

**CANADIAN FORCES  
FLIGHT SAFETY INVESTIGATION REPORT (FSIR)**

**FINAL REPORT**

**FILE NUMBER:** 1010-C-GCSD (DFS 2-3)  
**DATE OF REPORT:** 22 March 2006

**AIRCRAFT TYPE:** Schweizer 2-33A Glider  
**DATE/TIME:** 141847Z August 2003  
**LOCATION:** Debert Airport, Debert, Nova Scotia  
**CATEGORY:** "A" Category Accident

**This report was produced under authority of the Minister of National Defence (MND) pursuant to Section 4.2 of the Aeronautics Act (AA), and in accordance with A-GA-135-001/AA-001, Flight Safety for the Canadian Forces.**

**With the exception of Part 1, the contents of this report shall only be used for the purpose of accident prevention. This report was released to the public under the authority of the Director of Flight Safety (DFS), National Defence Headquarters, pursuant to powers delegated to him by the MND as the Airworthiness Investigative Authority (AIA) of the Canadian Forces.**

**SYNOPSIS**

The student pilot was conducting a solo flight in the Atlantic Regional Gliding School (ARGS) program. After upper area manoeuvres, the student pilot entered left downwind lower than the recommended height to compensate for updrafts that were encountered during previous flights. Due to the crosswind and sink conditions that had developed in the short time since the last flight, the glider was lower and in a wider pattern than normal. Despite the direction by ground staff to close the spoilers and to maintain attitude and airspeed, the glider became critically low while on base leg and struck a large tree on the airfield perimeter. After rotating about its vertical axis, the glider came to rest inverted. The student pilot released from the harness, fell to the top of the cockpit and was trapped until ground personnel opened the canopy. The glider suffered "A" category damage.

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## **1. FACTUAL INFORMATION**

### **GENERAL**

The student pilot was conducting a solo flight in the Atlantic Region Air Cadet Gliding Scholarship Program. The gliding operation at Debert utilizes Cessna L-19 Bird-dog tow-planes to conduct aero-tow launches with 250 ft towropes attached to the tow planes.

#### **1.1 History of the Flight**

The accident flight was the student's fifth flight and third solo of the day in the accident glider. The objective of the flight was to complete lesson plan (LP) S8 of the syllabus, a consolidation flight for the student pilot to improve skills and gain confidence in the glider.

Prior to the commencement of flight operations, runway 27 was selected as the active runway.

In preparation for the flight, the student pilot received a brief from the Launch Control Officer (LCO). The student pilot then proceeded to the glider and placed both seat back and seat bottom spacers in the cockpit. However, on the incident flight, the rudder pedal adjustments were left in the fully forward position instead of changing them to the pilot's normal neutral position. Before each launch, the pre-take off check was completed and it was confirmed that 150 feet (ft) mean sea level (MSL) was set on the altimeter. (Debert Airport is 142 MSL) Before the first solo, the student pilot conducted a circuit check with an instructor pilot (IP) on runway 27. After this first flight, a shift in wind direction forced a change to runway 34. Although the student pilot had previously flown from runway 34, another circuit check was conducted on that runway before commencing the solo flights.

Shortly after take off on the occurrence flight, the LCO observed the winds to be straight down runway 34 at 13-15 miles per hour (MPH). The solo ground monitor observed that the glider's passenger door opened and continued to flap periodically for the duration of the flight.

In the practice area, the student pilot conducted gentle stalls and turns before transiting back to the circuit. The student pilot joined downwind at 50 MPH with the second notch of trim set at an altitude between 1000 ft -1100 ft in anticipation of again encountering an updraft, as experienced on previous flights. Initially close in on downwind, the student pilot angled out to a slightly wider than the normal "2/3-strut" sight picture. As the glider approached the turn to base, the solo ground monitor informed the student pilot that the winds had significantly shifted to a right crosswind at 15 MPH, which would blow the glider wider in the circuit. Coincidentally, a tow pilot taking off at this time reported that after lift-off he experienced strong left drift.

Once established on base leg the student pilot increased the glider's airspeed to 65 MPH in consideration of the increased winds. Although not able to identify a rate of descent, the student pilot noticed that an area of sink had been entered instead of the previously encountered lift.

