

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

FINAL REPORT

FILE NUMBER: 1010-C-GCLY
DATE OF REPORT: 07 June 2002

AIRCRAFT TYPE: SZ 2-33A Glider
DATE/TIME: 10 June 2001 1715Z
LOCATION: Nanaimo Airport, Nanaimo BC
CATEGORY: "B" 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 – Factual Information, 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, National Defence Headquarters, pursuant to powers delegated to him by the MND as the Airworthiness Investigative Authority (AIA) of the Canadian Forces.

SYNOPSIS

The glider was being flown in support of the Pacific Region Spring Familiarization Flying Program at the Nanaimo Airport near Nanaimo, BC. The pilot, a Civilian Instructor, was a Familiarization Pilot (Front Seat). The passenger was an Air Cadet. After a normal tow to 2600 feet above sea level (ASL) (airfield elevation is 97 ft ASL) followed by some upper air work, the pilot joined a right downwind at 1300 feet ASL (1200 feet AGL) in 10 Kt winds. After turning final she noted that she was low and well short of her intended landing area. The glider made a hard landing on the grass between the runway and taxiway, approximately 1900' short of the intended landing area. The pilot unstrapped and egressed unhurt. The passenger complained of a sore back. After a local ambulance arrived on scene the passenger was placed on a backboard and transported to hospital. The passenger was released from hospital later that day. The glider suffered extensive damage to its wings and internal structures.

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1. FACTUAL INFORMATION

1.1 History of the Flight

The glider was being flown in support of the Pacific Region Spring Familiarization Flying Program at the Nanaimo Airport near Nanaimo, BC. The pilot was a Civilian Instructor. This was the pilot's first flight in two weeks and her first flight using Runway 16 in two seasons.

After a normal tow to 2600 feet above sea level (ASL) (2500 feet AGL) followed by some upper air work, consisting of gentle and medium turns, the pilot joined a right downwind for the grass strip parallel to runway 16 at 1300 feet ASL (1200 feet AGL). Surface winds were reported by the Nanaimo FSS as 140° Magnetic at 8-10 Knots.

The pilot passed abeam the landing area at approximately 1100 feet ASL (1000 feet AGL), or about 100 feet high. The pilot decided to correct this situation by applying full spoilers, angling away slightly, and extending the downwind portion of the circuit in order to regain the ideal glide path to the landing area. The pilot rolled out on the base portion of the circuit at 600 feet ASL (500 feet AGL) and was established on final at 400 feet ASL (300 AGL). Throughout these manoeuvres the pilot maintained a constant airspeed of 50 MPH.

Once established on final, the pilot noted that she was low relative to her intended landing point. The pilot closed the spoilers and began to raise the nose of the glider. Approximately 10 -15 feet from the ground, the pilot noted an unusually low airspeed of 40 MPH. The pilot applied nose-down elevator to regain speed, then applied full nose-up elevator just prior to ground impact.

The glider impacted the ground in a slight nose-down attitude with full nose-up elevator, slight left rudder and spoilers closed. The glider slid along the grass a distance of approximately 50 feet before coming to a complete stop.

The pilot unstrapped and egressed unhurt. The passenger complained of a sore back. After a local ambulance arrived on scene the passenger was placed on a backboard and transported to hospital.

The accident site is located at the Nanaimo airport in the grass abeam and to the right of runway 16 and approximately 1900 feet from the intended landing area. The accident occurred on 10 June 2001 at 1715Z during daylight hours.

1.2 Injuries to Personnel

The pilot was uninjured in the accident. The passenger received a minor injury as the accident aggravated a previous back injury sustained in a car crash. The passenger was transported to the local civilian hospital by ambulance for examination and released later that day. Toxicological testing was not performed on the pilot.

	Crew	Passengers
Fatalities	0	0
Injuries	0	1

1.3 Damage to Aircraft

The glider sustained B Category damage. The fuselage has 2 bent longerons in the skid attachment area at the point of impact. One of the bent longerons is the keel and the other longeron runs from the keel to the mid fuselage longeron on the left side of the fuselage. The tail post (rear tail spring attachment point) is bent and the rearmost vertical tubing has collapsed. The tail spring rear attachment bracket is bent. The LH lower window frame (on the fuselage) is broken at the aft fuselage attachment. The LH fuselage former (under the LH wing) is bent.

The LH wing strut is bent in the middle (not repairable). Both wings have substantial wrinkling on the bottom skins outboard of the strut attachments.

