AIRCRAFT ACCIDENT REPORT AND EXECUTIVE SUMMARY

				Reference:	CA18/2/3/8067		
Aircraft Registration	**ZU-VOS**	**Date of Accident**	4 February 2006		**Time of accident**	1200Z	
Type of Aircraft	Lambada UFM-13		**Type of Operation**		Private Flight		
Pilot-in-command Licence Type		Private Pilot	**Age**	48	**Licence Valid**	Yes	
Pilot-in-command Flying Experience		Total Flying Hours	1 100.0		Hours on Type	17.1	
Last point of departure	Port Alfred Aerodrome (FAPA)						
Next point of intended landing	Port Alfred Aerodrome (FAPA)						
Location of the accident site with reference to easily defined geographical points (GPS readings if possible)							
Port Alfred Aerodrome Runway 10L (left).							
Meteorological Information	Surface wind; 010°/15 to 18 kts, Visibility; 10 km.						
Number of people on board	1 + 1	**No. of people injured**	0	**No. of people killed**	0		

Synopsis

The pilot, accompanied by a passenger, flew the aircraft on a private flight, in the Port Alfred area. The flight path was along the coast line, at an altitude of 1500 feet. The pilot performed a medium 15° bank to the right, and a 360° turn in a similar attitude, to the left. After performing these manoeuvres, he started a climb in an easterly direction, away from the shore line, at 60 knots indicated airspeed (IAS).

When he reached the General Flying Area (GF), the pilot called outbound on the Port Alfred Aerodrome frequency. The aircraft was at 4 000 feet, and 70 knots Indicated Airspeed (IAS) and engine operating at 4500 r.p.m. The pilot initiated another turn to the left, at approximately 30° and after executing the turn, felt that the aircraft was over banking to the left. The pilot tried to correct the attitude of the aircraft by applying full right flapperon. There was no response from the right flapperon so he pushed the control stick forward to increase the speed, without any effect. The pilot decided to came back on the throttle to idle. There was still no flapperon control, causing the aircraft to dive to the left in a turning motion and upon which the pilot applied full right rudder and pulled the nose back to the horizon. The pilot attempted to keep the aircraft straight and level by applying rudder control, but the aircraft kept on yawing to the right. When trying to reduce the power and airspeed, the aircraft became difficult to control. This resulted in the pilot increasing the power and airspeed to 90 knots (IAS).

The pilot stated that he called the tower at Port Alfred Aerodrome and requested immediate joining and landing clearance. He informed the person in the tower of his emergency. He was cleared to join on a left down-wind for landing, Runway 10. As the pilot approached for landing, he noted that the left wing kept on dropping sharply. On short final approach, the aircraft approached at a 30° angle, in relation to the runway centre line. The aircraft landed hard on the grass surface runway, which caused damage to the main landing gear and the propeller to make contact with the surface. Nobody was injured in the accident.

Probable Cause

Due to limited controllability following the failure of the right-hand flapperon in flight, due to a flutter, a hard landing followed.

IARC Date		Release Date	

AIRCRAFT ACCIDENT REPORT

Name of Owner/Operator	: De Vos D.W.G
Manufacturer	: Urban Air S.R.O
Model	: Lambada UFM-13
Nationality	: South African
Registration Marks	: ZU-VOS
Place	: Port Alfred Aerodrome
Date	: 4 February 2006
Time	: 1200Z

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 (1997) this report was compiled in the interests of the promotion of aviation safety and the reduction of the risk of aviation accidents or incidents and **not to establish legal liability**.*

Disclaimer:

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1. FACTUAL INFORMATION

1.1 History of Flight:

1.1.1 The pilot stated that he was engaged on a private flight. He took-off from Port Alfred Aerodrome, at 1130Z. The pilot flew to the coast at a height of 1 500 feet above mean sea level (AMSL).

1.1.2 The pilot commenced a gentle turn to the right and thereafter a 360° turn in a similar attitude to the left. After performing these manoeuvres, the pilot started to climb in an easterly direction along the coast line at 60 knots IAS.