It became evident to the LCO that the glider was becoming critically low so he instructed the student pilot to maintain airspeed and attitude. At 400 ft the solo student pilot again noticed sink on the vertical speed indicator (VSI) and started to angle towards the airfield. The LCO then advised the student pilot to turn towards the airfield. The student pilot replied that it was not possible to turn toward the airfield because a stand of trees on the airfield perimeter created an obstacle to the flight path although this transmission was not received by the LCO. Simultaneously, ground personnel observed the glider had a high rate of descent as its attitude changed from a normal nose low attitude to a nose high attitude. The LCO then directed the student pilot to maintain an approach speed of 65 MPH, turn towards the airfield, and line up with the runway.

Believing that the glider was finally clear of the last remaining tree and at less than 150 ft (AGL) the student pilot began to turn towards the undershoot area of runway 34. The glider's left wing struck a tree at approximately 35 ft above the ground. This contact sheared the left outrigger wheel from the wing. The glider then nosed down, yawed left, and rolled left. The glider impacted the ground nose and left wing first in a near-vertical attitude approximately 30 meters from the impact tree. The leading edge of the right wing then impacted the ground before the glider fell over, coming to rest on its back.

The student pilot released the harness and fell to the top of the canopy in the now upside-down cockpit and remained trapped there until ground personnel could open the canopy. Once freed from the cockpit, the student pilot was taken to Truro Regional Hospital for medical examination.

At the time of accident, the LCO observed that the winds had again shifted to 320°-350°. Runway 34 is 335° Magnetic.

## **1.2 Injuries to Personnel**

The student pilot suffered minor injuries.

## **1.3 Damage to Aircraft**

The glider sustained "A" category damage (Photo 1).

The outboard portion of the left wing was torn from the rest of the wing due to the initial tree impact forces. The right wing suffered severe ground impact damage. The glider's nose was pushed in and shattered (Photo 2) and the vertical stabilizer was severely crushed.

#### 1.4 Collateral Damage

The crash site was within the Debert Airport boundary and no collateral damage was incurred.

#### 1.5 Personnel Information

Table 1: Personnel Information

	Student pilot
Rank	Cadet
Currency/Category Valid	U/T
Medical Category Valid	Yes
Total Flying Time (hours/flights)	6/40
Total on Type (hrs/flights)	6/40
Total Last 30 Days (hrs/flights)	4/32
Total Last 48 Hours hrs/flights	1/5
Duty Time Last 48 Hours	14

#### 1.6 Aircraft Information

The Schweizer 2-33A is a tandem seat glider used by the Air Cadet organization for training. The high wing construction allows excellent visibility from either the front or rear seat. The 2-33's rugged construction withstands the rigors and demands of ab initio flying, making it well suited to the Air Cadet training environment. Additionally, the glider's exceptional occupant protection has been well documented during its years of Air Cadet service.

The cockpit flight instruments and avionics consist of an airspeed indicator (ASI), a VSI, an altimeter, and a hand-held radio that is secured within the cockpit. Flight controls include rudder pedals, control column, control column trim, and over/under wing spoilers. Movement of the spoiler control handle past the fully extended position controls braking action for the single fuselage-mounted wheel. Both wingtips have an outrigger wheel that prevents ground-wingtip contact.

The Air Cadet Gliding Program Manual states 10 MPH (8 knots) is the maximum crosswind limit for 2-33A operations.

## **1.7 Meteorological Information**

Debert Airport does not have an Environment Canada weather station. The closest reporting station is Halifax International Airport (CYHZ) 32 nautical miles to the south of Debert.

TAF CYHZ 142031Z 142118 35010KT P6SM BKN040

FM0800Z 36005KT 2SM BR BKN004

FM1100Z 34010KT P6SM SCT020

RMK NXT FCST BY 00Z

METAR CYZX 141800Z 31009KT 15SM SCT032TCU BKN280 24/17

Just prior to the accident flight, winds were reported as consistently 340°Magnetic at 10 MPH gusting to 13-15 MPH. While the accident glider was on downwind, the ground monitor assessed the winds shifting significantly to approximately 070° at 15 MPH. At the time of accident, the LCO noted weather conditions to be approximately 4000 ft scattered clouds with winds shifting from 320°-350° at 15 MPH to 025° at 15 MPH. The local flying club assessed winds at the time of accident as 340°-020° at 6-12 MPH.

