



CA 18/3/2/0442

# SOUTH AFRICAN CIVIL AVIATION AUTHORITY

## AIRCRAFT INCIDENT REPORT AND EXECUTIVE SUMMARY

<b>Aircraft Registration</b>	<b>ZU-DAX</b>	<b>Date of Incident</b>	29 September 2005	<b>Time of Incident</b>	0741Z
<b>Type of Aircraft</b>	Jabiru SP	<b>Type of Operation</b>	Training		
<b>Pilot-in-command Licence Type</b>		<b>Age</b>	25	<b>Licence Valid</b>	Yes
<b>Pilot-in-command Flying Experience</b>	Total Flying Hours	1 285	<b>Hours on Type</b>	68	
<b>Last point of departure</b>	George Aerodrome (FAGG)				
<b>Next point of intended landing</b>	George Aerodrome (FAGG)				
<b>Location of the incident site with reference to easily defined geographical points (GPS readings if possible)</b>					
On runway 11 at George Aerodrome (FAGG)					
<b>Meteorological Information</b>	Wind: 100 %05 kts; Visibility: Good; Temperature: 20 °C; CAVOK.				
<b>Number of people on board</b>	1 + 1	<b>No. of people injured</b>	0	<b>No. of people killed</b>	0
<b>Synopsis</b>	<p>During a training flight in the George area, the instructor and student pilot informed the Aviation Training Organisation that they were experiencing mechanical problems with the elevator control system. The aircraft was responding only to a nose-down, and not to a nose-up, elevator control input. The instructor managed to control the aircraft's pitch by applying or reducing engine power, and executed a hard landing on runway 11 at George Aerodrome at approximately 0741Z. The nose gear collapsed and the propeller was damaged as a result. Neither the instructor nor student was injured, however.</p> <p>It appears as if the movement of the elevator control cable was affected as result of the anchor point clamp not being properly installed.</p> <p>Both pilots were appropriately type-rated on the aircraft and had valid medical certificates. The instructor was restricted to wearing corrective lenses.</p> <p>The aircraft was operated by Aviation Training Organisation CAA/0047 which had last been audited on 10 June 2005 and issued with an Approval Certificate on 28 June 2005 with an expiry date of 30 June 2006. The aircraft had a valid Training Authority to Fly Certificate issued on 9 September 2005, with an expiry date of 8 September 2006.</p> <p>The Aircraft Maintenance Organisation – AMO 909 – responsible for the maintenance of the aircraft had a valid AMO Approval Certificate issued on 2 August 2004 with an expiry date of 1 August 2005.</p>				
<b>Probable Cause/s</b>					
Loss of up-elevator control resulted in a hard landing, during which the nose gear collapsed.					
<b>IARC Date</b>		<b>Release Date</b>			



# AIRCRAFT INCIDENT REPORT

**Name of Owner/Operator** : Todd Air Finance CC  
**Manufacturer** : Shadow Lite CC  
**Model** : Jabiru SP  
**Nationality** : South African  
**Registration Marks** : ZU-DAX  
**Place** : George Aerodrome  
**Date** : 29 September 2005  
**Time** : 0741Z

*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 interest of the promotion of aviation safety and the reduction of the risk of aviation accidents or incidents and **not to establish legal liability**.*

## Disclaimer

*This report is given without prejudice to the rights of the CAA, which are reserved.*

## 1. FACTUAL INFORMATION

### 1.1 History of Flight

1.1.1 The instructor and student pilot flew the aircraft, under visual flight rules (VFR), from George Aerodrome (FAGG) and in the surrounding area on a training flight. According to the aviation training organisation, the pilots experienced mechanical problems with the elevator control system after takeoff. The aircraft responded only to a nose-down, and not a nose-up, elevator control input. The instructor managed to control the aircraft's pitch by applying or reducing engine power, and executed a hard landing on runway 11 at George Aerodrome at approximately 0741Z. The nose gear collapsed and the propeller was badly damaged as a result.

1.1.2 There were no injuries sustained by the instructor or student in the incident.

### 1.2 Injuries to Persons

Injuries	Pilot	Crew	Pass.	Other
Fatal	-	-	-	-
Serious	-	-	-	-
Minor	-	-	-	-
None	2	-	-	-

### 1.3 Damage to Aircraft

1.3.1 The aircraft sustained substantial damage to the nose landing gear and propeller.

### 1.4 Other Damage

1.4.1 There was minor damage caused to the surface of the runway at George Aerodrome.

### 1.5 Personnel Information

#### Instructor

Nationality	South African	Gender	Male	Age	25
Licence Number	0270459340	Licence Type	Commercial		
Licence valid	Yes	Type Endorsed	Yes		
Ratings	Instructor – Grade 2, Instrument and Night Rating				
Medical Expiry Date	31January 2006				
Restrictions	Corrective Lenses				
Previous Accidents and/or Incidents	Low-level flying incident on 5 March 1999				

#### Flying Experience

Total Hours	1 285
Total Past 90 Days	40
Total on Type Past 90 Days	25
Total on Type	68