1.1.3 The pilot established radio contact with Port Alfred tower on reaching the General Flying Area. The aircraft was at 4000 feet, 70 knots indicated airspeed (IAS) and the engine was operating at 4500 r.p.m. The pilot initiated a 30° turn to the left. During the turn it felt to the pilot as if the aircraft was over-banking to the left after executing the turn. The pilot tried to correct it by applying full right flapperon. There was no response from the aircraft following his input, so he pushed the control stick forward to increase the speed, without any effect. The pilot then decided to reduce his power setting to idle.

1.1.4 The airspeed indicator reading was observed to be 90 knots. There was still no flapperon control, causing the aircraft to spiral to the left and the pilot applied full right rudder to recover from the condition. The aircraft was flying at a height of approximately 2 500 feet at an indicated airspeed of 90 knots.

1.1.5 The pilot attempted to keep the aircraft straight and level by applying rudder control, but the aircraft kept on yawing to the right. It was noted that when he reduced the power and therefore the airspeed, the aircraft became difficult to control. This resulted in the pilot increasing the power and airspeed back to the approximately 90 knots.

1.1.6 The pilot then again established radio contact with the Port Alfred tower and requested immediate joining and landing. He informed the tower of his emergency condition of not having flapperon control. The pilot was cleared to join on a left down-wind for landing at Runway 10L (left). As the aircraft approached the runway, the pilot had difficulty in maintaining level flight as the left wing kept on dropping, which resulted in an unstable approach.

1.1.7 The aircraft landed hard, resulting in damage to the main landing gear and the propeller making contact with the runway surface.

1.2 Injuries to Persons:

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

1.3 Damage to Aircraft:

1.3.1 A section of the right flapperon, 3.72m in length, separated from the aircraft's right wing in flight. The aircraft sustained structural damage to the undercarriage, propeller and engine oil cooler during the forced landing.

Photo showing damage to the undercarriage and the propeller.

1.4 Other Damage:

1.4.1 There was no other damage caused.

1.5 Personnel Information:

Nationality	South African	**Gender**	Male	**Age**	48
Licence Number	***************	**Licence Type**	Private & Microlight		
Licence valid	Yes	**Type Endorsed**	Yes		
Ratings	Night Rating				
Medical Expiry Date	31 January 2007				
Restrictions	Corrective Lenses				
Previous Accidents	2 February 1998. Forced landing due to carburettor icing.				

Flying Experience:

Total Hours	1 100.0
Total Past 90 Days	27.0
Total on Type Past 90 Days	17.1
Total on Type	17.1

1.5.1 The pilot had submitted an application and was issued with a Student Pilot's Licence on 24 February 1997. On 4 September 1997 he submitted his application to be issued with a private pilot's licence after he had flown 59.6 hours towards obtaining his licence.

1.5.2 The following aircraft types were endorsed on his private pilot's licence: Cessna 150, 172, 210 as well as the Lambada UFM-13.

1.6 Aircraft Information:

Airframe:

Type	LambadaUFM-13	
Serial No.	68/13	
Manufacturer	Urban Air S.R.O	
Year of Manufacture	2005	
Total Airframe Hours (At time of Incident)	17.1	
Last MPI (Date & Hours)	New Aircraft	New Aircraft
Hours since Last Annual Inspection	Aircraft not reached hours of first Annual Inspection	
Authority to Fly (Issue Date)	20 January 2006	
C of R (Issue Date) (Present owner)	13 December 2005	
Operating Categories	Authority to Fly: Private Operation	

1.6.1 The aircraft was registered in the name of the current owner and issued with a Certificate of Registration, number: 368/ZU-VOS on 13 December 2005. The aircraft was manufactured by Urban Air S. R. O and was imported as a kit into South Africa by local manufacturing Organisation (M614). Current South African Civil Aviation Regulations allow for those aircraft, of which the type, the local or foreign manufacturing organization, the local assembling organization or agent, or the build standard has been approved by the Commissioner, to be built or imported and flown within the Republic. The conditions under which these flights may be conducted are normally defined in an appropriate Authority to Fly.

Engine:

Type	Rotax 912 S
Serial No.	5644720
Hours since New	17.1
Hours since Overhaul	T.B.O. not yet reached.