## **1.8 Aid to Navigation**

Nil.

## **1.9 Communications**

The glider operation at Debert utilizes a mandatory frequency (MF) for all operations. The LCO, tow-planes, gliders, and local traffic all monitor the MF while in the area and circuit. If a ground solo monitor is required, this person will be located beside the LCO in order to relay messages on the LCO's radio. Both the LCO and glider radios were serviceable at the time of accident.

## **1.10 Aerodrome Information**

The Debert glider site is located 30 km northwest of Truro, Nova Scotia. It has a triangular runway layout with grass strips suitable for aircraft operations abeam each runway. Glider and tow-plane launches and recoveries are made to the grass strips.

The LCO monitors and controls all Air Cadet flying operations, gives launch clearances; and manages and coordinates responses to any emergency. A site supervisor oversees the entire operation, including the LCO. The LCO is responsible for conducting daily operations briefings. The brief on the day of the accident covered the weather, an emergency of the day, operations from runway

27, possible operations from runway 34 due to a wind shift, the visual illusion on approach that the airfield perimeter trees created by making the ground appear closer than it actually was, obstacle clearances with regard to the perimeter trees, and the poor undershoot areas due to rough terrain.

The cadets, instructors, and staff, including LCO, maintain a position abeam the touchdown points on the grass landing areas. After a glider has landed, cadets retrieve and align the glider for re-launch. If required, a solo monitor will also be stationed at this position. The role of the solo monitor is to oversee the flight and provide guidance or instruction via the radio to solo students if deemed necessary.

Normal circuits at Debert utilize a downwind entry height of 1150 ft, base turn height of 650', and a final turn height of 450 ft. Airfield elevation is 150 ft; it is standard for pilots to set the correct QNH on the glider's altimeter.

### **1.11 Flight Recorders**

Air Cadet gliders are not equipped with any onboard voice or flight data recording devices.

### **1.12 Wreckage and Impact Information**

The impact site was within the airfield boundary approximately 700 meters from the approach end of runway 34 and beside a small access road just infield of a tall stand of trees. The left wing outrigger wheel was found at the base of the impact tree, 29 meters from the wreckage. The nose and wing ground impact scars were easily discernable and within a few meters of the glider's final resting point, indicating a near vertical ground impact; this was consistent with the glider's significant nose damage.

### **1.13 Medical**

The student pilot was slightly bruised as a result of impact forces and was taken to Truro Regional Hospital for X-Rays examinations. The student pilot was discharged from hospital with no significant injuries noted and was returned to flying status. Toxicology samples were not taken.

### **1.14 Fire, Explosives Devices and Munitions**

Nil.

### **1.15 Survival Aspects**

Due to the discomfort of being strapped in and inverted, the student pilot unfastened the harness and fell to the top of the inverted canopy and remained there until rescue personnel were able to open the canopy.

#### 1.15.1 Crash Survivability

The cockpit maintained its survivable volume and was undamaged. The deceleration forces were within the tolerance level of the human body.

#### 1.15.2 Life Support Equipment

The glider's ruggedness and four-point harness systems likely prevented further injury from occurring.

#### 1.15.3 Emergency Transmitters

The glider was not equipped, nor was it required to be equipped with, any type of aviation Emergency Locator Transmitter (ELT).

### **1.16 Test and Research Activities**

Nil.

### **1.17 Organisational and Management Information**

The ARGS is a summer gliding scholarship program for eligible Atlantic Maritime Air Cadets. The school is six weeks long and qualifies the students to Ministry of Transport licensing standards. Approximately 54 students were participating in the 2003 ARGS at the Debert gliding site.

### **1.18 Additional Information**

Due to the high volume of local all-terrain vehicle traffic, the CFB Halifax Military Police (MP) provided site security until the glider was removed.

### **1.19 Useful or Effective Investigation Techniques**

Nil.



## **2. ANALYSIS**

### General

The purpose of the Air Cadet Gliding Program (ACGP) is to provide practical aviation experience to Royal Canadian Air Cadets (RCAC). The rules, regulations and standards governing the Program are found in A-CR-CCP 242/PT-005, ACGP Manual which is issued under the authority of the Chief of the Defence Staff (CDS). The program uses the Schweizer 2-33 or the 2-33A glider. Gliders are launched by three methods: winch, auto tow, and air tow by L-19 or Scout aircraft. The standard practice in Debert was to use tow aircraft.

