CANADIAN FORCES
FLIGHT SAFETY INVESTIGATION (FSI) REPORT

FINAL REPORT

FILE NUMBER:	1010-CGBXK
DATE OF REPORT:	16 September 2002
AIRCRAFT TYPE:	B206 JET RANGER
DATE/TIME:	101812Z OCT 2001
LOCATION:	CFB EDMONTON
CATEGORY:	“A” CATEGORY ACCIDENT

SYNOPSIS

On 10 October 2001 a civilian registered Bell 206 Jet Ranger (C-GBXK), operated by 408 Squadron crashed while practicing an extended range autorotation. The aircraft initially touched down short of the prepared grass strip, slid 60 feet along the ground, became airborne again, rotated through 720 degrees and impacted the ground 200 feet from the point of initial ground contact. The pilots received minor injuries and the aircraft sustained “A” category damage.

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1 FACTUAL INFORMATION

1.1 GENERAL

On 10 Oct 01, aircraft C-GBXK, a Bell 206 (B206) helicopter contracted to DND by Canadian Helicopters and operated by 408 Tactical Helicopter Squadron (408 Sqn), crashed at CFB Edmonton while the pilots were practicing autorotations. The aircraft sustained “A” Category damage. Both the pilots received minor injuries. The civilian registered aircraft is used to train Reserve Force pilots to rotary-wing standard prior to their CH-146 conversion course.

1.2 History of the Flight

The flight was a proficiency trip for two squadron pilots. The Aircraft Commander (AC) was a Qualified Flying Instructor (QFI), and the co-pilot was a 408 Sqn Regular Force rotary-wing pilot awaiting the CH-146 conversion course. The aircraft departed the 408 Sqn ramp at approximately 1700Z. The flight began with a navigation route and culminated in a series of autorotations to a grass strip adjacent to an abandoned runway at CFB Edmonton. On the fifth and final autorotation, the QFI attempted a maximum range autorotation to the grass strip. The QFI, realizing that he would not reach the strip, attempted an overshoot, during which the aircraft impacted the ground. The aircraft slid along the ground for approximately 60 feet then became airborne again, rotated about its vertical axis through approximately 720 degrees, hit the ground a second time and then came to rest on its left-hand side. After the aircraft came to a complete stop, the pilots carried out the engine shutdown procedure and secured the aircraft. Both pilots were briefly trapped in the aircraft as one of the skids was resting on the right-side door, blocking its use. The pilots managed to force the door open and exited the aircraft. A small grass fire burning near the engine exhaust stack was extinguished by a member of the crew using a hand-held fire extinguisher.

1.3 Injuries to Personnel

	Crew
Fatalities	0
Major injury	0
Minor injury	2

1.4 Damage to Aircraft

The aircraft was damaged beyond economical repair. The aircraft’s tail boom was folded to the right and all but severed from the fuselage, except for a thin piece of the aircraft skin (Photo 3). The left side of the aft cross tube was pushed upwards into the fuselage, causing extensive structural damage to the aircraft’s internal framework. The left skid broke off and became wedged under the aircraft fuselage (Photo 5). The right skid came to rest over the right door, blocking the crew’s immediate evacuation of the aircraft. The main rotor blades separated from the rotor head and broke into four major pieces when they contacted the ground (Photo 2). The tail rotor drive shaft and cover was shattered into several pieces after the main rotor blades contacted the tail boom. The aircraft's tail rotor blades sustained only minor damage indicating they were not turning at the time of final impact. The transmission was partially separated from the airframe during the accident. During the recovery of the aircraft, the transmission was further separated from the airframe. The accident also caused damage to the windshield, exhaust stack, and fuel tank.

1.5 Personnel Information

	Instructor Pilot	Co-Pilot
Rank	Capt.	Capt
Currency	Current A2 Cat Instructor	Had flown 1.5 hours in the B206 in the past 90 days
Medical Category valid	Yes	Yes
Total flying time	3505	280
Flying hours on type	2350	102
Flying hours last 30 days	35	3
Flying hours last 48 hours	1.5	1.5
Flying hours on day of Occurrence	1.5	1.5

The co-pilot had successfully completed the prescribed syllabus for rotary-wing training on the CH139 Jet Ranger, 13 July 2001. He was subsequently posted to 408 Sqn, where he was carrying out On-Job-Training (OJT) prior to his CH146 Conversion Course. He had flown 1.5 hours on the B206 in the time between reaching wings standard and the day of the accident (90 days). The AC, a Qualified Flying Instructor (QFI), was posted to 408 Sqn in Aug 2001. He was sitting in the right seat and was the flying pilot at the time of the accident. His primary duty was to train Reserve Force pilots to rotary-wing standard prior to their CH146 conversion course.