- 1.5.1 The pilot submitted an application for the issuance of a student pilot's licence on 30 November 1998. After completing his flying training, the pilot submitted another application for the issuance of a private pilot's licence (PPL), providing evidence of 40 hours flown. The CAA approved and issued the PPL on 18 January 1999.
- 1.5.2 The pilot submitted an application to the CAA on 10 November 2001 for the issuance of a commercial pilot licence (CPL). In terms of the requirements for its issuance, the pilot showed evidence of 303.16 hours flown.
- 1.5.4 Several other aircraft types found on the licence were issued after the pilot completed type-conversion training.
- 1.5.5 The CAA received instructor upgrade application forms, and approved and issued the aircraft type – Jabiru – to the pilot on 9 May 2005. The evidence showed that the aircraft type was approved without having received any application or a conversion application. On the day of the issuance of the type rating, it was found that the pilot had already flown a total of 68 hours on the Jabiru aircraft.

## 1.6 Aircraft Information

### Airframe

Type	Jabiru SP 470	
Serial No.	563	
Manufacturer	Shadow Lite C C	
Date of Manufacture	12 May 2003	
Total Airframe Hours (at time of incident)	463.8	
Last Annual Inspection (Date & Hours)	7 September 2005	427.5
Hours since Last Annual Inspection	36.3	
Authority to Fly (Issue Date)	9 September 2005	
C of R (Issue Date) (Present Owner)	9 September 2005 Todd Air Finance CC	
Operating Categories	Training Authority to Fly	

- 1.6.1 The records in the aircraft file, which is held by the CAA, show that the aircraft was maintained by Aircraft Maintenance Organisation AMO 909. This AMO was responsible for performing scheduled and unscheduled maintenance inspections of the aircraft. These would be at specified intervals and also normally at the request of the owner. An entry, dated 13 August 2003, was made in the logbook of the aircraft of maintenance performed on the airframe and engine controls during the assembly of the aircraft. The evidence shows that after the maintenance was performed as required, the dual inspections were certified by maintenance inspectors of the AMO. There was also no evidence of further maintenance performed on the aircraft where the airframe flight controls were disturbed. This provides evidence that personnel from AMO 909 were the last to work on the elevator control system.
- 1.6.2 The aircraft was approved and issued with a Training Authority to Fly Certificate on 9 September 2005, for the owner to operate it as part of an Aviation Training Organisation (CAA/0064).
- 1.6.3 According to the equipment list, the aircraft was fitted with an Airpath CM244 (serial number 223) make and model type of compass. Entries in the logbook of the aircraft show that the last compass swing had been performed on 14 August 2003 by AMO 909. This is in contravention of CAR, Part 43.02.18 "Aircraft Compass Requirements" which states: "Any compass fitted to an aircraft shall be swung and maintained in accordance with the requirements as prescribed in document SA-CATS-GMR".
- 1.6.4 There is no evidence in the logbook copies or on the aircraft file to show that the required maintenance was performed on the altimeter and airspeed indicator of the aircraft.

- 1.6.5 As recorded in 1.6.1 above, the maintenance that was performed on the aircraft was identified as follows:

Date Performed	Hours Performed	Type of Inspections Recorded in Logbook	Intervals Exceeded
26/12/2003	99.0	Annual Inspection (100 hrs)	
			101 hrs
20/07/2004	200.0	Annual Inspection (200 hrs)	
			106 hrs
11/12/2004	306.0	Annual Inspection (100 hrs)	
			36.5 hrs
23/03/2005	342.5	Inspection (50 hrs)	
			60.2 hrs
04/08/2005	402.7	Annual Inspection (100 hrs)	
			24.8 hrs
07/09/2005	427.5	Annual Inspection (100 hrs)	

- 1.6.6 The block diagram above shows that the maintenance was performed at random intervals.

**Ref:** CAR, Part 94.01.1(4) states:

*Non-Type Certificated Aircraft operated in terms of this part are prohibited from providing a commercial air transport operation, as defined in Part 1 of the regulations. Although flying training is not considered to be a commercial air transport operation, any non-type certificated aircraft used in flight training shall be operated in terms of Part 96.*

*Note: 96.05.1(3), Any microlight aeroplane operated in terms of this Part shall undergo an inspection at intervals not exceeding 25 hrs of flight time, utilising checklist contained in SA-CATS-NTCA.*

- 1.6.7 The evidence shows that the owner of the aircraft did not comply with the requirements of this regulation. There was also no documentary evidence on the aircraft file of an exemption approved by the Commissioner for Civil Aviation that allowed the owner the provision not to comply with the regulation.
- 1.6.8 Evidence was also found that shows that maintenance had been performed on the aircraft and certified for on 11 December 2004 by Aircraft Maintenance Engineer AME 2884. It was found that this AME were not appropriately rated on the aircraft and engine type at the time of the incident. The AME licence holder was acting in contravention of SA-CATS-NTCA, 24.03.2 (1) (f). It was found in the investigation that AME 2884 had been responsible for the same contravention in another accident aircraft: ZU-DVY.

## Engine

Type	Jabiru SP
Serial No.	1384
Hours since New	463.8
Hours since Overhaul	TBO not reached

## Propeller

Type	Jabiru
Serial No.	JJ42358LC
Hours since New	463.8
Hours since Overhaul	TBO not reached.