The ACGP is a partnership between DND and the Air Cadet League (ACL) of Canada and is governed by a Memorandum of Agreement (MOA). The various provincial committees of the ACL own the gliders and tow aircraft used in the ACGP. They are civilian-registered in accordance with Canadian Aviation Regulations (CARs) and are fully insured (hull and liability) by the ACL. At the request of the ACL, DND exercises operational and technical control of the ACGP in accordance with Transport Canada (TC) policies, directives and regulations augmented by policies, directives, standards and procedures promulgated by the Department of National Defence (DND). In recognition of this partnership, TC has granted legal custody and control of the aircraft to DND, while allowing the aircraft to maintain civilian registry. DND is responsible for flying standards of the ACGP.

This was the aircraft's seventh flight of the day and it was serviceable prior to the accident. All maintenance and inspections were up to date. The weight and balance was within limits.

### **2.1 The Accident**

The student conducted a total of five flights on the day of occurrence. The first flight of the day was a solo check on runway 27. However, another solo check was conducted after a change to runway 34 due to shifting winds. The two solo check flights were conducted with an instructor in the back seat. The student's solo checks were generally well flown with the exception of a few debriefing points from the IP who was also the student's solo ground monitor. The main debriefing points were: high on circuit entries by up to 350 ft; high throughout circuits resulting in long landings partly because of the illusion effects caused by perimeter trees and the slow employment of circuit correction techniques. These trips were followed by three solo flights, all flown from runway 34.

During the first two solo flights the student pilot encountered areas of lift (in particular on the downwind leg), requiring the use of sideslip twice on the first solo to lose altitude. On both flights, the student pilot entered the downwind initial entry point at 1300 ft MSL (normal entry height is 1150 ft), was slow to move out to the correct "2/3-strut" sight picture for downwind spacing, and landed

long. The student pilot encountered bumpy conditions while on the first two solo tows to the practice area. Typical afternoon convective activity resulted in noticeable lift and sink conditions within the glider area of operations. Shortly after takeoff on the third solo the winds were noted to be parallel to runway 34 with a speed of 13 to 15 MPH. Following take-off the rear door opened and remained unlatched for the duration of the flight. This could have been the result of an incomplete or rapidly executed pre-flight check and likely distracted the student pilot during the flight. Although other pilots did not experience the conditions, the student pilot stated the third solo flight began with a difficult and bumpy tow to the 2200 ft release point in the practice area. The student pilot conducted the flight in the practice area and returned to the circuit for a left hand pattern, joining the initial point at "about 1000" ft MSL (vice 1150) to account for the lift experienced on the earlier downwind legs. The sight picture the student pilot had for lateral spacing while on downwind was more than the normal 2/3 strut; this indicated that the glider was slightly wide. The student pilot completed a downwind check as per normal and assessed the winds to be the same as on the previous flights. At some point along the downwind leg, the winds shifted to the northeast, such that the aircraft was experiencing drift away from the airfield. The instructor who was monitoring the student pilot from the ground noted this drift but did not provide guidance to the student pilot via the radio.

Feeling that the positioning was wide, the student pilot turned base slightly before the 45-degree visual reference point at approximately 850 to 900 ft, (normal base turn height is 650 ft MSL). The winds had by now veered to become a crosswind from the right at 15 MPH. The pilot was made aware of the winds and set the attitude to maintain a 65 MPH airspeed to account for the 15 MPH headwind on base leg. Shortly after turning base leg the student pilot briefly deployed the spoilers as per a normal circuit but retracted them almost immediately as the glider had entered an area of sink (as opposed to the lift encountered earlier) and was losing altitude. The LCO noticed the deployed spoilers and instructed the student to retract them as the student was doing so. At this time, the LCO noticed the aircraft was critically low and radioed the student pilot, with the advice to maintain airspeed and attitude. Shortly thereafter the LCO advised the student pilot to turn towards the airfield and the student pilot replied that was not possible due to trees in the way.