The RH inboard aileron is bent at the trailing edge and the LH inboard aileron has a minor crease at the trailing edge. The wing gap seal/rear upper window is cracked and the attaching Dzus fasteners were ripped out of the frame.

The amount of damage was deemed to be beyond economical repair, and as a result the glider has been written off.

1.4 Collateral Damage

The accident occurred on the airport property in a grass field. There was no damage to the airport property so a claim against the crown is unlikely.

1.5 Personnel Information

The pilot is a Civilian Instructor (Familiarization, Front Seat) who obtained both her private pilot licence and glider pilot licence through the Air Cadet program.

	Pilot	Passenger
Rank	C I	Cadet
Currency/Category valid as of	06 May 01 Familiarisation Pilot	N/A
Total Flying Time (Power)	100 hrs	N/A
Total flying time (Glider)	18.5 hrs	N/A
Flying hours on type	18.5 hrs	N/A
Flying hours last 30 days (Glider)	1.8 hrs	N/A
Duty time last 24 hrs	3.5 hrs	N/A

1.6 Aircraft Information

The aircraft had recently completed its SIRP (Structural Inspection and Repair Program) and was serviceable prior to the accident. All maintenance and inspections were up to date. The weight and balance was within limits.

The normal practise recommended by the manufacturer and used by the Cadets is to add the wind to the normal still wind approach speed of 50 MPH, i.e. in a 10 MPH wind a 60 MPH approach speed would be used. This results in increased profile drag (which is a function of the square of the velocity). As well, for every 10 MPH of wind, 100 feet should be added to the base and final altitudes.

1.7 Meteorological Information

The Nanaimo FSS provides both Forecasts and METARs for the Nanaimo airport. Actual conditions for the Nanaimo airport (CYCD) at the time of the accident were as follows:

CYCD 101600Z 13010KT 20SM FEW35 SCT60 BKN80 11/07 A3003 RMK SC3SC2AC3 SLP 170

CYCD 101700Z 14008KT 20SM FEW20 SCT35 BKN60 OVC90 12/7 A3004 RMK CU3SC2SC5 SLP 172

1.8 Aid to Navigation

Not applicable

1.9 Communications

The glider is equipped with a battery powered VHF radio. This radio was serviceable during the flight and the pilot made all the appropriate radio transmissions as confirmed by Nanaimo FSS recordings. Radio transmissions on the FSS frequencies are recorded in accordance with Nav Canada

procedures. A copy of the radio transmissions for the relevant period of time around the accident was obtained from the FSS personnel.

The FSS personnel called the local emergency services. An ambulance responded to the scene within 5 minutes.

1.10 Aerodrome Information

The Nanaimo airport is uncontrolled, but does have a FSS on site. The glider-operating site is bordered by runway 16/34 and taxiway Bravo. The area has a grass surface and is used for landing and takeoff of the tow planes and gliders. Refer to Annex B.

1.11 Flight Recorders

The glider is neither equipped nor required to be equipped with any type of flight recording device

1.12 Wreckage and Impact Information

The glider made a hard landing in a level, grass field abeam and to the right of runway 16. This impact area is approximately 1900' from the threshold of the landing area in use on the day of the accident. The nose of the glider made a 24" long and 2" deep gouge at the impact point. The glider then slid for approximately 50 feet before coming to a complete stop. The glider remained intact during the accident.

1.13 Medical

Two staff members (a tow plane pilot, who is also a paramedic, as well as the Launch Control Officer (LCO)) provided First Aid at the accident site. The passenger was then transported to the local civilian hospital by an ambulance that responded to the scene. She was released after treatment for her minor injuries.

1.14 Fire, Explosives Devices, and Munitions

Not applicable

1.15 Survival Aspects

After the accident occurred the LCO initiated the Emergency Response Checklist. The RCA Orders, which outline procedures to follow in the event of an accident, were not available at the time of the accident as they were off-site to be amended.

Two staff members, one a paramedic, went to the accident site in a vehicle to administer first aid and co-ordinate the crash response.

Once the glider stopped the pilot released her harness and exited the glider. The passenger complained of a sore back, which had been injured in an earlier traffic accident. The passenger was laid out on her back until the ambulance crew affixed a neck brace and placed her on a backboard for the trip to the hospital.

1.15.1 Crash Survivability

The crash was survivable. Damage to the glider was extensive but the cockpit maintained a survivable volume due to the robust nature of the airframe structure.

1.15.2 Life Support Equipment

The glider seats are equipped with a four-point harness system and Temperfoam cushions. No abnormalities were observed with this equipment.

