Transportation Safety Board of Canada

Bureau de la sécurité des transports du Canada

AVIATION INVESTIGATION REPORT

A00O0210

DIFFICULTY TO CONTROL

ONTARIO FUN FLYERS INC.

CESSNA 150G C-FVDR

KINGSTON, ONTARIO

13 SEPTEMBER 2000

Canada

Aviation Investigation Report

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Summary

The student pilot and the flight instructor took off from the Kingston, Ontario, airport to practice stalls in the Cessna 150 aircraft. The instructor first demonstrated the stall and recovery, then had the student attempt the same procedure. On his first stall recovery attempt, the student was slow to apply back pressure on the control column to bring the nose of the aircraft up. The instructor took control with the aircraft in a nose-low attitude. When the instructor applied back pressure, he found that the elevator control was restricted from full movement. Although he exerted considerable force on the control column, he could not get the elevator control back beyond neutral.

The aircraft reached a speed of approximately 190 miles per hour before the instructor was able to slowly pull out of the dive. The instructor was able to maintain altitude and fly back to Kingston Airport for an emergency landing by using a combination of back pressure on the elevators, full nose-up trim, and an engine power setting of 2500 revolutions per minute. During final approach to the runway, as the instructor applied flap to slow the aircraft, the elevator controls became free, and he was able to carry out a normal landing. The aircraft sustained substantial damage to the wings, flaps, and ailerons as a result of the overspeed situation.

Ce rapport est également disponible en français.

Other Factual Information

The flight instructor was a recent graduate of the aviation program at Seneca College and had approximately 300 hours of flight time, of which 60 hours were instructional. He held a valid Class 4 instructor rating. The student pilot started flight training approximately nine days before the occurrence. He had accumulated a total of 7.1 flight hours.

An aerodynamic stall is performed by slowing the aircraft while maintaining altitude by increasing the back pressure on the elevator control. This will result in an increasing angle of attack and increasingly nose-high attitude until the wings stall. When the aircraft stalls, the recovery is accomplished by easing the control column forward while simultaneously increasing engine power. Once the aircraft is no longer stalled, and as it accelerates, back pressure is reapplied to the control column to minimize altitude loss and to regain level flight. In this occurrence, when the aircraft stalled, the student pushed the control column forward aggressively, and the aircraft entered a dive. The instructor took control when he judged that the student was not initiating an effective recovery. When he pulled back on the control column, he noted considerable resistance and was unable to pull the control column past the neutral position. As the aircraft speed increased, the aircraft slowly came out of the dive while the instructor held the control column as far back as possible.

The instructor was able to maintain altitude with continuous back pressure on the control column combined with a relatively high engine power setting. As he brought the aircraft back to Kingston Airport, the instructor radioed to the flight service station that he had a stuck elevator and would require the emergency response vehicles to stand by for the landing. During a long final approach, the instructor lowered the flaps in an attempt to slow the aircraft to a lower touchdown speed. As he checked forward on the control column to compensate for the pitch change associated with the flap selection, he noted that he now had full elevator control authority. The landing was normal and uneventful.