1.6 Aircraft Information

The aircraft was fully serviceable prior to the occurrence. There were, however, minor discrepancies in the aircraft servicing set in that the daily inspection (DI) and journey log were not signed prior to the occurrence flight. The pilots did conduct the DI prior to the occurrence flight.

1.7 Meteorological Information

The weather observation made by the duty tower controller after the accident was:

1810Z BKN025 VIS 15NM TEMP 10/-3 WIND 200/10G16 ALT 29.66

1.8 Aid to Navigation

Not Applicable.

1.9 Communications

1.9.1 Alarm Bells

Alarm bells did not ring in all areas of the fire hall, nor did they ring at the Base Hospital. A known electrical fault had existed between the Tower and some alarm bells on the Base for a number of years. At the time of the accident the cause and rectification of this fault had not been found. The fire hall heard only a weak 'One Bell' from one of the three speakers located in the building.

1.9.2 Informing of Base Hospital

The Base Flight Surgeon was in a meeting at the time of the accident and was not immediately informed of the crash. There was no crash alarm heard in the base Hospital due to above-mentioned electrical fault; therefore, the Base Surgeon did not respond to the accident until 1600 hours, 3.5 hours after the crash.

1.9.3 408 Sqn

At the time of the accident, 408 Sqn Ops was not monitoring their operations frequency, VHF Channel One.

1.9.4 Communications with Civilian Hospital

The two pilots were transported to a nearby civilian hospital, where a non-Flight Surgeon civilian doctor examined them. The doctor had no instructions from the Base on what tests to conduct or what toxicology samples should be taken. The crew informed the civilian doctor that he should take urine samples, which he did. These samples were later transported by the accident crewmembers back to the Base and turned over to the Base Flight Surgeon.

1.10 Aerodrome/Alighting Area Information

The helicopter crashed on a prepared grass strip adjacent to an abandoned runway.

1.11 Flight Recorders

A Helicopter Performance Monitoring System (HPMS) was installed on the aircraft. Data was recovered from the HPMS that included specific parameter values and parameter exceedence alarms. The HPMS is designed to record the following parameters:

1. Date and Time	8.Flight time (air time)	15.Minimum Ng (Arriel Engine)
2. TOT	9.Bus Voltage	16.Auto Cycle Count
3. PT RPM (N2)	10.Max N1 (T53)	17.Pressure Altitude
4. N1 RPM	11.N1 excursions (T53)	18.Ng excursions (Arriel Engine)
5.Rotor RPM (NR)	12.Number of starts	
6.Torque	13.Number of flights	
7.OAT	14.Maximum Ng (Arriel Engine)	

The HPMS stores data in non-volatile (flash) memory. Data is recovered after every 100 hrs of flight time via a PC link to the maintenance computer. The sample interval is only once per minute and therefore was not useful in determining what transpired during the few seconds it took for the last events of the flight to unfold. The HPMS is a tool similar to the Data Acquisition Units used in Flight Operational Quality Assurance programs common in large commercial air carriers and is not designed to withstand crash or fire events.

1.12 Wreckage and Impact Information

The aircraft initially struck the ground while on a heading of approximately 210 degrees magnetic. It landed 100 feet short of the prepared grass surface, in tall weeds and grass. The aircraft slid along the ground for approximately 60 feet, and then became airborne again. The first pieces of tail rotor drive shaft were discovered scattered around the point where the aircraft became airborne. The aircraft rotated about its vertical axis through approximately 720 degrees while travelling forward on a heading of 215 degrees magnetic. While airborne the second time, the aircraft traveled forward approximately 200 feet, depositing various pieces of tail rotor drive shaft and tail rotor cover along the way. The aircraft contacted the ground a second time and came to rest on its left side, with the tail boom twisted to the right. Both the skids detached from the cross tubes, with the left skid lying under the fuselage, and the right skid resting over the right door. The main rotor blades came to rest approximately 15 feet forward of the fuselage. The tail boom remained attached to the fuselage by a thin piece of the aircraft skin. The tail rotor drive shaft and drive shaft cover were fragmented and dispersed between the end of the ground slide and the crash site, creating a debris field 300 feet by 300 feet.