1.15.3 Emergency Transmitters

The glider was neither equipped nor was required to be equipped with any emergency transmitters.

1.16 Test and Research Activities

Nil

1.17 Organisational and Management Information

The accident occurred on a weekend. After unsuccessful attempts by the gliding site staff to reach the RCA Ops O and D/RCA Ops O, contact was made with the 3rd person in line on the Emergency Response call list, who in turn left messages on the RCA Ops O and D/RCA Ops O answering machines. This delayed the passage of information to DFS which subsequently delayed the arrival of DFS staff by 24 hours.

In discussions and interviews with junior and senior staff, it was discovered that there seems to be perceived peer pressure, especially among junior staff, that in order to not impede the smooth operation of the site, one must try to land and stop as close as possible to the launch site.

2. ANALYSIS

2.1 Pilot

2.1.1 Aircraft Handling

There are two areas to examine with respect to the pilot's handling of the glider. The first is the method used to reduce excess altitude and the second is the airspeed the pilot maintained during the circuit.

Method Used to Lose Excess Altitude on Downwind

The pilot carried out several actions in her attempt to lose excess altitude while on the downwind portion of the circuit. These actions led directly to the glider being unable to reach the intended landing area.

Once established on final approach, the glider is to be flown with the spoilers set at 50%. This setting provides the pilot with the opportunity to reduce the rate of descent by retracting the spoilers, or to increase the rate of descent by setting the spoilers to 100%.

The pilot was at most 100 feet higher than the ideal altitude abeam the landing area. The Royal Canadian Air Cadets Gliding Manual describes a number of techniques that can be used to correct for a higher than normal altitude at the halfway point of the downwind leg.

A-CR-CCP-242/PT-005, Chapter 3, Annex B, Paragraph 8

After the halfway point of the downwind you should have a good idea whether you will be high or low for the base turn and you can adjust accordingly. You can shorten the downwind leg if you are low. You can even start angling in towards the landing area if you are extremely low. *If you are high you can use spoilers to lose the excess altitude or you can angle out slightly to give yourself a longer base leg. Under extraordinary circumstances you can modify your circuit as required to safely return the glider to the landing strip.* (Emphasis added)

Any one of these methods (full spoilers, angle away from landing area, modify the circuit by extending downwind) would have been sufficient to lose an extra 100 feet, but to employ all three at the same time was excessive and prevented the glider from being able to reach the intended landing area.

The investigation revealed that the pilot did not realize how far below the glide path or how far from the threshold of the landing area she was until the last 30 seconds of the flight, and in fact the pilot had a mental model of the situation that indicated a successful landing in the intended area would be accomplished. This fixation with landing at the intended area, instead of choosing a more realistic and safe landing surface, is discussed later.

Airspeed Control

The pilot's airspeed control played a major factor in the level of damage sustained by the glider.

The standard pattern is flown at an indicated airspeed (IAS) of 50MPH on the downwind portion of the circuit. The IAS is then adjusted to 50MPH plus windspeed (including gusts) for the base and final portions of the circuit. For unknown reasons, the pilot maintained a constant IAS of 50MPH on the base and final portions of the circuit, even though the reported winds were in excess of 10MPH. This action is not in accordance with published procedures.

After rolling out on final, at an altitude of approximately 150 feet AGL, the pilot began to realize that she was farther from the threshold than she had planned to be. The pilot was over a suitable landing surface, but for reasons discussed later was focussed on reaching the intended landing area approximately 1900 feet away. In an attempt to reach the intended landing area, the pilot began to stretch the glide by pulling back on the control column, in effect trading the glider's already low airspeed for altitude.

The IAS rapidly decayed to approximately 40MPH. The pilot noted this unusually low airspeed and, with the glider only 10-15 feet AGL, made an attempt to correct the situation.

The attempt to increase airspeed, by pushing forward on the control column, increased the downward velocity vector of the glider and made its subsequent ground impact more severe than it would otherwise have been. The damage to the glider supports this, as the rugged construction of the glider requires that quite large forces be applied to it in order to produce the damage observed. A level-attitude landing at 40MPH, while just above the stall, would not have created the same level of damage, if any.

In this situation, the pilot could have made a safe landing away from the intended landing area had she maintained the glider's recommended airspeed and landed on the suitable landing surface available.