Propeller:

Type	Woodcomp
Serial No.	RD 364
Hours since New	17.1
Hours since Overhaul	T.B.O not yet reached

1.7 Meteorological Information:

1.7.1 The following information was obtained from the pilot's questionnaire;

Wind direction	010°	Wind speed	15 to 18kts	Visibility	20 miles
Temperature	N/A	Cloud cover	N/A	Cloud base	N/A
Dew point	N/A				

1.8 Aids to Navigation:

1.8.1 In addition to the standard navigation equipment for this aircraft type, it was equipped with an AirMap 2000c Global Positioning System (GPS). The identified Mapping Receiver (GPS) assisted the pilot to navigate the aircraft and also provided important in-flight information. The pilot used the navigation information displayed on the Mapping Instrument and flew the aircraft back to Port Alfred Aerodrome.

1.9 Communications:

1.9.1 The aircraft was equipped with a Silser ATR–600 VHF radio. The radio was set on the tower frequency for Port Alfred on the frequency 122.0 MHz. The pilot declared an emergency to the Port Alfred tower. No transcripts were available of the radio communication between the tower and the pilot due to the fact that they had no recording facilities at Port Alfred Aerodrome, being an Aerodrome Flight Information Service (AFIS) station only.

1.10 Aerodrome Information:

Aerodrome Location	Port Alfred Aerodrome	
Aerodrome Co-ordinates	South 33°35.00 East 026°53.00	
Aerodrome Elevation	275 feet	
Aerodrome Status	Licensed	
Runway Designations	10L/28R	10R/28L
Runway Dimensions	1 828 x 30 m	1 200 x 30 m
Runway Used	10L	
Runway Surface	Grass	
Approach Facilities	NDB, Runway Lights	

1.11 Flight Recorders:

1.11.1 The aircraft was not fitted with a Cockpit Voice Recorder (CVR) or a Flight Data Recorder (FDR) and neither was it required by regulations to be fitted to this aircraft type.

1.11.2 Global Positioning System (GPS).

Further investigation was done on the AirMap 2000c Global Positioning System (GPS). The navigation instrument was taken to the local distributor, in order to facilitate the downloading of flight information from its memory card. Information of the flight path flown by the pilot with the aircraft could be seen displayed on the monitor of the GPS. However, it was not possible to have the estimated diameter of the turns done by the aircraft when the failure occurred. The results indicated that the pilot had executed at least four turns prior to the accident. It was also not possible for the distributor to give a paper printout of the information. This is due to the fact that they did not have the equipment suitable for this type of function.

1.12 Wreckage and Impact Information:

1.12.1 The inner section of the flapperon, 1.58 m in length, remained attached to the right wing structure of the aircraft, with the outer 3.72 m of flapperon separating from the wing. It was never recovered as it is believed that it probably fell into the sea.

1.12.2 Even though the flapperon section separated from the aircraft in flight, the pilot was able to control the aircraft and maintain flight. A hard landing followed on Runway 10L at Port Alfred Aerodrome, causing damage to the main landing gear, with the right side main wheel breaking off and the propeller impacting with the grass-covered runway surface.

1.13 Medical and Pathological Information:

1.13.1 Not applicable.

1.14 Fire:

1.14.1 There was no evidence of a pre- or post-impact fire.

1.15 Survival Aspects:

1.15.1 The pilot and passenger survived the accident. The aircraft design allows for only two seats. Both occupants were properly restrained by making use of the aircraft–equipped, four-point safety harnesses. The safety belts and shoulder harnesses were checked for condition and serviceability. The material strength and installation of attachments were found to be in a serviceable condition. The cockpit/cabin area remained intact and undamaged, rendering the accident survivable.

1.15.2 The fire extinguisher bottle, medical aid kid and emergency signals were not found in the aircraft following the inspection of the aircraft.

1.16 Tests and Research:

1.16.1 A test report was received from the original Aircraft Manufacture with reference to a further investigation into the failure of the flapperon flight control surface push-pull rod. The manufacturer conducted tests to establish what the required forces would have been for the push rod to fail in the way it did. The report also provided engineering calculations to determine the strength of material and manufacturing process applied to reinforce the grip between the two parts (Centre Rod & eye bolt rod end) held together by rivets.

