

CANADIAN FORCES FLIGHT SAFETY INVESTIGATION REPORT (FSIR)

FINAL REPORT

FILE NUMBER: 1010-C-GCLG

DATE OF REPORT: 12 Dec 2000

AIRCRAFT TYPE: Schweizer 2-33 Glider

DATE/TIME: 26 Sep 99, 1637Z

LOCATION: Iroquois Fall Municipal Airport, Ontario N48 44.9 W080 47.8

CATEGORY: B Cat Accident Minor Injury

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 and when provided for by law, the contents of this report shall be used for the purpose of accident prevention and are to be seen only by those with a need-to-know in the exercise of their formal functions. In any event, this report shall not be released to the public in whole or in part except under the authority of the Director of Flight Safety, National Defence Headquarters.

SYNOPSIS

The glider was being operated in support of the Air Cadet Fall Familiarization (Famil) Gliding Programme. The Famil Qualified pilot and a passenger were launched, using a winch, from Runway 18 at the Iroquois Fall Municipal Airport. A normal circuit was flown to the point where the pilot turned final and realised that the upper winds were much stronger than on the previous two flights he had just completed. The glider struck trees approximately 500 feet short of the airfield perimeter fence and came to rest on its side, with the left wing folded under the fuselage, sustaining B Category damage. The occupants egressed unaided. Staff at the gliding site contacted the Central Region Cadet Headquarters who later informed DFS of the occurrence. Further discussions the next day resulted in the decision to task an investigation. Following the accident, the passenger displayed symptom of emotional upset and some minor bruising on his arm. This is considered a minor injury.

TABLE OF CONTENTS

1.	FACTUAL INFORMATION	1
1.1	History of the Flight	1
1.2	Injuries to Personnel.....	1
1.3	Damage to Aircraft	2
1.4	Collateral Damage.....	2
1.5	Personnel Information	2
1.6	Equipment Information	3
1.7	Meteorological Information	3
1.8	Aerodrome Information.....	4
1.9	Communications.....	4
1.10	Wreckage and Impact Information	4
1.11	Medical.....	4
1.12	Survival Aspects.....	5
1.13	Useful or Effective Investigation Techniques	6
1.14	Tests and Research Activity	6
2.	ANALYSIS	6
2.1	Pilot	6
2.2	Gliding Site Supervision and Management	8
2.3	Glider Restraint System	8
2.4	Winch	9
2.5	Emergency response	9
3.	CONCLUSIONS.....	9
3.1	Findings.....	9
3.2	Causes and Contributing factors	10
4.	SAFETY MEASURES	11
4.1	Safety Measures Taken	11
4.2	Further Safety Measures Required	11
4.3	DFS Comments.....	12
	Annex A: Photographs.....	A-1
	Annex B: Maps and Charts.....	B-1
	Annex C: References	C-1

1. FACTUAL INFORMATION

1.1 History of the Flight

The glider was being flown in support of the Air Cadet Gliding Programme (ACGP) Fall Familiarization Session. The site (Arctic Watershed Gliding Centre) was using a winch to launch the glider to provide familiarization and motivational flights for a group of Air Cadets. The pilot was a qualified Familiarisation Glider Pilot who had already completed two flights without incident immediately prior to the occurrence.

With the pilot in the front seat and the cadet in the rear, the glider was once again launched and achieved an altitude of 800-900 ft at cable release. After a brief session of turns at altitude, the glider joined left downwind for Runway 18. The Launch Control Officer (LCO), at the launch point, noted that the glider was proceeding downwind at a faster rate than previously seen and radioed the pilot to warn him of this fact. The pilot did not recall hearing the transmission and proceeded to fly his circuit using the same check altitudes and ground references that had resulted in a successful approach and landing only seven minutes earlier on his previous flight. He used crab on base leg to account for the wind but he turned final slightly further away from the runway.