### 1.7 Meteorological Information

Wind direction	100	Wind speed	05 kts	Visibility	Good
Temperature	20°C	Cloud cover	None	Cloud base	unknown
Dew point	unknown				

- 1.7.1 The above weather information was submitted by the instructor to the SACAA in a pilot's accident/incident questionnaire dated 24 October 2005.

Wind direction	Easterly	Wind speed	Calm	Visibility	Good
Temperature	20°C	Cloud cover	No cloud	Cloud base	unknown
Dew point	unknown				

- 1.7.2 The above weather information was submitted in Report No. 2455 by Airports Manager George Aerodrome (ACSA) office.

### 1.8 Aids to Navigation

- 1.8.1 The aircraft was fitted with standard navigational equipment approved for the aircraft type. All additional navigational equipment installed in the aircraft was included on the approved equipment list and no defects were reported by the pilots.

### 1.9 Communications

- 1.9.1 The approved equipment list dated 13 August 2003, which was found on the aircraft file at the SACAA, shows that the aircraft was fitted with an ICOM A 200 type of radio (serial number: 31863). There were no reported defects experienced with the communication equipment.
- 1.9.2 No evidence was found that the pilot reported the incident to George air traffic control (ATC). The only evidence of communication was that the instructor reported the emergency to George Aerodrome Management. What could be concluded from a report submitted by George Aerodrome Management was that the instructor reported an emergency at approximately 0742Z, stating that he was experiencing a faulty elevator.

## 1.10 Aerodrome Information

Aerodrome Location	FAGG – George Airport (1008)	
Aerodrome Co-ordinates	S34°00.4 E022°22.5	
Aerodrome Elevation	648 feet	
Runway Designations	11/29	02/20
Runway Dimensions	2 000 m x 45 m	1 160 m x 30 m
Runway Used	11	
Runway Surface	ASPH	
Approach Facilities	PAPI, 2 Bar approach slope 3°	

## 1.11 Flight Recorders

- 1.11.1 The South African Civil Aviation Regulations (SACAR) do not require that flight recorders [cockpit voice recorders (CVR) and flight data recorders (FDR)] be installed in this aircraft type. None of the identified flight recorders was fitted to the aircraft.

## 1.12 Wreckage and Impact Information

- 1.12.1 This was not an on-site investigation. Available information shows that the nose landing gear collapsed after the aircraft landed on runway 11 at George Aerodrome. There was no evidence of any parts or components found separated from the aircraft.

## 1.13 Medical and Pathological Information

- 1.13.1 There were no injuries sustained by the occupants of the aircraft.

## 1.14 Fire

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

## 1.15 Survival Aspects

- 1.15.1 The instructor and student pilot survived the incident without sustaining any injuries.

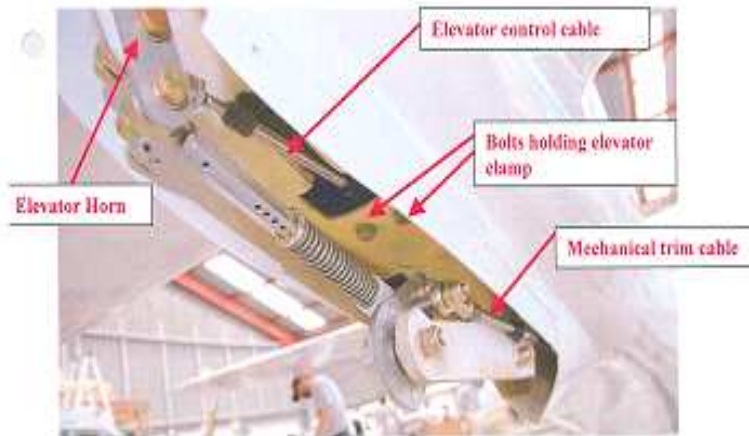
## 1.16 Tests and Research

- 1.16.1 The aircraft was recovered from the incident site and taken to the facility of the manufacturer at George. In a technical investigation report dated 10 October 2005, which was submitted to the CAA, the manufacturer's findings were documented as follows:

