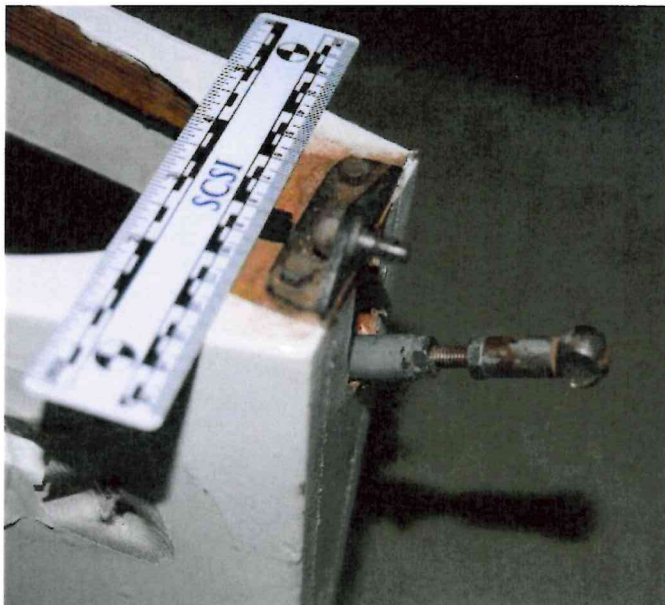


Figure 7 Socket joint showing corrosion



Figure 8. Ball joint showing corrosion

Elevator's Ball Socket joint required little manual force to delink

Maintenance

The wreckage exhibited repairs done at several areas on the wing and the fuselage, this repairs did not conform to the manufacturers manual. The investigations examined Life-limited parts Belts, Bungee rope at the Elevator, Steering cables, and tennis balls in the Skid.

The bolts from the de-rigged glider were found in a wooden box. The bolts were nearly dry and exhibited massive signs of wear.

The examination of the Tost system was conducted with the coordination of BFU and the designer.

1.13 Medical and Pathological Information

1.13.1. According to the statement of the police, the post-mortem examination of the pilot did not reveal any indications as to relevant pre-existing conditions. The pilot's death was caused by polytrauma secondary to glider plane crash.

1.14 Fire

1.14.1. There was no pre or post-impact fire.



1.15 Survival Aspects.

Rescue system

A rescue parachute was installed in the glider. The system was not activated or triggered.

Manufacturer: Brüggemann und Brand

SN: 01-78 164798

Build: 04/78

Last inspection: 10.10.1983



Figure 9. Rescue parachute.

- 1.15.1 This was not a survivable accident as the kinetic forces on impact with the ground were beyond human tolerance.

1.16 Tests and Research.

- 1.16.1. Go-pro videos retrieved showed the entire take-off and crash sequence.

1.17 Organizational and Management Information.

- 1.17.1. According to Namibia Civil Aviation Regulations part 104 (RULES OF THE AIR AND GENERAL OPERATING RULES: OPERATION OF GLIDERS)

104.01.2 No person shall act as pilot-in-command of a glider unless such person –

(e) is a bona fide member of an aviation recreation organisation approved by the Director in terms of Part 149.

None of the approved glider associations had the pilot or the glider in their registry. No member was familiar with the glider or the call sign affixed. The investigation contacted the German authorities and established that the glider was neither registered there.

1.18 Additional Information

The German authorities indicated that the pilot had started training on the glider but had no records that he had not completed the training nor was granted a certificate/license. The pilots logbook was also examined.

The Tow rope and Tost clutch mechanism

The red lead winch rope had a ring pair at one end and a predetermined breaking point at the other end. The breaking point was found broken. The counterpart was still attached to the white winch rope.