Once established on final he realised that, although he had added 20 mph to his final approach speed to compensate for the wind, he was barely making any headway towards the runway. The glider was instead descending towards trees just north of the airport boundary. The pilot elected to fly the glider between the trees and avoid stalling. The left wing struck a large pine tree approximately 25 feet above the ground. This caused the glider to pivot about the point of impact and the right wing to rise to a near vertical position. The glider eventually struck the ground with the left wing folding under the fuselage and the right wing parallel to and up against the trunk of another large pine tree. (Annex A Photo 1) The pilot and passenger were able to egress unassisted through the broken canopy.

The location of the crash was N48° 44.9' W080° 47.8'. The crash site was about 1500 feet from the launch point and 1000 feet short of the button of Runway 18. The accident occurred during daylight hours at 1637 hours (UTC) on 26 Sep 99.

1.2 Injuries to Personnel

	Crew	Passengers
Fatalities	-	-
Injuries	-	1

The passenger suffered a slight bruise on his left arm in the accident. Four days later he was suffering stress and insomnia associated with the aftermath of the event and was undergoing daily counselling. Consultation with 1 CAD Surgeon determined that this is considered a minor injury.

1.3 Damage to Aircraft

As a result of the accident, the glider suffered B category damage. The damage consisted of a broken canopy, a bent pitot tube, severe damage to the left wing. (Annex A Photo 3) The right wing was also damaged receiving a large rip in the leading edge, ahead of the aileron, which extended back to the spar. (Annex A Photo 4)

1.4 Collateral Damage

The glider crashed into a stand of trees, immediately north of the airport, in line with Runway 18-36. The top third of a large tree was broken off in the initial impact and a few branches were cut from the tree against which the glider came to rest. A few small saplings were removed to allow the pieces of the disassembled glider to be transported by hand to a trailer on the airport property.

As this land is privately owned, the possibility of a claim against the crown was reported to the Central Region Cadet Headquarters and the Gliding Zone Commander.

1.5 Personnel Information

Position	Pilot in Command	Passenger
Rank	Civilian Instructor*	Air Cadet
Age	31	12
Currency/Category valid as of	9 May 99	N/A
Medical Category valid	7 May 98	N/A
Total flying time (gliders)	42 hrs	N/A
Flying hours on type	42 hrs	N/A
Number of flights on type	253	N/A
Flying hours last 30 days	1.5 hrs	N/A
Number of flights last 30 days	27	N/A
Duty time last 24 hrs	8 hrs	N/A

*Note: Civilian Instructor is a term used to designate a civilian employed by the Cadet Instructor Cadre, a component of the Canadian Forces Reserves. He was neither a Glider Instructor nor a Transport Canada licensed Flying Instructor.

The pilot had obtained his glider pilot's licence during the summer of 1986 at the Central Region Gliding School. He eventually received his passenger carrying qualification on 21 Jun 87. He did not participate in gliding activities from 21 Jun 87 until 9 May 98 when he rejoined the programme as a Civilian Instructor and underwent training to be re-qualified as a Famil pilot using the air tow method of launch. Later that fall he received his first formal training on the winch method of launch and was qualified on 11 Oct 98 after 16 dual and 1 solo mission.

In order to regain his qualification, at the beginning of the 1999 Spring Gliding Familiarization programme, he received a full review and check out on airtow. After the finish of the spring programme he did not fly again until 12 Sep 99 when he received a three-minute review/check flight, which re-qualified him to fly as a familiarization pilot, using the winch method of launch. He had carried-out over 25 more flights on the winch between his checkout and the accident.

The glider pilot was also undergoing training to become a winch operator and had acted as LCO at one point during the day of the accident.

1.6 Equipment Information

1.6.1 Glider

The Ontario Provincial Committee of the Air Cadet League of Canada owns the glider. It is operated and maintained by the Canadian Forces on their behalf. The glider was serviceable during the flight and all maintenance inspections were up to date. It was being operated within the prescribed weight and balance limits.

1.6.2 Winch

The Winch utilised at this site was constructed locally and is unique in design from those used at other locations. This winch did not have an amber light affixed to the top (Annex A Photo 5), as required in A-CR-CCP-242 ACGP Manual (Annex C Ref C). On a typical winch this light is activated by the ignition switch and is used to confirm to launch personnel that the operator has started the winch in anticipation of a launch.