In an attempt to stretch the glide the student pilot inadvertently pulled back on the stick, eventually reaching stall buffet at approximately 40 MPH. The student pilot immediately assumed a nose down attitude, achieving an airspeed of 60 MPH, and trimmed to the full forward position. The LCO again advised the student pilot to turn towards the airfield. Thinking that the glider was now clear of all the trees between the present position and the airfield, the student pilot then turned towards the airfield at approximately 150 ft AGL. Shortly thereafter, the glider's left wing impacted a tree, breaking loose the outrigger wheel and causing the aircraft to pitch down and yaw and roll left. The glider impacted the ground; right

wing and nose first, in an inverted attitude, bounced backwards by about 5 ft, and came to rest on its back.

## **2.2 Active Human Factors**

### **2.2.1 Student Pilot**

The student pilot made a number of questionable decisions during the sequence leading to this accident. Initially, the student pilot chose to enter the initial point at a lower than prescribed altitude. Next, compensation for the crosswind on the downwind leg was not adequate, which resulted in a wider point for turn to base leg. During the base leg of the circuit, the student pilot briefly deployed the spoilers before retracting them indicating action based on rote memory from earlier circuits rather than the actual situation. The immediate retraction of the spoilers indicated that the student pilot was cognizant of the implications of this action. However, the student pilot should have been thinking ahead of the aircraft and not have deployed the spoilers because of the current situation. This indicates a lack of situational awareness likely due to a low experience level. The above decisions, combined with changing winds, varying lift, sink conditions and limited experience, resulted in the student pilot becoming critically low and poorly positioned in the circuit.

In addition to the above-mentioned items, the student pilot did not set the rudder pedals to a specific position for the flight. Instead, the student pilot ended up using the position that had been left by the previous student pilot. Given the importance of visual references for setting and adjusting attitude, it is important that student pilots utilize as similar a body position as possible for each flight so that they may learn consistent and accurate visual references to use throughout their training.

## **2.3 Latent Human Factors**

### **2.3.1 Glider Pilot Course**

The Glider Pilot Course contains a series of air and ground lessons designed to train student pilots with no previous flying experience to the TC Glider Pilot Licence standards. Air Cadets attending the course must be in possession of a TC Student Pilot Permit in accordance with procedures detailed in CARs. A Medical Category 4 is acceptable provided that the category has been assigned by a TC Medical Examiner in the course of an aviation medical. In addition, the Schweizer 2-33 glider used in the course imposes weight and size limitations for the pilot.

The investigation revealed that all licensing requirements were adhered to with regards to the student pilot involved in this occurrence.

The flying syllabus is comprised of 29 dual and 20 solo flights. Flights must be conducted in the order specified within the syllabus. The Chief Flying Instructor

(CFI) may approve exceptions for flights that require specific weather conditions. A standard National Progress Book is used to monitor student pilot progress during training using six levels of proficiency. In accordance with the ACGM the instructor rates each flight from an overall perspective based on the proficiency level achieved by the student pilot on each exercise or sequence; unsatisfactory, marginal, below average, average, above average or superior. The ACGM states that a maximum of three extra duals, also called "Red Card" flights may be authorized for students who fail to achieve the required standard. The Flight Commander may authorize the first extra dual. The CFI or the Commanding Officer (CO) must authorize all subsequent extra duals. If, after three extra duals, the student pilot has not achieved the required standard, then cease training action is mandatory.

The ACGM also states that under extraordinary situations, such as student pilot sickness, extended poor weather, etc., resulting in prolonged non-flying activity, the CFI, RCA Ops O or CO may approve review flights in order for the student pilot to regain previously demonstrated proficiency. The CFI, RCA Ops O or CO may also approve review flights during the solo phase to ensure that students do not fly solo in unfamiliar situations or conditions. Review flights are not intended to assist students with below average performance. These review flights are called "Green Card" flights.

### 2.3.2 Student Pilot Progress

A review of the student pilot's progress book revealed several flying instructional discrepancies. First, between the first flight and the accident flight, the student pilot flew with eight different instructors on 13 flying days spread over 38 calendar days. This contradicts the principle of instructional continuity and the learning law of readiness which states that: *"Good instructors will maintain a relationship with the student which will enable them to detect symptoms of learning and personal difficulties and attempt to alleviate them so that the student can become ready for learning."* With this particular student pilot, because of the number of instructor changes it was difficult to establish a sound student/instructor relationship, in which the instructor was allowed to detect difficulties and to provide solutions. Further, this was detrimental to the student's preparation and motivation for learning.