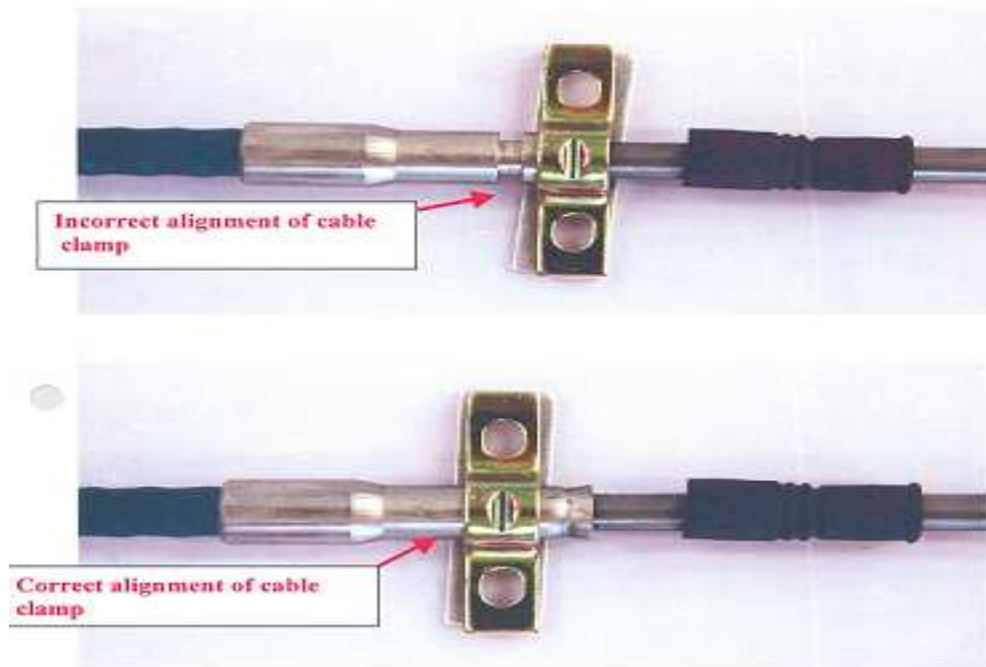
- (1) On investigation, the elevator push-pull cable was inspected and no defects were found with the condition of the cable.



- (2) The rear capture of the push-pull cable was found to have moved from its installation. This was due to the detent on the rear capture not being correctly installed. See photographs below.



**Figure 1.** The elevator control cable installation at the anchor point.



**Figure 2.** The anchor point cable clamp installation



1.16.2 Due to the uncertainty of the investigation results which the manufacturer produced, the investigator-in-charge decided to conduct further research and tests on a similar type of aircraft. The scenario as explained by the manufacturer was simulated as described and the possibility of elevator malfunction analysed. The following results were identified:

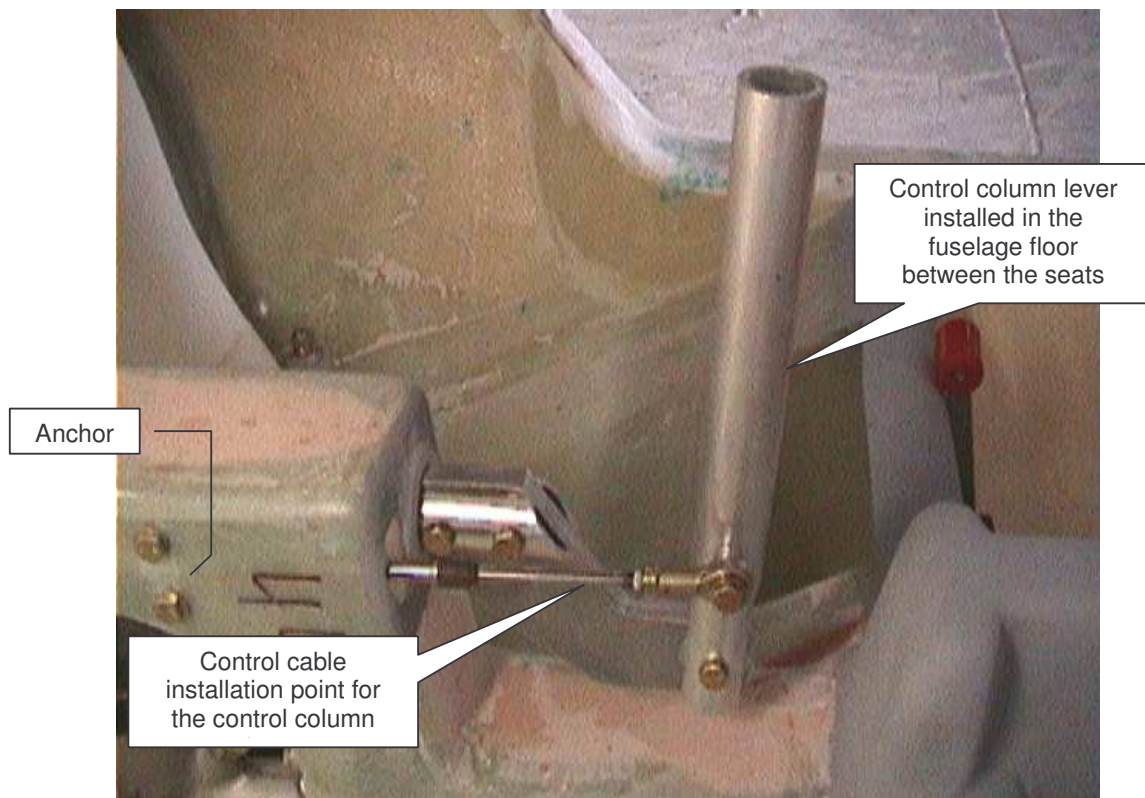
### **Elevator Control System**

1.16.3 The elevator control system installation includes the following parts:

- (i) Control column lever
- (ii) Control cable and two anchor point clamps
- (iii) Elevator flight control surface
- (iv) Elevator trim system

### **Operation**

1.16.4 The elevator control system is operated from the control column lever located in the cockpit of the aircraft. Elevator control is activated through the forward and aft (push and pull) movement of the control column lever by the pilot. The control cable is installed and routed from the control column lever, secured by the first anchor point clamp in the cockpit. The control cable (green sheath, 3 655 mm) is installed through the length of the airframe and to the tail section of the aircraft. (See Figure 3 below)