2.1.2 Fatigue

According to the Defence and Civil Institute of Environment Medicine (Annex C, Ref A), several studies have concluded that pilot fatigue is a major contributor to aircraft accidents and one study lists poor nutrition as a compounding factor to fatigue. The effects of less than six hours of sleep the night before a flight manifest themselves in poorer judgement, but not necessarily loss of skill in flying the aircraft. As fatigue levels increase, accuracy and timing degrades. Lower standards of performance are unconsciously accepted, the ability to integrate information from instruments into a meaningful overall pattern is degraded, and a narrowing of attention occurs that leads to forgetting or ignoring important aspects of flight tasks. Studies involving aircrew have shown that even experienced aircrew can show significant deviations in basic flight parameters even after only one night of sleep loss.

The pilot slept only 4.5 hours the night prior to the accident, and 5.5 hours the night before that. On the day of the accident, the pilot awoke at 0530 and consumed a light breakfast prior to departing Victoria for the 1.5-hour drive to Nanaimo. The pilot stated that she was forcing herself to stay awake at the wheel, going so far as to stop for coffee partway through her journey. Once in Nanaimo, the pilot did not have anything else to eat or drink in the five hours prior to the accident.

The pilot indicated in her accident report that she was not fatigued, which is at odds with her behaviour on the drive up from Victoria. Individuals judge their own fatigue levels poorly, since these judgement capabilities often suffer with other skills when the pilot is fatigued. The behaviours exhibited during the flight - three separate yet concurrent corrections for 100 feet of excess altitude, loss of situational awareness, and a fixation with landing at the designated landing area - suggest that the pilot was fatigued.

2.1.3 Ability

At the time of the accident, the pilot had accumulated 8.5 hours of solo glider time. Normally, 10 hours of solo glider time is required before a pilot can be authorized as a Familiarization Pilot (Front Seat). However, this requirement (A-CR-CCP-242/PT-005, Chapter 1, Section 3, Paragraph 18 NOTE) may be waived if the pilot possesses a power licence, which the accident pilot did. The same article also states that Familiarization Pilots shall perform at an Above Average level.

Qualification Title – Glider Famil Pilot (Front Seat)

Duties. When so designated by the RCA Ops O, a Glider Famil Pilot (Front Seat) is authorized to conduct glider famil flights only from the front seat of the glider.

Prerequisites. The pilot shall:

- (1) hold a valid Canadian Glider Pilot Licence and shall have 10 hours PIC in gliders;
- (2) have successfully demonstrated the ability to brief the passenger on the characteristics and limitations of the glider and the flying sequences authorized to be performed during the famil flight, and have successfully demonstrated the ability to perform, consistently and in an **above-average** (emphasis added) manner, all sequences in the Glider Pilot Course; and
- (3) have flown at least three solo flights utilizing the same launch method as that intended for the passenger carrying flight.

NOTE

If the pilot holds a Canadian Private Pilot Licence or higher, or has successfully completed flying training to CF “Wings” standard, then the 10 hours PIC in gliders is waived.

At the time of the accident, the Above Average performance level was understood by the RCA Ops O and Chief Standards Pilot to comprise no less than Proficiency Level (PL) 4 on all required Proficiency sequences. The various PLs are defined in A-CR-CCP-242/PT-005 page 3A-4 (Annex C). The Overall Flight Rating on the bottom of the Progress Card and Flight Test Report (Annex C) is understood to be a subjective assessment of the pilot's abilities as observed by the examiner. The RCA Ops O and Chief Standards Pilot would therefore allow a pilot with an Overall Flight Rating of Average to fly as a Familiarization Pilot (Front Seat) provided that there were no PLs below 4.

The wording of the prerequisites for Familiarization Pilot (Front Seat) does not specify if the Above Average performance level includes the Overall Flight Rating on the bottom of the Progress Card and Flight Test Report as well as the individual Proficiency Levels for each flight sequence.

The RCA Ops O appointed the accident pilot as a qualified Glider Familiarization Pilot (Front Seat) on 03 October 2000. At that time the accident pilot had slightly more than 5 hours solo on gliders and a Private Pilot Licence (Power). The accident pilot's last glider flight of 2000 was on 14 October. Her next glider flight was on 06 May 2001, when she began a series of flights with the Chief Standards Officer.

There were three flights on 06 May 2001 with the Chief Standards Officer. The first was an annual review, where the accident pilot received an Overall Flight Rating of Average, with no PLs below 4. The second flight was also assessed as Average, with no PLs below 4.

The final flight of 06 May 2001 was a Proficiency check. The Chief Standards Officer noted that the pilot tended to keep the spoilers deployed too long, and that the pilot was distracted by a radio call. The accident pilot was assessed as Average, with no PLs below 4.