View of flapperon push/pull eyeball end, which was found detached.

1.16.2 Several of the flapperon control rods were found to be bent as a result of the loads exerted on them in flight. Copies of documentation received from the Aircraft Manufacture explain the load limitations.

View of bent flapperon push-pull control rods.

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1.16.3 Flapperon:

The flapperon control surface was manufactured out of fibreglass. The material strength across the area (0.82 m^2) of the flapperon has been tested by the manufacturer to a factor of safety f = 2,25.

Section of flapperon, 1.58m in length, that remained attached to the wing structure.

1.16.4 Wing Hinges:

There is a total of nine hinge attachments to the trailing edge of the wing structure to accommodate the installation of the flapperon. The material of the wing hinges is made out of carbon as well as glass fibre and was tested by the manufacturer to withstand the required design limitations/forces imposed on them.

View of two of the hinges supporting the flapperon control surface.

1.16.5 A representative from the aircraft manufacturer assisted the investigating team in testing the digital instrument: Dynon Avionics EFIS–D10A that was installed in this aircraft. The purpose of the test was to confirm that the instrument readings were in compliance with manufacturers' requirements. The test result showed that the instrument was not calibrated prior to or during the installation of the unit into the aircraft. It was further noted that the flight and engine instruments that were installed in the aircraft did not correspond with the instrument layout as depicted in the Pilot Operating Handbook. Manufacturing Organisation (M614) installed this instrumentation in this aircraft. Incorrect markings due to non-calibration of the digital instrument can result in a pilot unintentionally exceeding the limitation of the airframe design with specific reference to the never exceed speed (VNE). Any control deflection above VNE speeds can result in control failure as was the case in this accident.

The following information is extracted from the POH, Section 2, Operating limitations, Instrument markings, and basic placards necessary for safe operation of a light aircraft, its engines, standard systems and standard equipment.

NOTE: The column 'Remarks' display the actual values that were obtained during the test from the instrument that was installed in the aircraft at the time of the accident.

Airspeed		IAS [kts]	Marking	Remarks
V_{NE}	Never exceed speed (*Do not exceed this speed in any operation)*	108	Red line	Starts at 149 kts
V_{NO}	Maximum structural cruising speed	78	Yellow arc	Starts at 139 kts
V_A	Manoeuvring speed	73	Green arc	Green arc starts at 52 kts and ends at 138 kts
V_{FE}	Maximum flaps extension speed	59	White arc	Test result was 58 kts

Start of the yellow arc at 139 kt on the air-speed in-dicator

A view of the EFIS instrument displaying the airspeed indicator on the left-hand side.

Conventional cockpit layout with the Vne indicated in red at 108 kts on the airspeed indicator.

1.17 Organisational and Management Information:

1.17.1 The aircraft was manufactured in the Czech Republic by Urban Air S.R.O. It was imported by a South African Manufacturing Organisation (M 614) as a kit. The aircraft was type-accepted in South Africa on 7 November 2002, after an inspection by the SACAA at the manufacturer in the Czech Republic.

1.17.2 The South African-approved manufacturer – M614 started with the assembly of the kit on 4 January 2006. The main landing gear and instrument panel were manufactured locally at the identified manufacturer. In terms of the product manufacturing principle of the aircraft type, the SACAA classified it as a Production Build aircraft. This is in compliance with the provisions of the Civil Aviation Regulations Part 21, Subpart 6.

1.17.3 The Approved Manufacturer (M614) sub-contracted the manufacturing of the main landing gear. According to available information, the sub-contracted Manufacturing Organisation did not have an Approval. The landing gears are not in accordance with the original type design standard of the Czech Republic Type Certificate.

1.17.4 The CAA conducted an inspection of the manufacturing processes of the Approved Organisation (M614). The findings were that the organisation did not have procedures to show their responsibility towards design change control; implying that Landing Gears (locally manufactured parts) were signed for by the Approved Manufacturing Organisation (M614) and became part of the Certificate of Release to Service issued for the complete aircraft. There is no evidence of a Certificate of Conformity issued to the Manufacturing Organisation (M614) by the sub-contracted Organisation.