**Figure 3.** Elevator control column and cable installation in the cockpit.

## Elevator Trim Control System

- 1.16.5 The elevator trim control system is operated from a control lever located in the cockpit of the aircraft. The trim system is activated through the forward (nose-down) and aft (nose-up) movement of the trim control lever by the pilot. The trim control lever is secured by an anchor point clamp in the cockpit. The cable is routed through the length of the airframe to the tail section of the aircraft. (See Figure 4 below)



**Figure 4.** Elevator trim control system Installation.

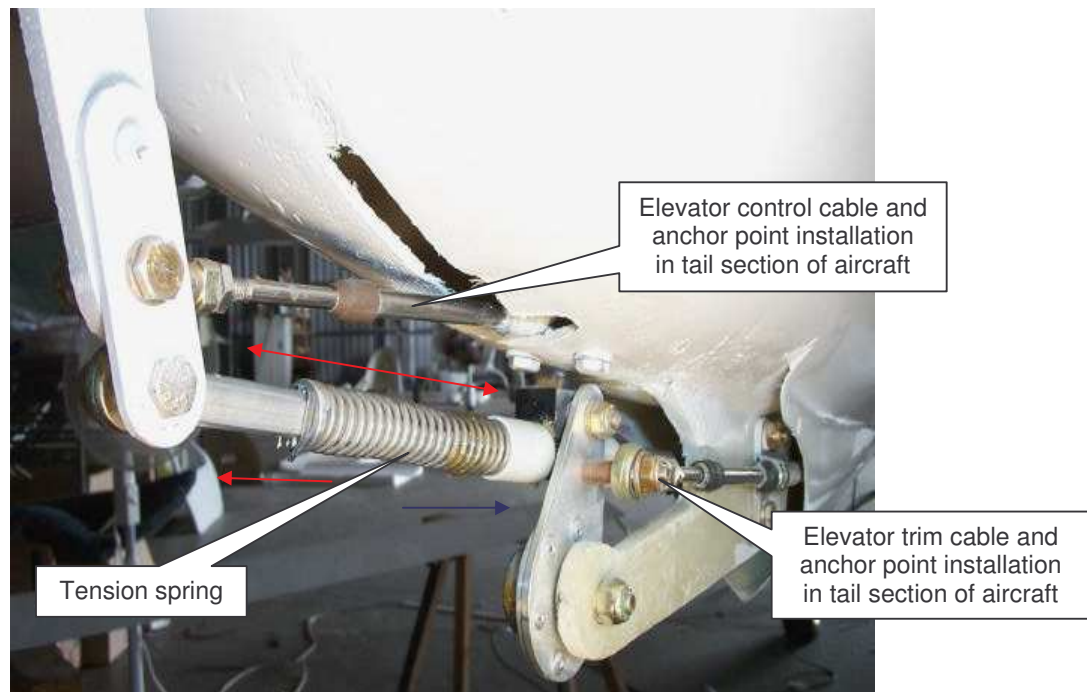
- 1.16.6 Both the elevator control and trim cables are routed to the tail section of the aircraft as shown in 1.16.4 and 1.16.5 above.

## Performance

- (i) The performance of the elevator control systems can be explained as follows:

When the trim control lever is put in neutral position and the elevator control column moved forward to nose-down or rearward to nose-up position, there is no change affected to the position of the trim control lever. The only visible change can be seen at the tension spring and elevator flight control surface, which is in the tail section of the aircraft.

- (ii) If the trim control lever is pushed to the nose-down or nose-up position, the elevator control column moves in the same direction. What can be concluded is that the elevator control lever movement operates independently from the trim system. On the other hand, it was found that mechanically, any input on the trim control lever subsequently has an influence on the elevator control column, due to the fact that the two control systems are mechanically connected. It was found that irrespective of which control system became defective, the pilot would still be able to control the elevator. This was unless a deficiency occurred, such as where the elevator flight control surface unexpectedly became stuck for some reason. (See Figure 5 below)



**Figure 5:** Elevator flight surface and control mechanism in the rear of the aircraft.

1.16.7 As stated above in [1.16.1(ii)], the manufacturer found that the rear anchor point clamp had moved. As part of the investigation, a physical inspection was done on the anchor point installation. The conclusion was that it is not possible for the anchor point clamp to move, due to the fact that it is held into place by two (AN3-10A) type bolts, tightened by nylock-nuts as required. (See Figure 5 for method of bolt installation)

- (i) Further evidence found shows that the elevator cable, as indicated in other sections of the report, has an anchor point close to the elevator control column lever in the cockpit and in the rear of the aircraft. In light of the information noted above, it is possible that the elevator cable may have started to move and not the clamp. This condition would have a radical influence on the effective control of the elevator system.