In summary, Progress Card & Flight Test Report results for the pilot indicate Average subjective performance with no PLs below 4 on the three flights prior to her resuming Familiarization Pilot (Front Seat) duties. As noted earlier, Above Average ability is required for Familiarization Pilots (Front Seat).

Since this accident, the Pacific Region Cadet Air Operations leadership has instituted a revised method for awarding the Familiarization Pilot (Front Seat) qualification as noted in paragraph 4.1.2.

A discrepancy was noted between the prerequisites for Familiarization Pilot (Front Seat) and the individual PLs on Card 4 (Annex C-2/2). The prerequisites require that the pilot perform “in an Above Average manner all sequences in the Glider Pilot Course”, but the PLs are numbered from 1 to 6, not from Unsatisfactory to Superior. There is thus some question as to which PL is associated with “an Above Average manner”.

2.1.4 Airport Familiarity

This was the first time in two seasons that the accident pilot utilized runway 16. Normally, runway 34 is used, as the prevailing winds in Nanaimo are from the north due to the topography of the area. The gliding site staff conducted a standard morning brief the day of the accident. The brief covered such items as weather, location of diversion fields, and the circuit pattern.

The pilot was unfamiliar with the location of the windsock for runway 16 and in fact spent a relatively long time searching for it while on downwind. This information was not provided in the morning briefing, and the pilot did not refer to the airport diagram for its location. The pilot perceived that prominent ground features, which she was using as turn points, are not as readily available for runway 16 as they are for runway 34. It should be noted that turns are to be made with reference to air position and not to ground features.

The lack of familiarity with the runway 16 circuit and its environs, fatigue, and the tasks of losing excess altitude and searching for a windsock, made it easier for the pilot to lose situational awareness and over-extend the downwind portion of the circuit.

In short, the pilot was suffering from task overload in the latter half of the downwind portion of the circuit.

2.1.5 Pressure to Land Close to Launch Point

The senior staff responsible for the Nanaimo Gliding Site has briefed all students and staff that it is more important to land safely than to land near the launch point. Minor disruptions to the flight schedule are preferable to the loss of an aircraft.

In the past, the accident pilot had heard some cadets and staff members joke about pilots who had landed a greater than normal distance from the launch point. This entailed extra work for the cadets, as the glider had to be pushed back to the proper launch point. Landing long also tended to slow down the launch and recovery cycle.

The accident pilot had no desire to impose extra work upon her comrades and was therefore under some degree of self-imposed pressure to land not only in the designated area, but as close as possible to the launch point. The pilot’s decision to overfly a suitable landing surface in favour of stretching a glide to

make the intended landing area was influenced by her desire to not impose extra work on her comrades.

2.2 Emergency response

Most aspects of the site's emergency response plan were handled adequately. The quick arrival of gliding site staff to the accident scene, as well as the rapid response of the local ambulance, is to be commended. Unfortunately, the required notification of DFS was delayed due to responsible persons in the chain of command being unavailable.

It should be noted that there is a 24/7 Wing Ops at 19 Wing Comox, which is able to contact the Wing Flight Safety Officer or DFS directly if required.

Although there is no legal requirement for civilian members of the Air Cadets to provide toxicological samples, the site staff made no request for voluntary samples to the pilot, thus some valuable information that may have been made available was lost.

3. CONCLUSIONS

3.1 Findings

3.1.1 The pilot was properly authorized to carry out the mission as assigned.

3.1.2 It is not clear if the prerequisite for Familiarization Pilots (Front Seat) to demonstrate an Above Average level of performance relates to the individual PLs or Overall Flight Rating on the Progress Card and Flight Test Report.

3.1.3 The pilot was fatigued as she had slept 4.5 hours the night prior to the accident and 5.5 hours the night before that. Her condition was exacerbated by the fact that she consumed only a light breakfast on the morning before the accident.

3.1.4 The aircraft was fully serviceable and properly maintained in accordance with existing regulations.

3.1.5 The pilot was not familiar with the location of the runway 16 windsock and spent considerable time searching for it while on downwind.

3.1.6 The pilot was 100 feet higher than the ideal abeam the landing area.

3.1.7 In order to correct item 3.1.6, the pilot employed three separate yet concurrent methods to reduce altitude. The three methods used to reduce altitude resulted in the glider travelling a greater than normal distance downwind and descending well below the ideal glide path to the intended landing area.

3.1.8 The pilot flew the glider at 50MPH instead of the 60MPH required by procedures due to the windspeed at the time of the accident.

