AIRCRAFT ACCIDENT SHORT REPORT

CA18/2/3/9787: The aircraft pitched the nose up after take-off and crashed due to the rope that was connected on the control stick.

Date and time	:	19 May 2019 0945Z
Aircraft registration	:	ZU-FBP
Aircraft manufacturer and model	:	Babst C F, Carl Babst Raven 1
Last Point of departure	:	Rhino Park Aerodrome, Gauteng Province
Next point of intended landing	:	Grasslands Airfield, Gauteng Province
Location of incident site with reference to easily defined geographical points (GPS readings if possible)	:	S25°50'01" E28°32'.27" at an elevation of 4780 ft AMSL
Meteorological Information	:	Temperature: 21°C, Visibility: 10km CAVOK
Type of operation	:	Training (Part 141)
Persons on board	:	2 + 0
Injuries	:	The pilot flying (PF) sustained minor burn injuries on his right hand and the instructor sustained serious back injuries
Damage to aircraft	:	The aircraft was destroyed on impact and by post-impact fire

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

Purpose of the Investigation:

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

Disclaimer:

Figure 1: A photograph of the aircraft.

1. SYNOPSIS

1.1 On 19 May 2019, an aircraft used for conducting a type conversion training flight at Rhino Park Airfield was involved in an accident. On-board the aircraft were a student pilot who was the pilot flying (PF) and was seated on the left seat, and the instructor, seated on the right seat. The aircraft had a nylon rope fitted from the control stick to the elevator to (i) keep the control stick back to allow the pilot to access the brake lever located on the floor between the two seats; (ii) keep the elevator in a full-up position when parked outside of the hangar to prevent the elevator from flapping up and down. This rope needed to be disconnected before take-off, thus, allowing for the control of the elevator. The aircraft took off with this rope still connected to the control stick and continued to climb in a nose high attitude to the point where it reached a high angle of attack. This led to a reduction in the rate of climb as a result, the aircraft entered a stall before crashing onto the runway. The aircraft was destroyed by impact and post-impact fire. The PF sustained minor burn injuries to his right hand and the instructor sustained serious back injuries.

1.2 Post-accident examination of the aircraft did not reveal anything abnormal with the aircraft. During an interview with the PF, he admitted to have forgotten to disconnect the rope from the control stick prior to the flight.

1.3 The investigation revealed that the aircraft pitched the nose up after take-off and crashed due to the rope that was connected to the control stick as it was limiting the pilot's control of the aircraft. The pilot could not recover the aircraft as he could not push the control stick forward to reduce the angle of attack below the stalling angle.

2. FACTUAL INFORMATION

2.1 HISTORY OF FLIGHT

2.1.1 On Sunday morning on 19 May 2019, a Carl Babst Raven 1 aircraft took off from Grasslands Airfield in Centurion on a type conversion training flight. On-board the aircraft were a Grade A flight instructor who was rated on the aircraft (seated on the right seat) and the owner of the aircraft, also a Grade A flight instructor, who was a student under instruction and the pilot flying (PF) seated on the left seat. According to the PF, after take-off from Grasslands Airfield, they flew to Rhino Park Aerodrome situated in Bapsfontein where 15 touch-and-go landings were carried out on Runway 27. After the last touch-and-go landing, they performed a full stop landing and taxied the aircraft to the hangar where they parked the aircraft. A few minutes later, they disembarked the aircraft and walked to the restaurant to have breakfast.

2.1.2 About an hour later, the pilots walked back to the aircraft and conducted a pre-flight inspection. The aircraft had about 38.8 litres of Mogas fuel remaining in the fuel tank. The pilots boarded the aircraft and started the engine. Again, the owner of the aircraft was the PF. The aircraft was taxied to Runway 27 holding point where pre-take-off checks were completed. The PF took power and accelerated. After about 150 metres from the runway threshold, the aircraft rotated. The aircraft continued climbing in a nose high attitude to the point where it reached a high angle of attack. This led to a reduction in the rate of climb, as a result, the aircraft entered a stall before crashing onto the runway approximately 15 seconds after take-off. A post-impact fire ensued after impact. The PF sustained minor burn injuries to his right hand and the instructor sustained serious back injuries and was transported to Netcare Unitas Hospital situated in Lyttelton, Centurion, for immediate medical care.

2.1.3 The accident occurred during daylight conditions at a geographical position that was determined to be S25°50’01” E28°32’.27” and at an elevation of 4780 feet above mean sea level (AMSL).

Figure 2: The burnt aircraft at the accident site.