1.7 Meteorological Information

There are no weather services available at the Iroquois Falls airport. Area forecasts, winds aloft and actual weather conditions were available from the Timmins Flight Service Station, which is located 25 miles to the south west of the Iroquois Falls Municipal Airport. These forecasts were obtained by the Site Supervisor and used for the morning operations brief, prior to commencing flying. Strong winds aloft and occasional turbulence below 5000 ft, due to low-level wind shear, were expected in the forecasts.

Winds of 180°(M) at 15-20 mph were noted at the site by the LCO using a hand held anemometer. The 1700 Z weather observation for Timmins reported winds of 160° True at 10 gusting to 20 Kts. Other glider pilots, who had flown earlier in the day, reported strong winds from the west at circuit altitude. The winds aloft forecast for Kapuskasing, approximately 75 Nm to the northwest predicted the 3000 foot winds would be 200° True at 33 Kts.

The winds at the site were within the limits for the conduct of gliding operations as detailed in the Air Cadet Gliding Program Manual.

1.8 Aerodrome Information

Iroquois Falls Municipal Airport is uncontrolled. Air Cadet Gliding Operations were being conducted from Runway 18. The launch point was approximately 500 ft south of the runway button. The winch was positioned about 500 ft south of button of Runway 36. Coniferous trees surround most of the airport. There are few off-field landing sites available around the airport but none within reach once on final for Rwy 18.

1.9 Communications

The Iroquois Falls Municipal Airport has an Aerodrome Traffic Frequency (ATF) published to ensure that all radio equipped aircraft, operating on the ground and in the specified ATF area, are listening on a common frequency and are following a common reporting procedure. The frequency (122.8 MHz) is also in use at the Cochrane Airport, which is 25 miles to the north, which frequently results in transmission interference between the two airports.

Immediately after the LCO transmitted his warning to the glider another aircraft transmitted on the frequency from Cochrane. This prevented the LCO from re-transmitting his message. In order to minimise the number of transmissions and also to conserve battery power in his radio, the LCO was calling the glider every two flights to report ground winds and landing information. He generally spoke to each glider pilot after landing to discuss any irregularities he noticed.

1.10 Wreckage and Impact Information

The crash site was about 1500 feet from the launch point and 1000 feet short of the button of Runway 18. (Annex B) It was located in an area of dispersed mature pine trees, most approximately 40 feet tall. The initial impact occurred when the leading edge of the left wing contacted one of these trees, approximately 14 feet from the fuselage. This caused the aircraft to pivot about the point of impact and the leading edge to be peeled away from the spar towards the wingtip. The top of the tree was bent, severed and thrown back along the flight path. The glider turned left through about 90°, to an easterly heading, as the right wing rose to a vertical position. The glider descended to the ground, with the left wing folding under the fuselage, as the leading edge of the right wing was directed by large branches to the trunk of the tree, against which it eventually came to rest. The canopy broke as the fuselage slid to the ground.

1.11 Medical

The pilot and passenger received initial medical exams at the Iroquois Falls hospital. Urine samples were collected as required and they were both released

with no apparent injuries. The passenger received a further medical exam at the Kapuskasing hospital, once he returned home later that evening. Four days later he was undergoing counselling for a delayed emotional upset.

The accident occurred at 1237 hrs local on Sunday 26 Sep 99. The pilot's work/rest cycle in the days prior to the accident were as follows:

Friday 24 Sep 99

Civilian employment 1800 hrs until 0200 hrs

Saturday 25 Sep 99

Sleep 0215 hrs - 0700 hrs

Flying Duty 0730 hrs - 1545 hrs

Civilian employment 1800 hrs - 0200 hrs

Sunday 26 Sep 99

Sleep 0215 hrs - 0700 hrs

Flying Duty 0730 hrs until time of accident

The pilot had consumed an "Instant Breakfast" drink prior to reporting for duty on 26 Sep 99 and had not eaten again prior to the accident.

1.12 Survival Aspects

1.12.1 Emergency Response

The LCO initiated an emergency response in accordance with the established checklist. Gliding Staff and some Staff cadets were dispatched to the crash site and found the crew already out of the glider.