3.1.9 The pilot was suffering from task overload during the latter half of the downwind portion of the circuit.

3.1.10 The pilot was under self-induced pressure to land as close as possible to the launch area in order not to impede the smooth and orderly operation of the gliding site.

3.1.11 The pilot flew over a suitable landing surface. She was fixated on landing at the intended landing area and attempted to stretch the glide in order to do so.

3.1.12 While stretching the glide, the pilot allowed the airspeed to decay to 40MPH on final approach. During the pilot's attempt to recover airspeed, the glider impacted the ground in a wings level and slightly nose down attitude. The impact resulted in Cat 'B' damage to the glider.

3.1.13 The flying orders were not available at the gliding site as they were in the process of being updated.

3.1.14 DFS notification was delayed due to responsible persons in the chain of command being unavailable and initially unreachable during the weekend.

3.2 Causes and Contributing factors

3.2.1 Causes

Due to task overload, the pilot failed to properly correct for a slightly higher than ideal altitude abeam the landing area by employing three separate yet concurrent altitude correction methods. These corrections placed the glider beyond the point of being able to land at the intended area.

The pilot chose to overfly a suitable landing surface and attempted to stretch a glide in order to land at the launch site and prevent disruption to the gliding schedule.

The performance of the pilot was impeded by fatigue related to inadequate rest and nutrition before assuming her duties.

3.2.2 Contributing factors

Lack of exposure to the circuit for runway 16 contributed to the pilot losing situational awareness on the downwind portion of the circuit.

4. SAFETY MEASURES

4.1 Safety Measures Taken

4.1.1 The flying orders, which were absent at the time of the accident, have been returned to the gliding site.

4.1.2 The Pacific Regional Cadet Air Operations leadership has instituted a revised method for awarding the Familiarization Pilot (Front Seat) qualification. Pilots must obtain a PL of 5 on take off, tow, release, circuit and landing portions of the check ride in order to travel with passengers. All other PLs must be no lower than 4. As well, every 10th flight is flown with an instructor in order to ensure the continued proficiency of the pilots.

4.1.3 The procedure for adding the windspeed to the glider's approach speed was clarified at the Fall 2001 Gliding Conference in Ottawa. From now on the windspeed will be added to the approach speed only up to a combined total of 65 MPH.

4.1.4 The Pacific Region Flying Orders have been amended with respect to Occurrence reporting. All occurrences are now to be reported to the 19 Wing Ops Centre immediately via fax or by telephone.

4.2 Further Safety Measures Recommended

4.2.1 The National Cadet authority should resolve the question of which PL is associated with "an Above Average manner".

4.2.2 The National Cadet Authority (NDHQ/VCDS/DCdts 4-2) should promulgate and insert clear and effective crew rest orders in the A-CR-CCP-242/PT-005.

4.3 DFS Comments

This accident is similar to an occurrence from September 1999, where an Air Cadet glider crashed while on approach to an airfield at Iroquois Falls, Ontario. Fatigue was also a major factor in that accident.

One of the recommendations made in the Final Report of that accident was for the National Cadet Authority to develop crew rest requirements for Air Cadet units. It is unfortunate that such requirements had not been developed at the time of the accident, and that another valuable aviation resource has been lost due, in part, to crew fatigue. This accident should serve as a catalyst to develop a clear and effective crew rest policy and regulations for the young men and women who are just beginning their aviation careers in the Air Cadets.

This is at least the second recent Air Cadet gliding accident where perceived pressure to land as close to the launch site as possible contributed to decision errors. These pressures do not normally come from the leadership – they come from the other cadets and pilots, but they are there nonetheless. Leaders must

be aware of these pressures and take an active role in eliminating the attitudes that cause them.