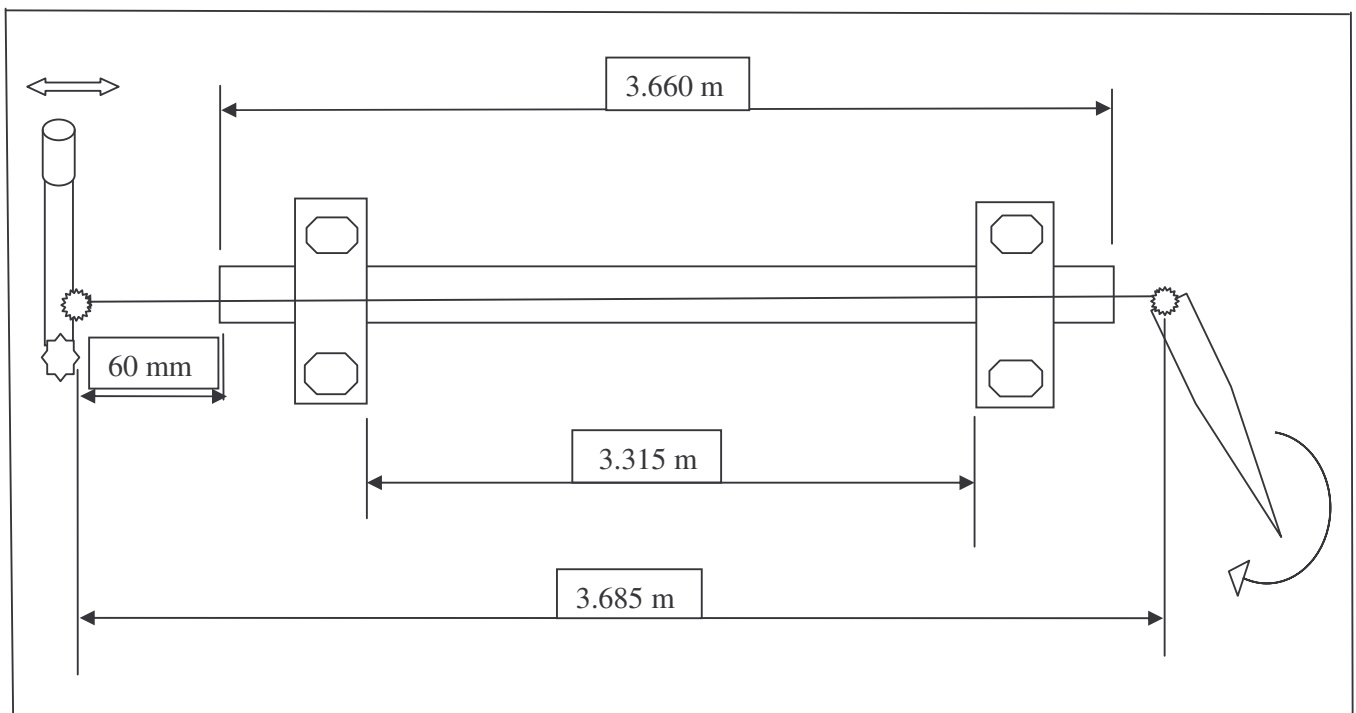
There is another reason it is highly unlikely the anchor point clamp would have moved: the actual maintenance records do not refer to it. Entries certified in the aircraft logbook when the aircraft was repaired state: "Retighten elevator cable rear anchor point". There is no evidence found of its ever having been removed or re-installed after the incident.

1.16.8 Further investigation into the reported defect and finding by the manufacturer led to a test – performed on the “test” aircraft – wherein the investigator-in-charge installed the rear anchor point clamp in the same way as illustrated by the manufacturer and then later completely removed it. The following finding was made:

- (i) Both the primary and secondary elevator control systems operated without any visible defect. The elevator flight control surface travel was not disturbed, only slightly increased in both nose-down and nose-up direction.

1.16.9 It was reported to the CAA that the instructor realised he had nose-down, but no nose-up elevator control. On the basis of the information above, no evidence could be found in the investigation to support the finding of the instructor and manufacturer. There was also no evidence to support the finding during the verification process of the technical and mechanical operation of the elevator control system.

1.16.10 The following technical information of the elevator control system was submitted by the manufacturer: (See Figures 4 & 5 also)



- (i) The overall length of the elevator cable between the control column lever and flight control surface attachments was determined to be approximately 3.685 m. The operation of the elevator system is through the movement of the control lever aft or forward, resulting in a deflection of the flight control surface (up or down). There are only two anchor points, installed approximately 3.315 m apart. The one is installed in the cockpit, close to the elevator control lever and the other in the rear of the aircraft tail section. The cable is then clamped at the anchor points for security of installation. The elevator cable requires that rigging be done during maintenance to allow movement of approximately 60 mm in order to facilitate the correct deflection of the flight control surface.



## **1.17 Organisational and Management Information**

- 1.17.1 The instructor and student pilot were engaged in a training flight. The Aviation Training Organisation (ATO 0047) responsible for scheduling the training flight had last been audited by the SACAA on 10 June 2005, and was issued with an Approval Certificate on 28 June 2005 with expiry date 30 June 2006. The training school was found to be appropriately rated to give training on the aircraft type.
- 1.17.2 The Aircraft Maintenance Organisation – AMO 969 – responsible for maintenance of the aircraft had been audited by the SACAA on 21 July 2004. An audit report dated 28 July 2004 was forwarded to the management of the AMO to inform them of all the findings. In their response, they submitted an action plan to the SACAA. After receiving and accepting the proposed corrective actions, the SACAA issued an AMO Certificate on 2 August 2004, with an expiry date of 1 August 2005.