2.2 THE INVESTIGATION REVEALED

2.2.1 The Accident and Incident Investigation Division (AIID) was notified of the accident and an investigator was dispatched to the accident site. On examining the wreckage, it was established that the aircraft's main wheel struts were pushed through the wings and fuel had leaked from the main tank. The front section of the fuselage (cockpit area) was burnt. The flaps and ailerons remained attached to their respective wings. An examination of the flaps showed that they were in a retracted/up position. The rudder and elevator remained attached to the empennage. Control continuity was confirmed from flight control surfaces to the cockpit controls. The engine was still attached to the cradle and airframe. The wooden propeller remained attached to the engine and all blades had rotational damages. The top spark plugs were removed and their electrodes were intact and light grey in colour. The propeller was rotated and the crankshaft rotated freely. The valve train continuity was confirmed and thumb compression was attained on all cylinders.

2.2.2 Review of the aircraft's maintenance records revealed that the aircraft's recent annual inspection was completed on 20 March 2019 at 248.6 airframe hours. At that time, the airframe had accrued 258.9 total hours since new and the engine had accrued 34.9 hours since new.

2.2.3 The PF also held a valid NPL and had accrued a total flight experience of 6.2 hours on the accident aircraft. The last validation was done on 5 February 2018.

2.2.4 Post-accident interview with the PF revealed the following:

The PF informed the investigator-in-charge (IIC) that the aircraft had a nylon rope fitted to the control stick connecting to the elevator to (i) keep the control stick back to allow the pilot to access the brake lever located on the floor between the two pilots' seats while taxing; (ii) keep the elevator in a full-up position when parked outside of the hangar to prevent the elevator from flapping up and down. The PF further stated that with the nylon rope holding

back the control stick, pilots are unable to lower the nose. The rope, as shown on Figure 3, does not come fitted with the aircraft and, therefore, does not form part of the pre-take-off checklist. This rope had consequently prohibited the forward movement of the control stick, thus, prohibiting the pilots from effecting changes to the pitch control of the aircraft. See Figure 3.

Figure 3: The aircraft's cockpit area with the rope secured from the control stick to the elevator.

***NOTE**: The cable was consumed by post-impact fire and no evidence of it was found during the on-site investigation.

2.2.5 The PF also reported that the only option he had was to cut the engine power so that the aircraft can stop climbing. The aircraft could not be recovered upon which it crashed onto the runway about 15 seconds after take-off. During the post-accident interview, he admitted to have forgotten to disconnect the rope from the control stick prior to the flight. In addition, the flight instructor also didn't check if the rope was disconnected prior to the flight.

3 FACTUAL INFORMATION

3.1 FINDINGS

3.1.1 Fine weather conditions prevailed at the time and this was considered not having a bearing on the accident.

3.1.2 The PF was undergoing type conversion training when the accident occurred. The PF held a valid national pilot licence issued on 6 February 2018 with an expiry date of 4 April 2020. The medical certificate was issued on 5 March 2019 and expiring on 31 March 2022 with restrictions to wear suitable corrective lenses.

3.1.3 The PF had accrued a total flight experience of 6.2 hours on the aircraft type.

3.1.4 The instructor held a valid national pilot licence issued on 11 June 2012 with an expiry date of 6 April 2020. The skills test was conducted on 5 April 2019. The medical certificate was issued on 8 December 2017 and expiring on 31 December 2019. In addition, the instructor had an aircraft type endorsement on his licence.

3.1.5 Review of aircraft's maintenance records revealed that the aircraft's recent annual inspection was completed on 20 March 2019 at 248.6 airframe hours. At that time, the airframe had accrued 258.9 total hours since new and the engine had accrued 34.9 hours since new. In addition, the aircraft had a valid authority to fly (ATF) certificate issued on 27 March 2019 and expiring on 19 March 2020.

3.1.6 The aircraft had a nylon rope fitted from the control stick to the elevator to keep the control stick back to allow the pilot access to the brake lever located between the two pilots' seats on the floor while taxing; and to keep the elevator in a fully up position when parked to prevent the elevator from flapping up and down.

3.1.7 The aircraft had about 38.8 litres of Mogas fuel remaining prior to take-off.

3.1.8 Control continuity was confirmed from flight control surfaces to the cockpit controls.

3.1.9 The rope restricted the pilots from attaining control of the elevator during take-off and flight.

3.1.10 Post-accident examination of the aircraft did not reveal anything abnormal with the aircraft. During an interview with the PF, he confessed to having contributed to this accident as he forgot to disconnect the rope from the control stick before took-off.

4 PROBABLE CAUSE/CONTRIBUTING FACTOR

4.1 During take-off roll the aircraft nose pitched up uncontrollably resulting in the aircraft stall from which the crew could not recover and the aircraft crashed on the runway.

4.2 Contributing factor is that the pilot forgot to remove the nylon rope attached to the control stick and that prevented the crew to control the aircraft nose pitch.

5 SAFETY RECOMENDATION

5.1 Safety Message: It is recommended that the crew at all times conduct a proper pre-flight including flight controls checkouts prior to the line-up for take-off, this accident could have been avoided should the crew have done proper flight control checkouts prior to take off.