R.E.K. Harder

Colonel

Director of Flight Safety

Annex A: Photographs



Glider shortly after landing



Front view of glider



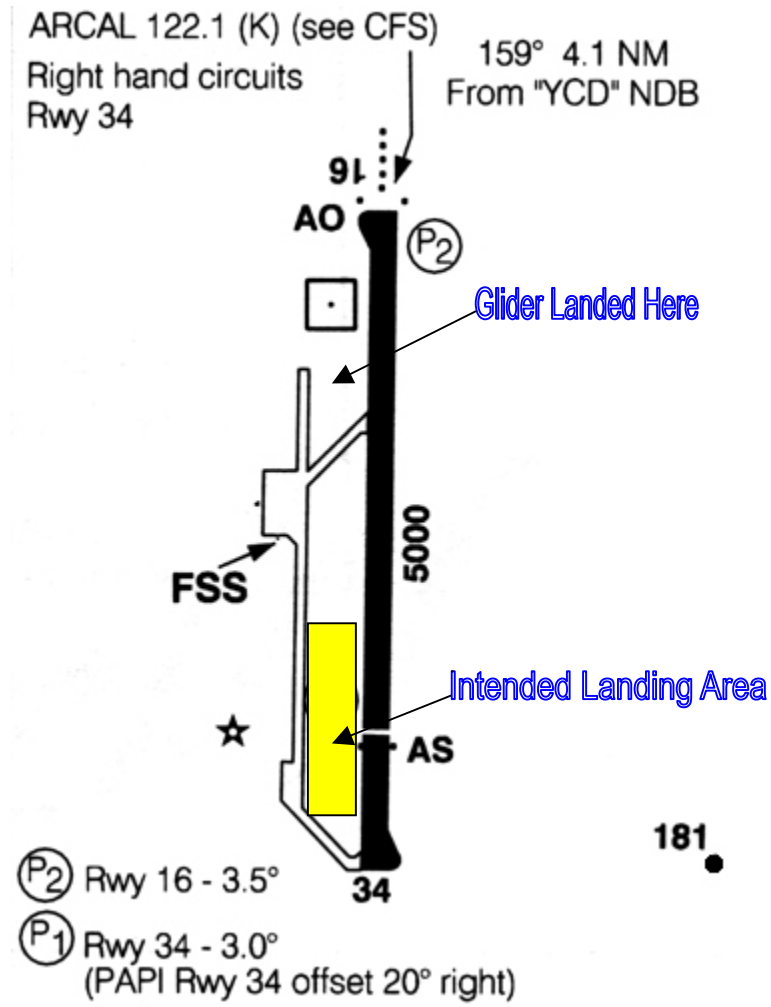
Top view showing skin buckling



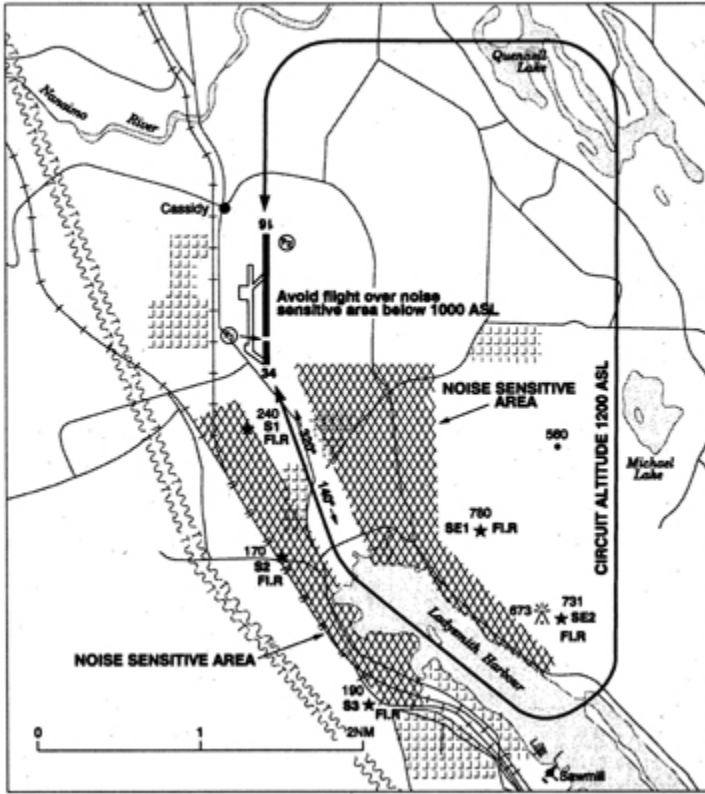
Glider after being towed to storage area

Annex B: Maps and Charts

Nanaimo Airport Diagram



**NANAIMO VFR TERMINAL PROCEDURES CHART -
DAY / NIGHT CIRCUIT PROCEDURES**



Annex C: References

- A. DCIEM Human Factors Analysis C-GCLG, 29 Sep 1999, 1010- C-GCLG (HFI) dated 16 February 2000.
- B. DCIEM Human Factors Analysis C-GCLY, 10 Jun 2001, 1010-C-GCLY (HFI) dated 26 November 2001.
- C. Air Cadet Gliding Program Manual A-CR-CCP-242/PT-005 dated 04 Apr 2001.
- D. Progress Card and Flight Test Report. A-CR-CCP-242/PT-005.