## **1.18 Additional Information**

- 1.18.1 According to the pilot's personal file held by the SACAA, the pilot submitted an application form; CA 61-68 dated 9 May 2005, which is a "Flight Instructor Upgrade from Grade 3 to 2". No evidence was found in the file of a conversion application by the pilot of the Jabiru aircraft. The pilot gave evidence in logbook copies that he had flown the aircraft type for 68 hours as pilot-in-command.
- (i) On the basis of the above evidence, it was found that the pilot had been acting as pilot-in-command (PIC) on the aircraft type – accumulating 68 hours in the process – without being appropriately rated on the type by the Commissioner for Civil Aviation.
  - (ii) As he had not been appropriately type-rated, the pilot was not authorised to give training or certify the competency of students on the type. The Designated Examiner – DE A1A (0270011752) – had only certified the pilot competent for the instructor's upgrade, stating "satisfactory flight test for re-grading to Grade 2 Instructor's Rating". There were no further remarks adding the aircraft type to the licence.
  - (iii) The pilot stated in the pilot's accident/incident questionnaire, dated 24 October 2005, that the aircraft type rating of Jabiru on his licence had been done on 10 February 2005 by instructor no. 0270486939. He also gave evidence on the same document that the total flying hours "on type" on the day of the incident had been 30 hours, which was approximately 40 hours less than what he provided evidence of at the time he performed the instructor's upgrade test.
- 1.18.2 All the forms which the pilot submitted to the SACAA and processed by the licensing department have a block, with a heading: "Office Use Only" and require the licensing officials to complete the appropriate "Approved/Not Approved" information. It was found that the identified blocks had not been filled in, which makes it difficult to understand how the application was approved. It is possible that the staff of the department has changed its procedures, and that they are no longer filling in the above identified block. However, if this is the case, the department should amend the forms to include the newly used format of approving the documents submitted by pilots.
- 1.18.3 The SACAA approved and issued the aircraft type to the pilot in contravention of the Air Navigation Regulations (ANR 3.8).

1.18.4 The incident occurred on 29 September 2005, but the notification of it was only received on 7 October 2005. Thus, 8 days passed without any investigation by the SACAA. In a letter dated 10 October 2005 and submitted to the SACAA– Jabiru Aircraft SA, the aircraft manufacturer gave evidence to the appointed investigator-in-charge that the aircraft had arrived at their facility on 28 September 2005 for repairs. This is in contravention of CAR, Part 12.02.2 (1): *The pilot-in-command, and any other flight crew member, operator or owner, as the case may be, of an aircraft involved in an incident, other than an air traffic service incident, within the Republic, shall as soon as possible, notify – (a) the Commissioner.*

1.18.5 According to the Pilot's Operating Handbook (POH), *Pre-Flight Inspection Checklist: Section 4, Cabin and Empennage*, the following inspections are required:

- (i) *Cabin: - Elevator cable mounting and rod end; check for free rotation and excessive movement bolt secure and anchor on main beam secure.*
- (ii) *Empennage: - Rudder, Elevator and Trim Cable; check freedom of movement and security.*

**Note:** If the instructor and student pilot had complied with the above pre-flight inspections, they would most likely have noticed that the elevator control was showing signs of being defective at the anchor point installation. If, on the other hand, they did not, this implies that either no pre-flight inspection was done or the elevator control system possibly became defective only after takeoff. This is likely to be the case, as there was no evidence of the same defect experienced prior to this flight.

1.18.6 In a technical report of the incident submitted by George Aerodrome, the following information was supplied: "While on finals the instructor reported that the aircraft had a faulty elevator." This is particularly significant as the aircraft had been flying for approximately 40 minutes (0.6 hour) without reporting any defect with the elevator control system.

## 1.19 Useful or Effective Investigation Techniques

1.19.1 The investigator visited an owner who is also an operator (training category) of a Jabiru SP, to verify the findings by the manufacturer. The findings of the incident were then practically simulated.

## 2. ANALYSIS

2.1 This was a training flight. The instructor, accompanied by a student pilot, was flying the aircraft when they experienced the reported emergency with the elevator control system. The CAA received information of the incident only eight days later, on 7 October 2005, from the aviation training organisation (ATO) responsible for the flight. The ATO reported that the emergency started after takeoff, when the pilots realised that they had a problem with the elevator control.