1.13 Medical

The Base Hospital Emergency Response Plan calls for injured personnel to be transported to the local civilian hospital via civilian ambulance. This is accomplished through a 911 call (planned response time of 12-15 min). In order to reach the airfield the civilian ambulance must first cross a secure access gate that can only be opened by security or other authorized personnel. The ambulance was delayed from reaching the crash site by approximately five minutes while awaiting clearance from the Tower. The Flight Surgeon was also delayed access to the flight line by several minutes until authorized personnel could open the security gate. The Base Flight Surgeon took toxicological samples from both pilots after they returned to the Base (3 hours after the occurrence). The toxicology tests were negative.

1.14 Fire, Explosive Devices, and Munitions

The heat of the engine exhaust stack coming in contact with the ground caused a minor post-crash grass fire. The co-pilot, using a hand-held dry chemical extinguisher, extinguished the fire.

1.15 Survival Aspects

1.15.1 Crash Survivability

This was a survivable occurrence. Both sets of restraints held the pilots in position. During the crash there was no significant contact between the pilots' heads or limbs and the internal structures of the aircraft. Only after the aircraft came to a full stop on its side and the pilots released their harnesses was there significant pilot/airframe contact. The pilots were both wearing approved Aircrew Life Support Equipment (ALSE), including helmet, gloves, boots and flight suits. All ALSE equipment performed as designed with no failures. The co-pilot's seated height was in excess of the safe envelope. This required an odd head posture that affected the normal field of view. He was able to complete the Jet Ranger training in Southport using the modified seat (thinner seat cushion). The co-pilot's height restriction was documented in his medical file but the information was not passed to the Squadron. The accident aircraft was equipped with a thinner version of seat cushions, but this was not documented in the aircraft log set.

1.15.2 Emergency Transmitters

The control tower personnel did not detect an ELT signal from the accident aircraft, nor did the Canadian Mission Control Centre (CMCC) in Trenton. CMCC is a ground station for the SARSAT (Search and Rescue Satellite) program, and is equipped to detect all North American ELT transmissions on VHF 121.5 and UHF 243.0. Investigators could not positively determine if the ELT was in the ARMED position at the time of the accident. Following the accident, the ELT was purposely activated and its signal was clearly heard by the Tower personnel. The ELT was bench tested serviceable by QETE.

1.15.3 Search and Rescue

Not applicable.

1.16 Test and Research Activities

The main rotor blades, tail rotor drive shaft, ELT, and fuel and SOAP (spectrographic oil analysis program) samples were shipped to QETE for analysis.

1.17 Additional Information

For convenience of servicing the aircraft, a plastic container containing consumable POL (oil) and a civilian toolbox were stored in the baggage compartment of the occurrence aircraft.

2 ANALYSIS

2.1 General

The aircraft was serviceable at the time of impact and therefore the investigation focused on the crew and the human error chain that culminated in the accident.

2.2 The Crew

The aircraft captain (AC) was a Qualified Flying Instructor (QFI) recently posted to the squadron from the Rotary Wing Training School in Portage. He had extensive experience in conducting emergency procedures and practice autorotations to touchdown. The co-pilot (non-flying pilot) was a recent wings graduate of the Rotary Wing School in Portage who was awaiting a CH146 Conversion course. His experience in conducting emergency procedures on the Jet Ranger was limited to what he had been exposed to on his rotary wing course. Therefore, those flight sequences flown by the AC did not receive the benefit of in-flight 'peer' monitoring as would be the case for instructor mutual trips; the AC was essentially 'solo'.