PROGRESS CARD & FLIGHT TEST REPORT							
STUDENT		FLT No.	FLT TIME				
INSTRUCTOR		DATE					
EXERCISES	PL	NOTES					
PRE-FLIGHT	Docs/Wt & Bal						
	Inspection						
PRE-TAKE-OFF	Pre T/O Check						
	Hook-Up & Signals						
TAKE-OFF	Ground Roll						
	Lift Off						
	Control & Position						
EMERGENCY	Rope Break						
AIR TOW	Control & Position						
	Release						
SPIN	Entry						
	Recovery						
SPIRAL DIVE	Entry						
	Recovery						
STALL	Entry						
	Recovery						
SIDE-SLIP OR SLIPPING TURN	Control inputs						
	Attitude						
	Recovery						
STRAIGHT GLIDE	Speed & Attitude						
	Direction						
GENTLE, MEDIUM OR STEEP TURNS	Speed & Attitude						
	Bank Angle						
DOWNWIND	IP Entry						
	Speed & Track						
	Downwind Check						
BASE LEG, BASE TURN	Altitude & Position						
	Coord/Speed/Track						
FINAL TURN	Altitude & Position						
FINAL APPROACH	Speed & Coord						
LANDING	Speed & Track						
	Spollers						
	Round-Out & Hold-Off						
AIRMANSHIP	Touch Down						
	Ground Roll						
	Inflight Checks						
	Flight Management						
	Look Out						
	Radio						
OVERALL FLIGHT RATING (CIRCLE ONE)		U	M	BA	A	AA	S
INSTRUCTOR INITIALS		STUDENT INITIALS					

Card 8 (Dual – Blue, Solo – White, Extra Dual – Red, Review – Green)

E. Proficiency Levels and Overall Flight Ratings. A-CR-CCP-242/PT-005.

PROFICIENCY LEVELS (PL)

1	Even with physical assistance the task could not be performed. The mechanics of the tasks to be performed may or may not have been understood.
2	Frequent verbal and physical assistance was required to avoid making critical errors to perform each task. The mechanics of the tasks performed were understood, but further instruction is required before solo flight can be authorized
3	Verbal assistance was required to avoid making critical errors. The student demonstrated basic knowledge of the mechanics, techniques and procedures of the tasks performed. Further practice prior to solo is required.
4	Tasks were performed with no critical errors and required only minimal verbal assistance for improvement. The student demonstrated a detailed knowledge of the mechanics, techniques and procedures of the tasks to be performed. The student can analyze errors and is qualified for solo.
5	Tasks were performed without assistance and with only non-critical errors. The student demonstrated comprehensive knowledge of the tasks to be performed.
6	Tasks were performed without assistance or error and with complete regard for safety, accuracy and good airmanship. Aircraft handling was smooth and accurate. Knowledge of each task performed is complete. An ideal pilot under existing conditions.

DEFINITIONS: CRITICAL AND NON-CRITICAL ERRORS

CRITICAL	A Critical Error is an error which could either jeopardize the safety of the flight or jeopardize the completion of the exercise at hand.
NON-CRITICAL	A Non-Critical Error is an error which detracts from the ideal but in no way jeopardizes the safety of the flight or jeopardizes the completion of the exercise at hand.

OVERALL FLIGHT RATINGS (OFR)

UNSAT	The student failed to achieve the required standard (PL) on two or more exercises or significant regression was shown. An Extra Dual (additional instruction) is mandatory.
MARGINAL	The student failed to achieve the required standard on one exercise, or showed little or no progress. <u>For a Marginal OFR on Flights D1 to 22 inclusive:</u> The failed exercise must be flown to the required standard during the next flight. If the required standard has still not been met, then that flight will be assessed as Unsatisfactory. <u>For a Marginal OFR on Flights D23 or 24:</u> An Extra Dual is mandatory. <u>For a Marginal OFR on a Solo Flight:</u> An Extra Dual is mandatory because a failed exercise automatically results in the loss of solo status.
BELOW AVERAGE	The student achieved the required standard on all exercises, but did experience difficulty.
AVERAGE	The student achieved the required standard on all exercises, and progress was noted.
ABOVE AVERAGE	The student achieved the required standard on all exercises, and performance was noticeably better than the required standard.
SUPERIOR	The student achieved the required standard on all exercises, and performance was significantly better than the required standard.

Card 4 (Yellow)