The crew was transported to the local hospital for examination and was released. An attempt to contact the parents of the passenger was unsuccessful.

1.12.2 Impact Forces

The impact was survivable. The cockpit area maintained structural integrity. The vertical impact, as the glider slid down the tree, was absorbed by the left wing folding under the fuselage. The canopy remained intact, after initial impact, and shattered as the fuselage slid down the tree from branch to branch. (Annex A Photo 2) The pilot and passenger egressed unassisted. Minor impact injuries consisted of slight bruising only due to side loads. The four-point harness held the occupants securely and prevented more serious injuries. Some fraying of the shoulder straps of the harness was noted after the accident. (Annex A Photo 6) The impact absorbing cushions (Temperfoam), upon which the crew were seated, were not a factor in absorbing impact energy, as forces were not directed against them in the crash.

1.12.3 Emergency Locator Transmitter

The glider was not equipped with an Emergency Locator Transmitter, as neither Transport Canada regulations nor orders concerning the Arctic Watershed Gliding Centre required one.

1.13 Useful or Effective Investigation Techniques

Positions and distances of the crash site relative to the threshold and glider landing area were determined from a topographical survey photo using the known length of runway 14-32 as a measurement scale. It was difficult to establish the exact location of the threshold of runway 18, as there is little to distinguish where the runway begins from the turf surrounding it.

1.14 Tests and Research Activity

Harnesses from both cockpits were sent to the Defence and Civil Institute of Environmental Medicine (DCIEM) for further analysis and testing.

2. ANALYSIS

2.1 Pilot

2.1.1 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. However, for an inexperienced pilot who is relying more heavily on cognitive skill to fly the aircraft, this may have a more significant effect on flying performance. 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 4.75 hours on each of the two preceding nights due to his civilian employment and only consumed an Instant Breakfast 5 hours prior to the accident. The pilot had also acted as LCO and winch operator at different times before the accident and therefore had little time for rest during the morning. These factors support the conclusion that his performance during the accident flight was hindered by fatigue exacerbated by not having eaten in 5 hours.

At the time of this accident neither the Air Cadet Gliding Program Manual (Annex C Ref C) nor the Central Region Flying Orders (Annex C Ref D) included hours spent in civilian employment as part of the limitations on duty time. Although he did not indicate at his interview that he was fatigued, the pilot may still have been so. 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 - missed radio calls, inability to react in a timely fashion to the higher wind conditions - suggest fatigue.

2.1.2 Experience

The pilot had recently returned to the glider program after a lengthy absence. He had been appropriately re-qualified on the glider in the spring of 1998. Even though he had a relatively large number of hours on the glider, he lacked recent experience in the wide variety of conditions experienced during gliding operations. This lack of recent familiarity created an increased mental workload and led the pilot to focus primarily on basic aircraft handling. It also meant that he likely had fewer recent experiences with unusual conditions, such as high winds. These factors lead the pilot to fly "by formula" in these high wind conditions and use his normal ground reference points to fly the circuit. The high tailwind on the downwind leg also reduced his time available and further increased his mental workload. The Launch Control Officer radioed the pilot on the downwind leg to advise him of his apparent high ground speed but the pilot did not acknowledge the call or even remember hearing it. This can be an indication of task saturation. It is believed that the strong upper winds at the time of the accident were challenging for this inexperienced pilot.

The pilot failed to recognize that the wind had increased in intensity since the last flight he had just completed seven minutes earlier. It was only once he turned onto the final leg of his approach that he realized he was not penetrating into the strong headwind he now faced. The cues that indicated the change (faster ground speed on downwind, indicative of a strong tailwind, and more crab required on base, indicative of a stronger crosswind) were not recognized until the readily apparent undershooting of the approach path on final cued the pilot to take corrective action. At this point his options were limited by the lack of suitable off-field landing sites available to him.

Because of the combined effects of fatigue and lack of recent experience, it is believed that the pilot was unlikely to correct in a timely fashion for the high upper winds encountered. The adrenaline rush that undoubtedly occurred shortly after the pilot realised he was not going to reach the landing area likely overcame any symptoms of fatigue and allowed him to make the proper decisions to minimise injuries.