Second, the student pilot's activity record showed an irregular training pattern with frequent no-fly periods, lasting up to 10 days, mostly due to weather. While on most flying training days the student pilot flew an average of two to three trips, there were three occasions where many more were flown. On 01 August 2003 seven trips were flown with the last one being a solo flight, then the student pilot did not fly until 12 August 2003 when eight trips were logged in a single day. The next day was a no fly day. On 14 August 2003, the accident occurred during the fifth trip. It is assessed that this training pattern is not conducive to continued progress or effective motivation.

Third, some “Green Card” trips were misused. A study of the progress book suggests that they were used to improve below average or unsatisfactory flying performance. Lesson plan (LP) D23G (G stands for “Green Card” flight) was flown immediately following D23, the fifth flight on the day, which is contrary to the definition of a “Green Card Flight.” LP D25G was repeated three times (after 10 no-fly days) with the minimum required standard not achieved on at least one exercise on final approach (Airmanship) after the student pilot “*flew towards another glider.*” The ACGM states that an extra dual trip was mandatory in this case.

Lastly, the student pilot’s progress was at least below average if not unsatisfactory. The student pilot was given frequent below average assessments during training. Three marginal assessments were also recorded, two of them in consecutive trips (LPs D14 and D15). This contradicts student progress assessment procedure as stated in A-PD-050-001/PF-001, Flight Instructor’s Handbook:

*“marginal assessment is used to ‘flag’ students who had a bad trip but may continue training. A student who has received a marginal rating in his/her last trip may not be assigned a second consecutive marginal rating. The marginal rating is not meant to be a default assessment or applied indefinitely. You must make a decision regarding the performance of the student, either ‘achieved standard’ or ‘unsatisfactory’.”*

Moreover, the analysis of instructor write-ups in the student’s Progress Card and Flight Test Report suggests that more trips should have been given an overall marginal or unsatisfactory assessment. Some critical errors were repeated throughout the training, particularly during the final approach, i.e. difficulties in the line-up, difficulties in assessing wind speed and drift, etc.

The staff members expressed concerns regarding the students’ feelings and emotions. The use of the coloured card system was believed by one staff member to be inappropriate for the students as it was felt that the system caused unnecessary emotional stress on students. The staff member related incidents where students would cry when given a red card. The system in use is very similar to that used by the CF in training military pilots and in that capacity it is not concerned with the emotional toll on student pilot candidates. Beyond the particular staff member’s comments there appeared to be a general attitude of charity towards the students. In the past three years at the camp, only one cadet has been sent home and there have been no failures. Given the inherent risk associated with flying operations, including those of a summer Air Cadet camp, it is important to regard proficiency standards as a vital component of a safe and effective training system.

### 2.3.3 Launch Control Officer and “Solo Monitor”

In order to assist and guide solo students there is a “solo monitor” who works with the LCO when solo students are airborne. Either individual can provide assistance. In this accident monitoring of the student in the circuit was assessed

as ineffective. At various times during this event, guidance from the ground solo monitor was not provided in a timely fashion. Specifically, the instructor noted the glider was getting wider than a normal circuit downwind but did not provide guidance to the student pilot via the radio. This may have been due to a belief that radio contact to provide simple guidance would lead to a loss of solo status. On Progress Cards, which instructors complete after every syllabus flight, Proficiency Level 3 is defined as "Trainee completed the task, making only minor errors. Trainee required minimal verbal cues to analyze and/or correct errors." A Proficiency Level 4 is required to obtain or maintain solo status. Instructors were under the impression that if you provided guidance to a solo student, you would have to "fail" them on that flight.

#### 2.3.4 Standards

Standards and instructional staff are required to meet the prescribed TC and ACGP licence, medical, qualification and rating prerequisites and standards. Once qualified, they may operate ACGP gliders, tow aircraft and launch equipment. They may perform associated supervisory and instructional duties with the approval of the Regional Cadet Air Operations Officer (RCA Ops O). The RCA Ops O oversees qualification upgrading and standards proficiency and currency in accordance with the ACGP Manual directives.