1.18 Additional Information:

1.18.1 After the process of assembly and testing was completed, the Certificate of Release to Service for the aircraft was then issued by the Organisation (M614). The release was certified under the provision of the privilege granted by the Manufacturing Organisation Rating. The validity of the Certificate of Release to Service issued by the Manufacturing Organisation (M614) is not without safety concerns. The aircraft structures are imported, but not manufactured in South Africa and the Organisation (M614) has been allowed by the SACAA to issue a Certificate of Release to Service on behalf of the manufacturer; Urban Air S.R.O for the product (kit) as if it was manufactured inside South Africa. There is no evidence of a certificate of conformity issued by the original manufacturer for the kit.

1.18.2 The aircraft was issued with a South African Registration Certificate on 13 December 2005. Thereafter on 20 January 2006, the SACAA issued the owner of the aircraft a Private Operation Authority to Fly. The production-built aircraft types do not need to be issued with a Proving Flight Authority. This is due to the status of the aircraft type, that it holds a Type Certificate and the Proto Type Tests were found acceptable by the SACAA Certification department. The aircraft was test-flown by the manufacturer for the duration of two separate 30 minute-intervals by a private pilot, who happens to be the Accountable Manager of the Approved Manufacturing Organisation (M614).

1.18.3 International manufacturing technical standards in terms of CAR, Part 21 requires that a Certificate of Conformity be issued by the manufacturer of a product, for an applied process and the testing of it. In the case of this type of aircraft there is no evidence to show that this document was ever issued. The aircraft is type-certified in the Chezk Republic. In terms of the same CAR, Part 21, this aircraft should be type-approved if imported into South African.

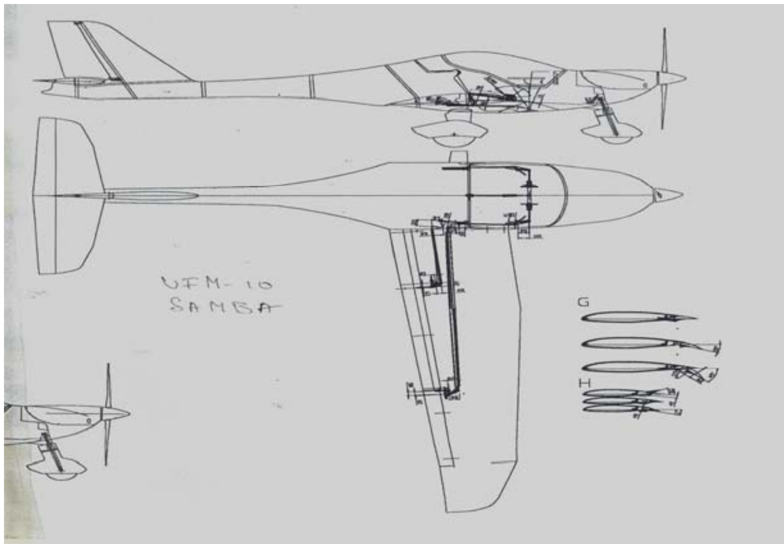
1.18.4 As part of the assembly process, the Manufacturing Organisation (M614) installed all the avionic, engine instrumentations and electrical wiring. The installation of instrumentation is regarded as a modification to the original type design standard and was installed by an Approved Person. The Approved Person was never trained as an Aircraft Avionic or Licensed with the appropriate rating that authorises him to sign off the Certificate of Release to Service after performing the work. It is only after the installations are completed and the aircraft is taken for the test flight that a qualified avionic maintenance engineer is contracted in by the Manufacturing Organisation (M614) to carry out the calibration tests on the instruments.

1.18.5 Description of Flight Controls:

The aircraft's primary flight control surfaces are controlled by a dual push–pull control system. The flapperons are controlled by the control stick located inside the cockpit. Generally Flapperons are Flaps, acting as ailerons. They work in conjunction with the ailerons when turning the a/c . They are still used as regular flaps to increase airflow and reduce airspeed. The design of the push-pull control rods are such that the movement takes place in both the push and pull direction. The control rods are installed to bell cranks at points, where the system turns into an angle, routed inside the wing from the flapperon attachment to the flight control stick. The control system consists of two free-moving parts, which depend on input or output forces for deflection. When the pilot moves the control stick inside the cockpit to the left side, it would result in the flapperon on the left wing deflecting up and the aircraft rolling in the left direction. The opposite happens when the pilot moves the control stick to the right. (The flapperon on the left wing pulls down and aircraft rolls to the right). However, only two significant movements are made on the control rods system – push and pull.