2.2 Gliding Site Supervision and Management

A Zone Commander, who has overall responsibility for the operation of the gliding program, is appointed by Central Region Headquarters to run the Arctic Watershed Gliding Centre. On the day of the accident the site was being run by an On Site Supervisor, a senior person who had overall command of the day's activity including briefings, assigning personnel to various activities and co-ordinating the non-flying aspects of the operation. An LCO was responsible for the close monitoring and authorization of each individual flight.

The pilot involved in the accident had acted as LCO and Winch operator during the morning. He had not received the LCO Qualification Course as detailed in the Air Cadet Gliding Program Manual (Annex C Ref C). He was however undergoing training to be qualified as a Winch operator.

Although the pilot involved in this accident was an adult Civilian Instructor with a reasonable number of hours in his logbook, his recent experience level should have mandated closer supervision especially in the challenging conditions of that day. A glider pilot flying in the ACGP with a similar number of hours and flights would typically be an 18 year old pilot licensed for about two years and working to upgrade his skills to qualify as an instructor at summer camp. The level of supervision accorded to a pilot with such experience would normally be stricter than what was accorded to the pilot involved in this accident. This is supported by the fact that he was re-qualified for winch launch on 12 Sep 99 after only one check flight. He had not flown a winch launch since the end of the Fall Famil Program the previous year, 322 days previously, and had not flown at all since the end of the Spring Famil Program, 84 days previously (Iroquois Falls uses a tow aircraft for the Spring Program and a winch for the Fall Program). His recent experience in high winds was not ascertained and he admitted to not being comfortable in similar conditions.

2.3 Glider Restraint System

Both harnesses were sent to DCIEM in Toronto for analysis (Annex C Ref E). They showed signs of extensive use and stretching. The buckles showed signs of corrosion. The rear harness was the weakest and showed some signs of breakage with a load of less than 1000 PSI. It finally broke in two at 1650 PSI. Such failure does not meet current CF standard which requires no signs of breakage below 1000 PSI (Annex C Ref E). Although this standard does not apply to restraints in civilian aircraft, it certainly reflects the benchmark one would expect to apply to aircraft used by the CF. Fortunately, this crew was only subjected to lateral forces as the glider slid sideways along the tree. Had the occupants been subjected to forces that would otherwise have been survivable, it is possible that the rear harness would have failed and might have contributed to more serious injuries.

2.4 Winch

The winch in use at Iroquois Falls is of a unique design. Being self-propelled, its engine is kept running constantly except during rest and meal periods. This fact defies the rule on rotating beacons as described in the A-CR-CCP-242, which is that the rotating beacon must be illuminated any time the ignition is on thereby warning personnel on the site that a glider launch is about to take place. If this winch were equipped with a rotating beacon in accordance with regulations, its constant operation would desensitize personnel to the dangers for which it was designed for. Alternative means of visually indicating that a launch is about to take place should be developed, at this site, which recognizes the unique design and operation of this winch. A-CR-CCP-242 must be amended to mandate a visual warning system that considers the launch status and not the engine status.

2.5 Emergency response

All aspects of the site's emergency response plan were handled adequately. Unfortunately, this plan, and most other region's plans, does not include any direction as to the notification of the parents of cadets flying as passengers after an accident. As these Famil sessions are being conducted with very young passengers, it is understandable that some parents might become very upset if not notified immediately of their child's involvement in an air accident. Follow up medical care for personnel involved in accidents should be mandated and supported financially by the Regional Cadet Headquarters should it become necessary. Regional Cadet Headquarters is more knowledgeable and experienced in the insurance aspects of accidents and will be in a better position to handle these requirements than the local Gliding site supervisors.

3. CONCLUSIONS

3.1 Findings

3.1.1 The pilot was properly licensed, certified and authorized to carry out the mission as assigned.

3.1.2 The pilot had slept 4.75 hours on each of the two preceding nights due to civilian employment and had only consumed an Instant Breakfast 5 hours before the accident.