Central Flying School (CFS) is the organisation responsible for ensuring that effective and appropriate training instruction and methodology is standardized across the Air Force. At the time of occurrence, CFS was not mandated to provide more than minimal assistance to the ACGP, providing only team members for evaluation. Essentially, the ACGP conducted self-evaluation with some assistance from CFS. Even though DND is responsible for the flying standards, CFS had little input in defining and supervising air standards. In 2004, this was changed when an ACGP Standardization and Evaluation Team (ACGP SET) cell was stood up in CFS. This cell is responsible for the development and review of operational procedures, flight standards, qualifications and training of the ACGP.

The Regional Gliding Schools (RGS) conduct their own training of instructors and students. The ACGP SET ensures that they do this in accordance with established orders during the Field Testing and Evaluations (FTEs) visits. CFS now conducts check rides on Air Cadet standards personnel and line instructors. In addition, the RGS have access to Flight Instructors Course manuals and use the same standard as the CF for instructor pilot training. This new arrangement is expected to substantially improve the monitoring of standardization and flying training with the ACGP.

### **3. CONCLUSIONS**

#### **3.1 Findings**

3.1.1 Following take-off, the rear door of the accident glider opened and remained open for the flight's duration. This was missed in the pre-flight check and likely resulted in a source of distraction during the flight. (para. 2.1).

3.1.2 The wind direction veered significantly during the flight. (para. 2.1).

3.1.3 The four following unsafe acts/conditions were found to have occurred during this accident: (para. 2.2.1).

- a. The glider was low at the Initial Point;
- b. Crosswind on downwind leg was not adequately compensated for and winds were not checked on downwind;
- c. Improper attitude and airspeed were used on base leg; and
- d. The glider was not positioned to avoid trees;

3.1.4 While on base leg, the student pilot briefly opened the spoilers despite being too low. (para. 2.2.1).

3.1.5 The student pilot did not set her rudder pedals to the usual position prior to take off. This may have contributed to the student pilot's use of inconsistent visual references for the flight. (para 2.2.1).

3.1.6 The monitoring of the student pilot in the circuit by the ground solo-monitor was assessed as ineffective. (para 2.3.3).

3.1.7 Prior to this accident, CFS was not mandated to provide oversight of the ACGP. It is now closely monitoring ACGP flying training. (para 2.3).

3.1.8 Several discrepancies were found in the student pilot's progress book, indicating an irregular training pattern and repetitive critical errors made throughout the student pilot's training, particularly during the final approach phase. (para 2.3.2).

3.1.9 The staff misused "Green Card" flights. They were used to improve below average or unsatisfactory flying performance. (para 2.3.2).

3.1.10 The student received two marginal assessments on consecutive trips in contravention of procedures detailed in the Flight Instructor's Handbook.

3.1.11 The student pilot flew with a total of eight instructors during flying training. This significantly affected the continuity of instruction provided. (para 2.3.2).

3.1.12 The ACGM does not impose limits on the number of flights a student pilot may fly per training day. (para 2.3.2).

3.1.13 Student's feelings and emotions influenced instructor assessments of proficiency standards. (para 2.3.2).

## **3.2 Causes**

The student pilot used an improper technique and did not apply proper wind drift correction for the sudden and significant wind change during the solo trip.

## **3.3 Contributing Factors**

3.3.1 It is assessed that the student pilot did not possess the pre-requisite capability and knowledge to assess the new visual and physical cues associated with the wind change. The student pilot applied corrections to the flight path based on the wind conditions of the two previous trips rather than the actual wind condition of the accident flight.

3.3.2 The Solo Monitor did not intervene in a timely manner to provide verbal guidance immediately upon perceiving that the solo pilot was out of position on the downwind portion of the circuit.

3.3.3 Deficiencies were noted in the instructional technique, progress monitoring and instructional procedures used during the student's training. Instructional procedures and standards were compromised on a number of occasions.



## **4. SAFETY MEASURES**

### **4.1 Safety Measures Taken**

4.1.1 All Atlantic RGS aircrew were made aware of the requirement to properly check winds while conducting the downwind check.

4.1.2 Ground solo-monitors were counselled on the guidelines for providing in-flight assistance to solo students and on the guidelines for solo-trip assessment when in-flight guidance is required.