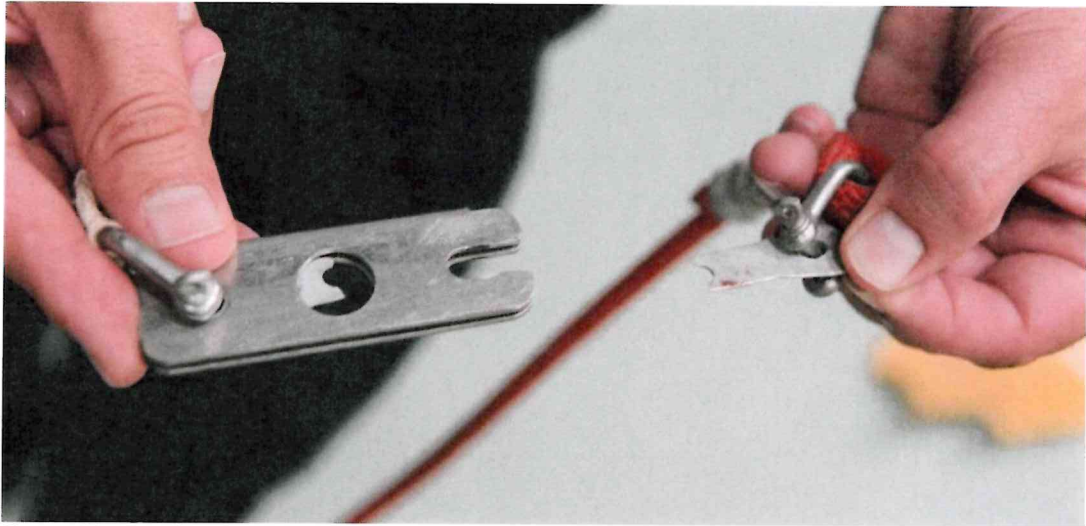


Figure 11: Breaking-point



Figure 12: Ring pair connect with the lead rope and Tost clutch

1.19 Useful or Effective Investigation Techniques.

1.19.1 Review of GOPR0379 Videos by BFU

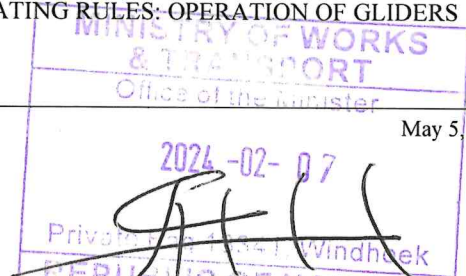
Go-Pro videos installed on the glider were downloaded and decoded by the Namibia Forensic Institute they were then reviewed and sent to the German Federal Bureau of Aircraft Accident Investigation (BFU). Go-pro videos retrieved revealed the entire take-off and crash sequence

2. ANALYSIS

Software – (the rules, procedures, written documents etc., which are part of the standard operating procedures.)

2. 1. OPERATING RULES (NAMCARs)

PART 104 RULES OF THE AIR AND GENERAL OPERATING RULES: OPERATION OF GLIDERS



1) Airworthiness

104.02.1 *No person shall operate a glider unless such glider -*

(a) has been issued with an authority to fly in terms of Part 21; and

The glider was never issued with the *authority to fly*, by the Namibian regulator as per the above regulation.

(b) is in an airworthy condition

Investigation on the wreckage, indicate multiple repairs done on many sections of the aircraft, on the fuselage wings flight controls and flight control surface. Most if not all these repairs were all not done according to the manufacturer/builder's specifications and using approved methods of repair and with approved parts. The adhesive and repair patches were made for boat repair.

Several life-limited parts and components scheduled to be replaced at different intervals as per the builder's specification to ensure the airworthiness of the glider. However, investigations reveal this was not done.

2) Registration

104.02.2 *No person shall operate a glider unless it is registered and marked in accordance with, and complies with, the provisions of the regulations in Part 47.*

Despite evidence indicating the aircraft was operated in Namibia for several years, the glider was never registered into Namibian Aircraft Register nor issued with a Namibian registration.

Investigations revealed that the glider was also not registered in Germany. The German authorities confirmed that the registration mark found on the glider was allocated to ultra-light aircraft in Germany.

3) Flight Manual

104.02.3 *Notwithstanding the provisions of regulation 91.03.2, a person may operate a glider without carrying a currently approved flight manual on board.*

There was no evidence to indicate the aircraft had an approved flight manual, normally manuals are approved by a glider association. Investigation revealed that the glider did not belong to any of the Namibian gliding associations and consequently did not operate the glider with an approved manual.

4) Maintenance and inspection requirements

104.02.4 (1) *The pilot-in-command of a glider shall ensure that the glider is in an airworthy condition before the commencement of each flight.*

(2) The owner of a glider shall-

(a) take such action as is necessary to ensure the continued airworthiness of the glider concerned; and

(b) maintain the glider in accordance with the provisions of the regulations in Part 43.

The investigator in charge conducted several interviews and reviewed the existing records the findings indicate that repairs which were done on that morning and previous occasions on the rudder pedals as well as on other flight control surfaces, were accomplished in a manner that rendered the glider not airworthy.

The wreckage investigations reveal repairs at the wing and the fuselage not responding to the building manual. Life limited parts weren't replaced: Belts, Bungee rope at the Elevator, Steering cables, and tennis balls in the Skid. There was no evidence that the rigging grease was used at the bolts and ball head and socket.

The bolts from the de-rigged glider were found in a wooden box. The bolts were nearly dry and show massive signs of wear.

There was multiple signs of corrosion visible on control cables.



Liveware

Investigation into the pilot's records indicate that the pilot had a PPL issued by the Namibian Regulator on the 28TH June 2011. PA 70185. However, there was no records of renewal of his group type rating Single Piston Engine Land Aero plane which expired on 17/10/2018.