3.1.3 The pilot was fatigued on the morning of the accident. This fatigue, combined with his lack of recent experience in high wind conditions, affected his judgement and led to task saturation.

3.1.4 Neither the Central Region Flying Orders nor the Air Cadet Gliding Program Manual, in effect at the time of the accident, included provisions to account for civilian employment in the length of the duty day.

3.1.5 Due to a combination of fatigue, task saturation and relative inexperience, the pilot failed to notice the change in wind conditions and alter his circuit accordingly.

3.1.6 The pilot had acted as LCO during some of the morning prior to the accident notwithstanding that he had not completed the training specified in the Air Cadet Gliding Program Manual required to carry out this responsibility.

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

3.1.8 The harnesses of this glider were degraded to the point that even with survivable impact forces, it might have failed.

3.1.9 The ground winds at the site were within prescribed limits for glider and winch operations

3.1.10 There may be a claim against the crown since some trees had to be cut at the site in order to remove the glider.

3.1.11 The Emergency Response Plan in use at the Arctic Watershed Gliding Centre did not contain provisions for the notification of the parents of cadets involved in accidents.

3.1.12 The direction in A-CR-CCP-242 ACGP Manual regarding the use of the amber light on the winch does not mandate a visual warning system that consider the launch status.

3.2 Causes and Contributing factors

3.2.1 Causes

The pilot failed to properly assess the wind aloft and to alter his circuit accordingly.

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

3.2.2 Contributing factors

The weather was a contributing factor in this occurrence. Even if the ground winds were within the limits of the glider, the presence of much stronger winds at altitude severely challenged the capabilities and the experience of this pilot.

4. SAFETY MEASURES

4.1 Safety Measures Taken

4.1.1 The Zone Commander was advised to monitor the duty/rest cycles of personnel employed at his site, as other site personnel are also subject to shift work schedules that may negatively impact on their performance during flying operations.

4.1.2 The Central Region Flying Orders now include limitations for duty day and crew rest. These limitations include both military and civilian work times in the calculation of the duty day.

4.1.3 The Zone Commander reviewed the qualifications of all personnel at the Arctic Watershed Gliding Centre to ensure that only those qualified to act as LCO, carry out those duties.

4.1.4 All harnesses for all three Air Cadet fleets (gliders and tow aircraft) were replaced. The inspection checklists for the three fleets were amended to include a more thorough check of the harnesses. In addition, harness inspection criteria, source of spares and overhaul facilities have been discussion topics at Maintenance Review meetings for the last two years. Harness condition is now an item that is specifically checked during biannual audits of the maintenance facilities.

4.2 Further Safety Measures Required

4.2.1 The National Cadet Authority (NDHQ/VCDS/DCdts 4-2) should review the crew rest and crew day provisions in the Central Region Flying Orders with the view of extending them to all regions.

4.2.2 The direction contained in A-CR-CCP-242 with regards to the need for an amber light should be clarified for non-standard winches. Winches should be required to have a rotating beacon that will indicate that the operator has engaged the drum and is about to launch a glider.

4.2.3 The National and Regional Cadet authorities should review the qualifications required in order to become re-qualified as a glider pilot after lengthy absences from the ACGP as well as the experience level required to fly in challenging weather.

4.2.4 All Gliding Sites Emergency Response Plans should be reviewed by RCA Ops Os to ensure they include provisions for the immediate notification of the parents of children involved in an air accident. As well, Regional Cadet Headquarters should be assigned responsibility to follow up on the care of individuals involved in accidents.

4.3 DFS Comments

This accident involves Human Factors at several levels. The active failure was inadequate assessment of winds, but preconditions for this unsafe act existed. The pilot's lack of proper rest and nutrition as well as relatively low level and lack of recent experience impacted on his preparedness for the mission and on his ability to handle the high winds. As we are poor judges of our own deterioration in performance when fatigued, supervisors have significant responsibility for knowing the personal situation of those involved in their operation. In this case, supervision on three levels: the Zone Commander, the Site Supervisor and finally the LCO, were either unaware or failed to appreciate the implications of the pilot's limitations and allowed the flight to take place. Zone Commanders must be attuned to the lifestyle stresses faced by their staff, Site Supervisors must assess the condition of the personnel when they report for duty and LCOs must monitor the flying performance of the crews as they face the challenges of the day. Finally, the organisation must provide the first level of defences by providing clear regulation and guidance. In this case, the lack of crew rest and duty time regulation was a direct contributory factor. Although crews are charged with the responsibility to guard against accepting tasks when their performance is impeded by fatigue, Flying Orders that guide how much rest crews must have prior to reporting for flying duty will ensure that they are ready to safely participate in the Air Cadet Gliding Program.