The movement of the push–pull control system is dependent on the deflection or travel of the flapperon. The movement of the control system can be seen by the movement of the control stick in the left or right direction, affecting a response of up or down deflection from the flight control surface, In addition the push–pull control system keeps the flapperon secured in position to ensure positive flying characteristics.

(i) It is possible that the flapperon may have been exposed to some sort of fluttering during flight, causing the wing hinges to fail and allowing the movement clearance within the push – pull control system to be greater than allowed for by its design. The flapperon could now have a deflection up or down, causing the safety guard strip to become dislodged from its position in the wing trailing edge. The flapperon then got stuck in the full up position, leaving the flight control stick as the only free-moving mechanism in the control system; with the pilot applying a force to the control stick and an opposing flattering force exerted in the control system from the flapperon. As a result the weakest link in the control system, the eyeball end, failed. The flapperon was loose from the wing on the in board side, exposed to undetermined loads and fluttering vibration, causing the flight control surface to fail and separate from the wing in flight. Have in mind that the information, sequence of events discussed happens in a matter of seconds, before reaching the stage of complete disaster.



A schematic view of the flapperon control layout for the aircraft type in question

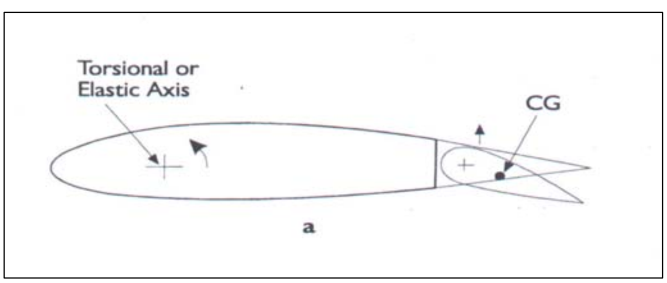
1.18.6 Flutter:

Reference: AP3456 Manual, Section 1-1-1-9.

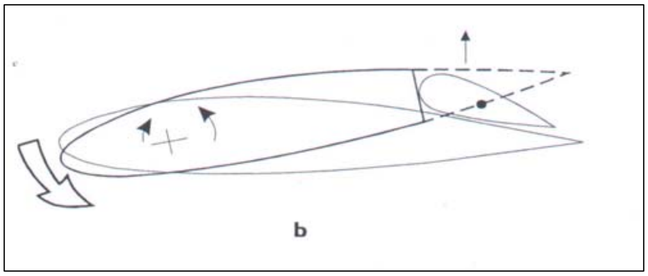
Torsional Aileron Flutter.

This is caused by the wing twisting under loads imposed on it by the movement of the aileron. A sequence for a half cycle is described below.

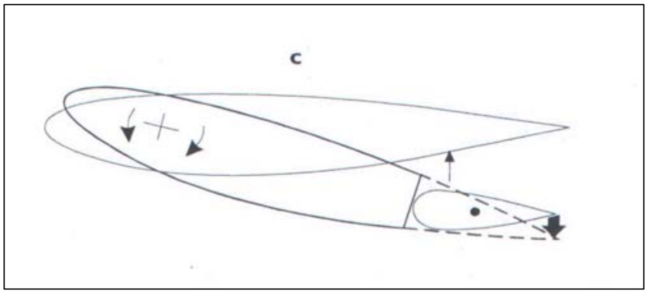
The aileron is displaced slightly downwards, exerting an increased lifting force on the aileron hinge.