Training records in Germany indicated that he had commenced on glider training however he had not completed the course and therefore never issued with a glider license.

There were no records of a glider's skill test or ratings on the pilot's records.

Environment

Evidence indicate the pilot used the "base" (Camp 15 near Rehoboth) for several years to launch and fly the glider the base camp. The base camp is a sandy public space and he used corrugated iron sheets to glide during the launch. The camp was not approved by the regulator for any aviation activities.

Vehicle towing launches of gliders is a specialised operation. The tow vehicle has to be adequately equipped and the driver qualified, experienced and approved by a glider association.

Liveware –Hardware (The interface between people and hardware)

During the winch launch, where the Tost clutch was positioned in front of the glider, a nose-down force was applied to the glider through the winch rope. In response, the pilot applied a nose-up input to the elevator to counteract this nose-down moment. As the speed of the glider increased, the force on the rope and the glider itself also increased. Video footage depicted the glider gradually gaining speed while climbing at a slow rate, leading to significant forces acting on the elevator.

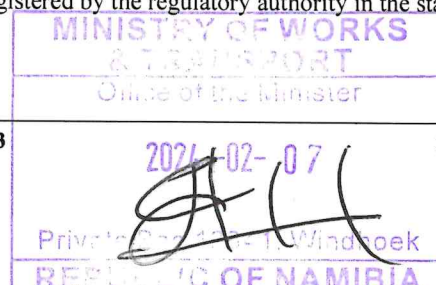
The designer noted that the Tost winch clutch installed was not approved for use in winch launches with this particular glider. A CG clutch should have been used instead for winch launches.

Based on the information collected and research conducted, it is a reasonable conclusion to suggest that the tow car exceeded the designated airspeed during the launch, causing the glider to reach speeds beyond its design limits. Consequently, the glider entered a high-speed stall due to an elevated angle of attack and induced G-forces. The tow rope then broke at a point of weakness. Additionally, the turbulence from the wing led to the elevator being shielded, causing it to tilt forward.

3. CONCLUSION

3.1 Findings

- 3.1.1 The pilot did not have a valid license or medical certificate.
- 3.1.2 The pilot did not belong to any glider organization nor did he have an approved flight manual as required
- 3.1.3 The "base" (Camp 15 near Rehoboth) from which this pilot operated was not approved by the NCAA.
- 3.1.4 There was no evidence to indicate that the glider was issued with the authority to fly, and neither was the aircraft registered in Namibia nor Germany
- 3.1.5 Repairs and maintenance were not done according to the manufacturer/builder's specifications, and life-limited parts were not replaced at the required interval as expected to ensure the airworthiness of the glider.
- 3.1.6 The tow vehicle was not adequately equipped nor was the driver qualified, experienced and approved by an approved organization.
- 3.1.7 The aircraft had no valid permit to fly neither was it registered by the regulatory authority in the state of manufacture nor the state of occurrence.



- 3.1.8 Life-limited parts were not replaced as required: Belts, Bungee rope at the Elevator, Steering cables, and tennis balls in the Skid.
- 3.1.9 There was no evidence that during the rigging grease was used at the bolts and ball head and socket.
- 3.1.10 The installed Tost winch clutch was not approved for winch launch with the Glider.
- 3.1.11 Pilot Training and skills were insufficient for the flight
- 3.1.12 The Pilot didn't release the tow rope when the speed went up over the maximum launch speed

3.2. Probable Cause

- 3.2.1. High-speed **stall** due to high angle of attack caused by exceeding designated airspeed. (Flight envelope).

3.3 Contributing factor

- 3.3.1 Non-approved parts
- 3.3.2 Pilot Training and skills were insufficient for the flight
- 3.3.3 Unapproved maintenance practice.
- 3.3.4 Disregard for standard /Safe Regulatory Operating Procedures

4.0. Safety Recommendations

None

Compiled by


Hafeni Mweshixwa

Investigator-in-Charge

Date: 5 FEBRUARY 2021

Released by:

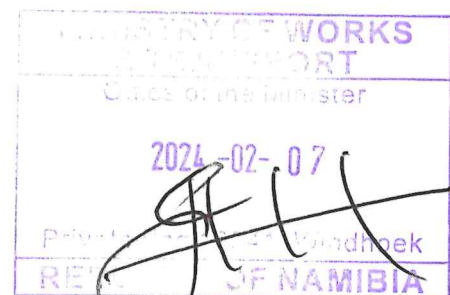

Hon. John Mutorwa, MP

MINISTER: MINISTRY OF WORKS AND TRANSPORT

Date: 7.2.2024



Side view of ULF 1



Steering System Ulf 1