Ron Harder
Colonel
Director of Flight Safety

Annex A: Photographs



Photo 1 Overview of Crash Site from Rear



Photo 2 Detail of Cockpit against Tree



Photo 3 Impact Damage - Left Wing



Photo 4 Impact Damage - Right Wing



Photo 5 Winch in Use at Iroquois Falls

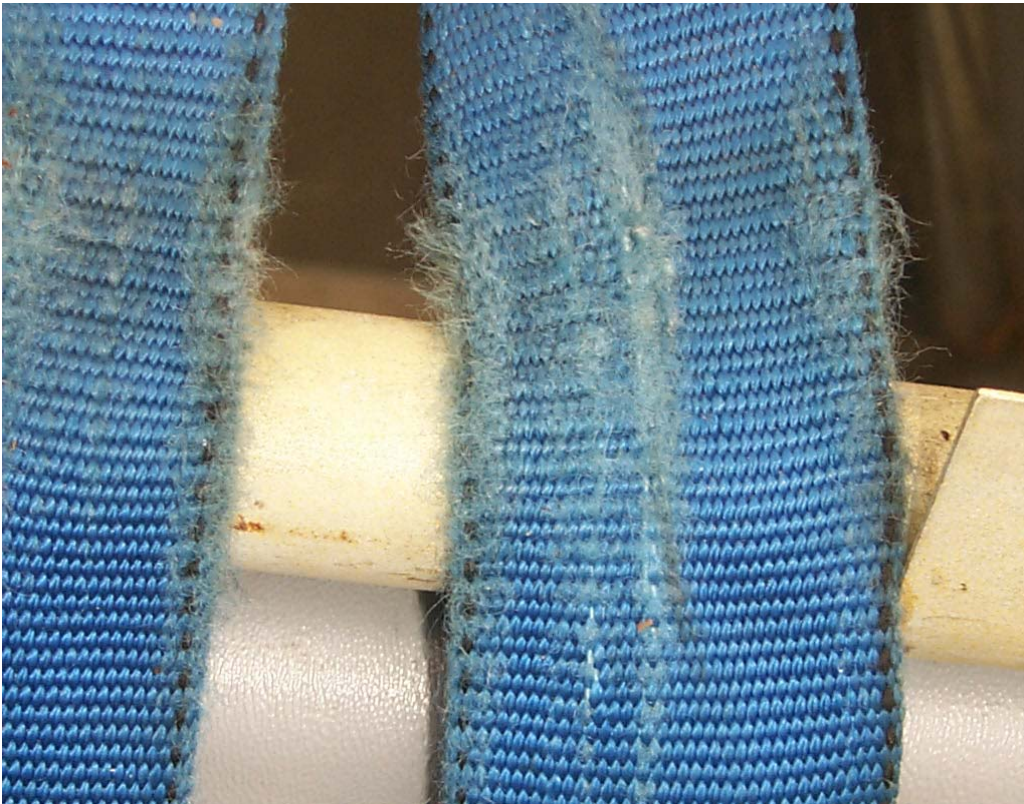
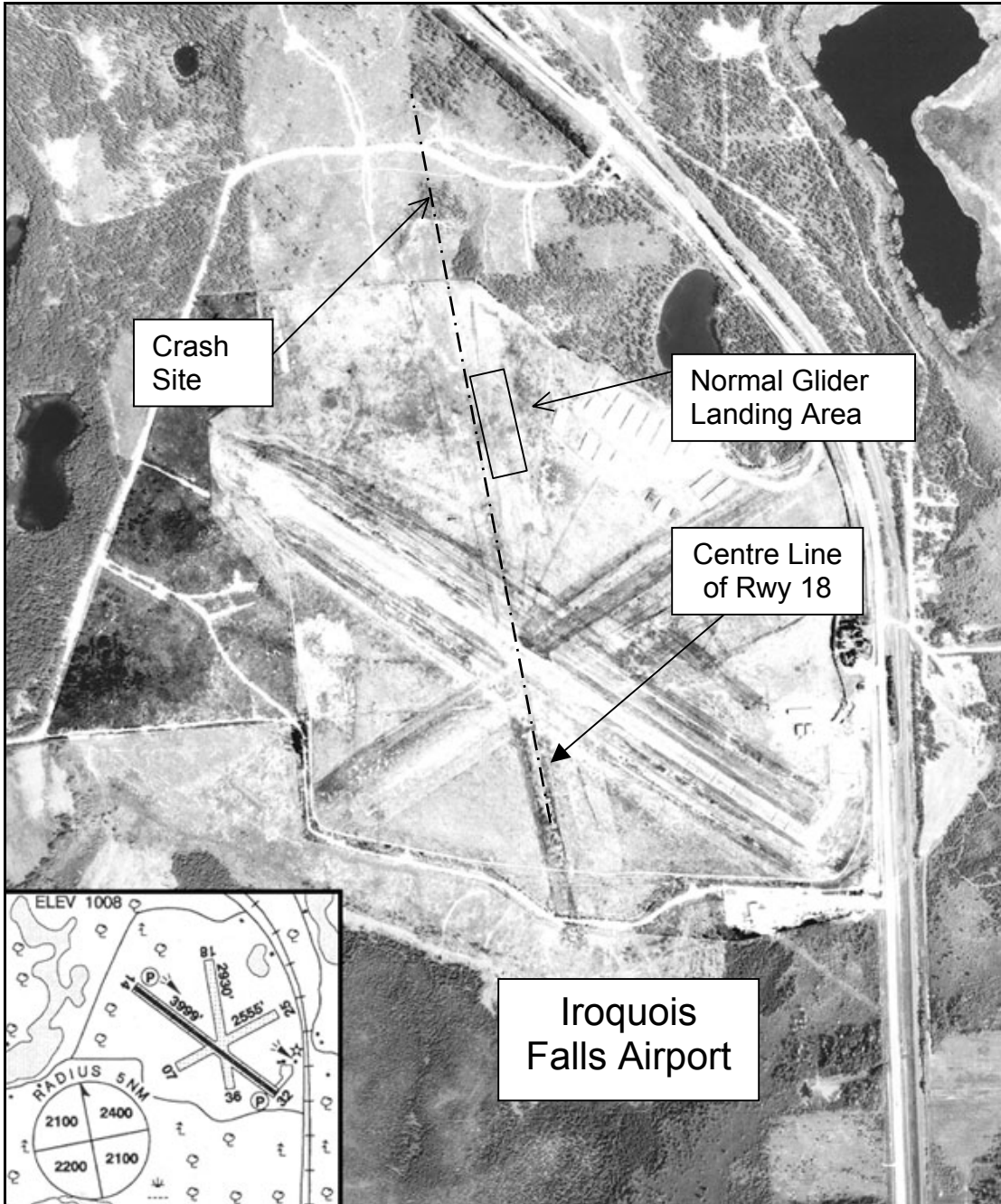


Photo 6 Frayed Shoulder Straps

Annex B: Maps and Charts



Annex C: References

- A. DCIEM Human Factors Analysis C-GCLG, 29 Sep 99, 1010- C-GCLG (HFI) dated 16 February 2000.
- B. DCIEM ALSE Analysis of Aircraft Accident C-GCLG Glider Iroquois Falls 26 Sept 99, 1010- C-GCLG (LSEG) dated 28 February 2000.
- C. Air Cadet Gliding Program Manual A-CR-CCP-242/PT-005 dated 1 Apr 99
- D. Central Region Flying Orders (No NDID Number) dated 1 Jan 97
- E. CFTO C-22-010-007/MF-000