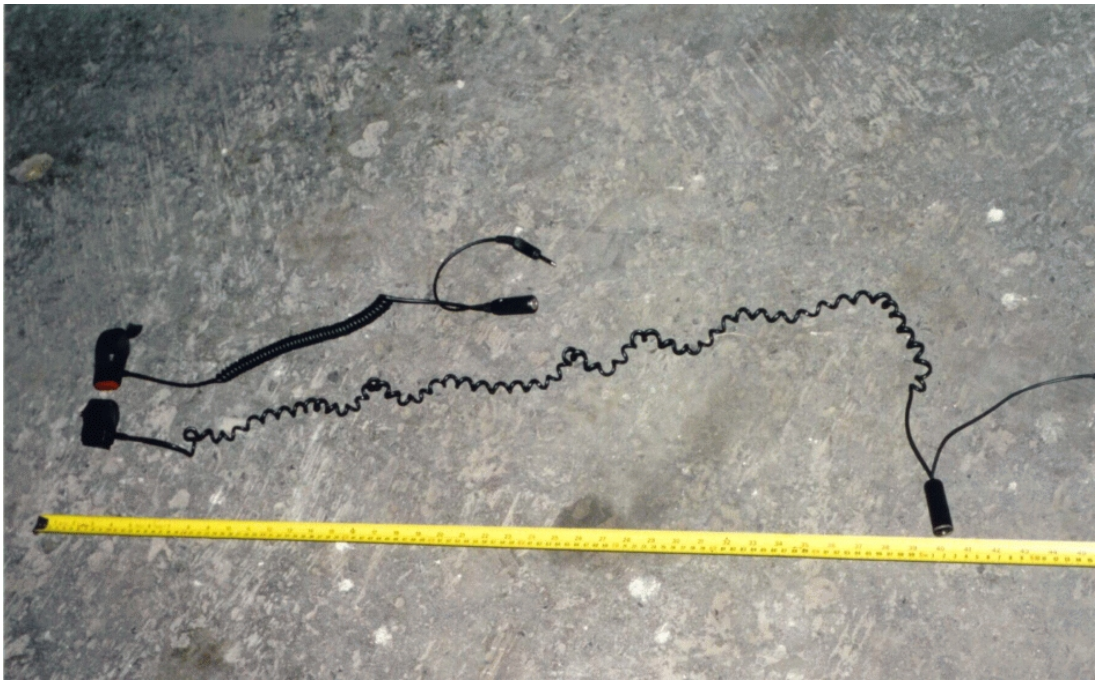

Figure 1 - Top: left push-to-talk cord (new). Bottom: right push-to-talk cord (old).

An examination of the flight control system did not reveal any anomalies that could have restricted or jammed the elevator controls. During the examination of the aircraft, it was noted that the cabin air control knob (ancillary control), which is located on the right side of the instrument panel, was pulled fully out. The aircraft had been modified to facilitate the use of headsets and boom microphones. This included the installation of a radio panel in the centre of the dash, with receptacles for the push-to-talk connections. A push-to-talk button was attached to each control column by a velcro strap. A spring-coiled electrical cord led from the push-to-talk button to the receptacle on the radio panel. The spring-coiled cord on the left side was new and approximately two feet long when contracted. The cord on the right side, which was old and had lost most of its recoil, was approximately four feet long when relaxed. It was common practice for the instructor in the right seat to take up the slack in the electrical cord by wrapping it around the right control column eight or ten times.

Figure 2 - The right control column movement probably was restricted by the push-to-talk cord, which snagged on the cabin air control knob.

Analysis

When the aircraft landed, the elevator control system was functioning normally. There was no binding or indication of any previous binding in the elevator system, nor was there an indication of any damage to any part of the elevator system. The cause of the restriction in the elevator control system had to be something subtle and transitory. The investigation revealed that if the push-to-talk cord was wrapped loosely around the control column, a single loop could snag on the cabin air control knob, and the electrical cord would then restrict the aft movement of the control column. This likely happened as the student was attempting to recover from the stall. The action of pushing the control column forward likely allowed a loosely wrapped electrical cord hanging from the right control column to swing forward and snag the cabin air control knob. The fact that the aircraft was in a nose-down attitude would also tend to allow the loop to swing forward. When the control column was pulled back, the cord would remain snagged and tighten on the knob. This was most likely the condition the aircraft was in

when the instructor took control from the student. During the landing approach, when the control column was moved forward to compensate for the flap selection, the tension on the cord would have relaxed, allowing the cord to swing free of the air control knob, freeing the control column through its full travel.

Findings as to Causes and Contributing Factors

1. The push-to-talk cord on the right side of the aircraft was stretched to twice its normal length and wrapped loosely around the control column. The cord could therefore become entangled on the aircraft ancillary controls.

2. It is likely that the push-to-talk cord became snagged on the cabin air control knob, restricting the movement of the elevator control.

This report concludes the Transportation Safety Board's investigation into this occurrence. Consequently, the Board authorized the release of this report on 26 April 2001.