4.1.3 An ACGP SET was established in CFS in 2004.

4.1.4 In 2004, RGSs were given access to Flight Instructor Course (FIC) manuals and are incorporating them during instructor training. A lecture on Monitoring Solo Students is included in a Glider Instructor Course Lesson Plan.

4.1.5 CFS is now supervising flying instruction by conducting check rides on standards personnel and line instructors.

4.1.6 Starting in 2003, DFS is attending the Annual Air Cadet Flying Training Conference.

### **4.2 Further Safety Measures Required**

4.2.1. The use of a lower circuit initial entry point altitude is not an authorized correction for lift experienced while in the circuit. (para 3.1.3.a) This should be reinforced using this accident as an example. The next issue of the ACGM should indicate 1000' vice the 800-1000' found in previous editions to remove any ambiguity.

4.2.2. Student pilots should be encouraged to find a comfortable seating position prior to their first flight and should be reminded to adjust the pedals the same way before each flight as per the checklist for the pre-flight procedures.

4.2.3 The use of review trips (green card flights) in all situations should be universally understood and expressed in clear and unambiguous orders.

4.2.4 Students should experience the minimum number of instructor changes as possible in order to limit the effects of different teaching styles and to establish a sound student-instructor relationship. This is an agenda item for the 2005 Standards Working Group hosted by the ACGP SET with options for incorporating this principle in Training Plans and orders to be discussed.

4.2.5 The maximum number of training flights for cadets should be six per day, with the option of extending to 8 flights per day with approval from the Chief Flying Instructor. This recommendation was discussed and supported at the 2005 Air Cadet Training Conference.

### **4.3 Other Safety Concerns**

Nil.

### **4.4 DFS Remarks**

One of the hard lessons that has been learned over the years is that flying training is a very demanding activity. This maxim applies to all types of aviation including glider operations. Accordingly, in order to ensure safe operations, flying training standards have been established and procedures have been put in place to ensure that students meet these standards.

In this particular occurrence, it would appear that concern for the feeling of the students had resulted in dilution of the applicable standard. Moreover, there is anecdotal evidence to suggest that this culture may have been present at other Air Cadet Regional Gliding Schools. While it is laudable that the IPs were highly motivated to ensure that all students were given every opportunity to succeed, this cannot be allowed to affect standards. However, given the intensity of the summer training period and the disruptions caused by weather, it is difficult for the individual schools to ensure that the appropriate standards are being universally applied. This situation highlighted the requirement for a centralized standards cell.

Since this accident the Air Cadet Standards and Evaluation Team (SET) has been established at CFS. It is believed that this centralized oversight has already greatly enhanced Air Cadet Glider Training. With the support of Air Cadet standards personnel and line instructors it is anticipated that the SET will help improve not only flight safety, but the overall quality of an excellent program.

//ORIGINAL SIGNED BY//

A.D. Hunter  
Colonel  
Director of Flight Safety

## ANNEX A: PHOTOGRAPHS

Photo 1: Final Resting Place



Photo 2: Nose Damage



## **ANNEX B: LIST OF ABBREVIATIONS**

ACGM	Air Cadet Gliding Manual
ACGP	Air Cadet Gliding Program
ACGP SET	Air Cadet Gliding Program Standards and Evaluation Team
ARGS	Atlantic Region Gliding School
ASI	Airspeed Indicator
ACL	Air Cadet League of Canada
CARS	Canadian Aviation Regulations
CDS	Chief of the Defence Staff
CF	Canadian Forces
CFI	Chief Flying Instructor
CFS	Central Flying School
CO	Commanding Officer
ELT	Emergency Locator Transmitter
FIC	Flight Instructor Course
FTE	Field Testing and Evaluations
IP	Instructor Pilot
LCO	Launch Control Officer
LP	Lesson Plan
MF	Mandatory Frequency
MOA	Memorandum of Agreement
MP	Military Police
MPH	Miles per Hour
MSL	Mean Sea Level
QNH	Altimeter Setting to indicate altitude above sea level
RCAC	Royal Canadian Air Cadets
RCA Ops O	Regional Cadet Air Operations Officer
RGS	Regional Gliding School
TC	Transport Canada
VSI	Vertical Speed Indicator