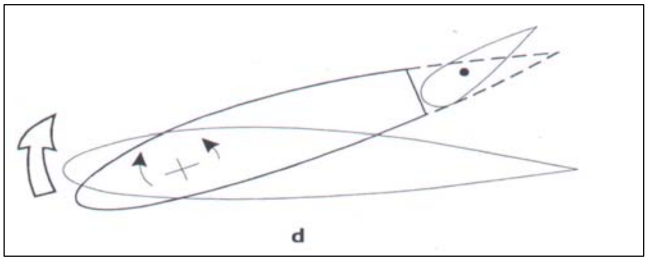
The wing twists about the tensional axis, the trailing edge rising, taking the aileron up with it. The CG (Centre of Gravity) of the aileron is behind the hinge line; its inertia tends to make it lag behind, increasing aileron lift, and so increasing the twisting moment.



The torsional reaction of the wing has arrested the twisting motion but the air loads on the aileron, the stretch of its control circuit, and its upward momentum, cause it to overshoot the neutral position, placing a down load on the trailing edge of the wing.



The energy stored in the twisted wing and the reversed aerodynamic load of the aileron cause the wing to twist in the opposite direction. The cycle is then repeated.



Flutter risks can never be completely avoided. Avoidance within the flight envelope of an aircraft is achieved by designing for flutter speeds considerably higher than the maximum dive speeds. All aeroplanes are flight-tested for flutter up to these speeds. The risk of divergent flutter should therefore be nil. However, this is not the case. Changes in balancing weights, control system sloppiness and reduced structural stiffness may reduce the critical flutter speed to normal operational speeds.

1.19 Useful or Effective Investigation Techniques:

1.19.1 None.

2. ANALYSIS

2.1 While engaged in a private flight at a height of approximately 4 500 feet, the outer section (3.72m in length) of the right flapperon failed and separated from the aircraft. The aircraft became difficult to control and the pilot elected to reduce his speed to reduce his height. The pilot had no control over the flapperons and was able to maintain flight by means of rudder and throttle control. The pilot declared an emergency to Port Alfred tower and requested permission to land. Due to limited controllability the aircraft landed hard, which caused damage to the undercarriage and the propeller.

2.2 Further investigation showed evidence that the push/pull control rod of the right-hand side flapperon had failed. The flapperon control push/pull rod became disconnected at the eyeball fitting, where two rivets were installed. The rivets could not be found inside the aircraft. The failure of the attachment fitting was attributed to the extreme forces that acted on the control system during the failure of the flapperon control surface. The aircraft had gone through different quality control checks, when it was assembled at the manufacturer, prior to it having been shipped to South Africa. Again upon arrival in South Africa, at the facility of the local manufacturer/distributor, all the flight control rods and primary flight control surfaces were inspected for security of installation and attachment.

2.3 The Dynon Avionics EFIS-D10A primary flight instrument system was tested and it was found that the instrument airspeed indicator markings did not conform to the values as stipulated in the Pilots' Operating Handbook (POH). The instrument was therefore not calibrated according to the required design limitations of the aircraft. It should be noted that the aircraft had flown a total of 17.1 hours when the failure of the flapperon occurred. Although the flight in question was still stored in the non-volatile memory of the GPS unit, it could be seen that the pilot had executed several turns prior to the failure of the flapperon, however, no detailed information indicating the airspeed and angle of bank could be downloaded.

2.4 Two fundamental errors were considered to have contributed and eventually caused the failure of the right-hand flapperon in-flight:

2.4.1. The EFIS instrument that was fitted to the aircraft was made available as an option to the client. The instrument was installed in the aircraft without being calibrated. The airspeed limitations on the instrument displayed substantial discrepancies/errors, with the instrument under reading, especially when it came to critical airspeed limitations. This under reading could therefore result in the actual airspeed much higher than indicated.

2.4.2 The aircraft was subjected to a test flight following its assembly in South Africa and 17.1 flying hours where logged with the aircraft when the accident/failure took place. Not one of the pilots who flew the aircraft during this period had noted that the airspeed limitations as stipulated in the POH do not correspond with the airspeed limitations displayed on the EFIS instrument airspeed bar. This implies that with the EFIS not appropriately calibrated and not marked with colour codes any pilot would not have a ready reference as to the allowable and not to exceed indicated airspeeds as defined in the POH.

3. This is a matter of concern, as one needs to question the purpose and procedures relating to the test/function flight and the technical knowledge displayed by the pilots who had flown the aircraft up to the time of the occurrence. It is believed that most pilots are used to flying aircraft equipped with analog-type flight instruments and need some time (transition period) to convert and become acquainted with the more modern type of technology in the form of EFIS.