- 2.2 The instructor was then also requested by the CAA to explain the sequence of events that led to the incident. He instead referred to and advised the investigator-in-charge to read the technical report of the aircraft manufacturer. The only significant information which the instructor gave was that he had flown the aircraft for approximately 40 minutes (0.6 hour) prior to performing the emergency landing. Due to the instructor's decision not to submit a statement to the CAA on the matter, an incident report was requested and received from the airport manager's office (ACSA) at George Aerodrome. The information supplied was that the instructor had reported that "while on finals the aircraft had a faulty elevator".
- 2.3 The information discussed in (2.1 and 2.2) displays two different time-lines at the time the instructor experienced the defect with the elevator control system. This clearly shows that the three reports from the ATO, George Airport management and the instructor are creating confusion. There is also no evidence to show that the student pilot had been questioned during the initial stages of the investigation to establish his/her response to the matter.
- 2.4 After testing the installation and operation of the elevator control system, the aircraft manufacturer, submitted that the anchor point clamp had moved, which had possibly contributed to the elevator becoming ineffective, as described by the instructor. However, after further investigation into the matter, evidence showed that due to the installation of the clamp to the airframe, it was not possible for the anchor point clamp to move. This investigation also showed that the alleged identified defect of the elevator could not have created a situation where the aircraft pitch became uncontrollable as the instructor suggested. In addition, no evidence was found to show that the instructor had used the elevator trim system to assist him in handling the identified emergency. After further investigation, the evidence showed that it is possible that the elevator control cable may have moved in its installation.
- 2.5 The above mechanical malfunction of the elevator control system could only be attributed to improper maintenance practices performed by the aircraft manufacturer during the assembly of the kit. The evidence shows that the manufacturer exercised the authority and privileges of AMO 909, which was responsible for maintenance of the aircraft. Thus, if there were any improper maintenance practices that resulted in the elevator becoming defective, these would be the responsibility of AMO 909, unless the system had been tampered with and not appropriately certified in the logbook by those responsible.
- 2.6 The aviation training organisation (ATO) was also responsible for ensuring that the maintenance of the aircraft was performed at its prescribed inspection intervals. No evidence could be found to show that there was any intervention by the management of the ATO in the matter. The instructor flew a total of 68 hours for the ATO without being appropriately rated on the aircraft type. It does not seem that the management of the ATO were aware of the situation prior to the incident. Only during the investigation did they become aware of the anomaly.
- 2.7 The investigation could not determine what resulted in the instructor's declaring the emergency. Whatever it was, however, had made him execute an emergency landing. This had been a hard landing, causing the nose gear to collapse, which resulted in damage to the propeller.



### **3. CONCLUSION**

#### **3.1 Findings**

- 3.1.1 The evidence shows that there are no records of a compass swing or of altimeter and airspeed indicator maintenance inspections performed by AMO 909 as required by regulation.
- 3.1.2 The aircraft was operated and maintained in contravention of CAR, Part 96.05.1 (3), which requires that the aircraft be maintained at 25-hourly intervals.
- 3.1.3 The aircraft was released to service after an annual inspection had been conducted by Aircraft Maintenance Engineer AME 2884 – in contravention of SA-CATS-NTCA (24.03.2). The AME was not appropriately rated on the airframe and engine types, or approved by the Commissioner for Civil Aviation to perform the maintenance and release the aircraft to service as he did.
- 3.1.4 During an inspection performed by the manufacturer, it was found that the rear capture elevator push-pull cable had moved or was incorrectly installed.
- 3.1.5 The instructor flew the aircraft type as pilot-in-command, as recorded in his pilot's logbook, without submitting a conversion application or having the rating endorsed in his licence at the CAA.
- 3.1.6 There was no evidence of the aircraft type rating having been appropriately certified by a Grade 2 Instructor, after performing the training and testing.
- 3.1.7 The incident was reported to the CAA, eight days after it had taken place.

#### **3.2 Probable Cause/s**

- 3.2.1 The aircraft landed hard on the runway, causing the nose gear to collapse, which in turn damaged the propeller.
- 3.2.2 It is considered that the elevator control cable moved as a result of the anchor point clamp not being properly installed.

### **4. SAFETY RECOMMENDATIONS**

- 4.1 It is recommended that the CAA Airworthiness Non-Type Certificated Aircraft Division should do proper aircraft document assessment prior to issuing the Authority to Fly Certificate. There are very specific maintenance practice requirements for the owners and/or operators to adhere to, and the regulator should ensure compliance. It appears that the department in question is not performing a proper check on the documents submitted, and thus not assisting in preventing certain unsafe conditions, most of which can easily be noticed on the documents.

- 4.2 It is recommended that the CAA Licensing Department do proper document assessment prior to issuance of type ratings on pilot licences. This is particularly important for type-rating approval to the licence after conversion training applications are received. As mentioned above, the pilot flew the aircraft type for 68 hours as pilot-in-command prior to submitting an application. If the document assessment had been done properly, the licensing officer could have raised the anomaly and addressed it with the pilot.
- 4.3 It is recommended that the Commissioner give instruction to aircraft manufacturers. Jabiru (George) did not get involved with the investigation prior to requesting permission from the Commissioner. This manufacturer began performing maintenance on the aircraft without seeking to ascertain whether the incident had being reported or investigated by the CAA. Only after the investigator enquired did they respond with the technical report, which they then submitted to the CAA.
- 4.4 It is recommended that CAA Safety Promotions Department should inform the industry of the importance of reporting accidents and incidents to the Air Safety Investigations Department without delay when such occurrences take place.

## **5. APPENDICES**

- 5.1 No appendices are attached to this report.

-END-

Reviewed by EM Office: AIID November 2009