4. This was the first time that the pilot/owner flew the aircraft type that was equipped with this type of instrumentation. As he maintained his indicated airspeed within the green arc it is possible that he was thinking that he was flying the aircraft within the design limits of the aircraft, while he was actually exceeding it. Whilst he had flown this aircraft on several flights prior to the one in question, he could therefore have unintentionally exceeded the V_{NE} (108 kts) in this particular flight. What had made the flight in question slightly different from his previous flights was that the pilot had executed several climbing and descending turns, which might have aggravated the loads incurred on the control surfaces and caused it to fail due to the actual higher than indicated airspeeds..

5. Available evidence indicates that the control surface most probably had been subjected to flutter and as a result caused the flapperon to fail and to separate from the wing structure. The reason for the inner section remaining attached could be associated with the severity of the oscillations that the flapperon had been exposed to during flutter.

3. CONCLUSION

3.1 Findings:

3.1.1 The pilot was the holder of a valid microlight as well as a private pilot's licence with the aircraft type endorsed in his logbook.

3.1.2 The Manufacturing Organisation (M614) certified the release of the aircraft after assembly in compliance with an Approved "Build Standard".

3.1.3 The Manufacturing Organisation (M614) issued the Certificate of Release to Service on behalf of the sub-contractor. There is no evidence that a Certificate of Conformity was issued for the manufactured Landing Gear. This due to the fact that the sub-contractor was not Approved as a Manufacturing Organisation by the Commissioner.

3.1.4 The Dynon Avionics EFIS-D10A flight instrumentation that was found fitted in the aircraft was not calibrated according to the Manufacturer's Performance Data in the Pilots' Operating Handbook.

3.1.5 The aircraft instrumentation had been installed by an Approved Person. There is no evidence of any Approved Design of the Wiring Diagrams. The Manufacturing Organisation has no employees who are qualified or licensed avionic technicians.

3.1.6 The rivets installed on one of the push-pull rods failed at the eyeball-end.

3.1.7 The instrument panel layout included in the Aircraft's Operating Handbook is not as per equipment installed in the aircraft.

3.2 Probable Cause/s:

3.2.1 Due to limited controllability following the failure of the right-hand flapperon in-flight, due to flutter, a hard landing followed.

3.3 Contributory Factor/s:

3.3.1 Erroneous airspeed calibration of the EFIS flight instrument, resulting in a Vne display error of 38%.

4. SAFETY RECOMMENDATIONS

4.1 It is recommended that the Approved Manufacturing Organisation (M614) request from the sub-contractor that manufactures the undercarriage, to issue certificates of conformity or a release document; especially for the aircraft that are operating in Aviation Training Organisations.

4.2 It is recommended that the Approved Manufacturing Organisation (M614) should out-source the installation of avionic equipment or have an Approved Aircraft Maintenance Organisation with appropriate rating carry out the installations and perform the required inspections after the work is performed; especially on the aircraft that are operating in Aviation Training Organisations.

4.3 It is recommended that the Commissioner should perform inspections and tests on the Lambada Aircraft and installed Dynon Avionics EFIS-D10A instrument sold by Manufacturing Organisation (M614). This is to satisfy the requirement by the manufacturer of calibration in terms of Airspeed Limitations as stipulated in the Aircraft Operating Manuals.

4.4 It is recommended that the SACAA calls on the inspection of the flapperon control system of EFIS equipped Lambada aircraft to verify that no damage exists that may have been unintentionally caused.

4.5 It is recommended that the SACAA conduct a feasibility study into making the installation of ballistic parachutes in this type of aircraft compulsory.

4.6 It is recommended that the SACAA re-evaluate the pilot training as well as conversion training regarding new aircraft equipped with new technology, especially in the form of EFIS cockpit layouts. It is believed that the new technology would require a transition period for pilots (this does not mean technically all pilots), to orientate themselves and become acquainted with such instrumentation.

5. APPENDICES

5.1 There are no appendices to this report.

-END-

Report reviewed and amended by the Advisory Safety Panel
5 May 2009