2.3 Extended Range Autorotation

During an actual engine failure the ideal landing spot is rarely right in front of the aircraft. The 'Extended Range' autorotation is an emergency procedure designed to maximize the distance travelled during autorotative flight. Crews practice this manoeuvre for the express purpose of extending the gliding distance in order to reach a suitable landing area. The pilot will enter the manoeuvre by rolling the throttle to idle and lowering collective. The aircraft attitude is adjusted to achieve 69 knots and the collective set to maintain 90-107% Rotor RPM (RRPM). In practice, the collective is raised to reduce the RRPM as close as possible to the 90% end of the RRPM range, as this maximises the distance covered during the autorotation. Once the pilot judges that the landing spot will be made, the speed and RRPM are adjusted to meet the requirements of the 100 foot check: area made, RRPM in the green (90-107%), airspeed minimum 50 knots (60 kts desirable) and bank, drift and crab are eliminated. If any of these parameters is not met, an overshoot must be initiated. If the parameters of the 100 foot check are met, the pilot will flare the aircraft at 50-75 feet to reduce the rate of descent and forward speed and to build RRPM for the landing. When the flare is no longer effective (10-15 feet) the aircraft will be levelled and cushioned onto the ground using the remaining rotor energy (collective input). On touchdown, the RRPM has usually decayed to the point that further flight is not possible.

2.4 Overshoot Procedure

The normal descent rate for an autorotative glide in the Jet Ranger is 1500 feet per minute or 25 feet per second. The time from the '100 Foot Check' to touchdown is thus only 4 seconds. The purpose of the '100 Foot Check' cannot be overstated; it allows sufficient time and altitude to safely recover if the aircraft is not in a position to land. Under normal conditions you would initiate the overshoot from a 60 knot attitude with flat pitch on the collective (fully down). To overshoot, the throttle is slowly increased from idle to full (engine response and RRPM recover more quickly when starting from a flat pitch position) and collective is applied while monitoring the rise in torque and RRPM. Coincident with this, the nose attitude is adjusted to achieve a normal climb at 70 knots. A positive rate of climb should be established before the aircraft descends below 50 feet above any obstacles within 200 feet of track.

2.5 The Accident

The AC entered the autorotation as described in paragraph 2.3. Approaching 100 feet he was still carrying 69 knots of airspeed and the RRPM was still drooped for extended range (collective pitch applied). This would imply that the AC was unsure whether the landing area could be made as the manoeuvre requires the pilot to adjust speed and RRPM to the parameters of the 100 foot check once certain the landing area will be reached. At this point the area made parameter for a safe landing (100 foot check) was not met and he should have initiated an overshoot. The low rotor tone sounded (90% +/- 3%) shortly after his decision to continue the approach and coincident with this it became apparent that he would not make the landing area. He rolled the throttle to full power, left the collective raised as the ground was coming up quickly and nosed the aircraft over to gain speed for the overshoot. This change in aircraft attitude was not required as he was already in a '69 knot' accelerating attitude (slightly nose down), and this control input increased his closure rate with the ground. In addition, he never fully lowered the collective, so rotor pitch slowed the engine and RRPM recovery as the throttle was increased to full (due to increased drag on the rotor blades). This also resulted in an increased rate of descent. While pre-occupied with his airspeed and RRPM he descended through the altitude where an autorotative flare would normally be initiated. Had he flared the aircraft he would likely have landed short of the prepared touchdown area (acceptably flat/smooth terrain), but he would have reduced his rate of descent and forward speed to within manageable parameters. Because the AC did not properly execute either the overshoot or the autorotative flare and landing, the aircraft touched down firmly with at least 69 knots of forward speed. The collective had been raised to cushion the impending ground contact and during the ground slide this resulted in the main rotor creating sufficient lift to bring the aircraft off the ground again once the engine finished spooling up. At this point the rotor RPM was likely below the green arc making the rotor disc very unstable (sloppy). The AC applied aft cyclic to check his forward speed and that input along with the reduced rotor RPM was sufficient to cause the main rotor blades to contact the tail boom severing the tail rotor drive shaft. The loss of tail rotor thrust in turn caused the helicopter to spin in the opposite direction to the main rotor thrust (two complete revolutions, 720 degrees). At this point the AC rolled off the throttle in an attempt to negate the torque of the main rotor. The rotor was unable to produce sufficient lift for the aircraft to remain airborne and the helicopter impacted the ground a second time.

2.6 Tail boom Strike

The investigative team considered the possibility that the tail boom strike occurred as a result of excessive blade flexing during the initial impact with the ground. Had this been the case, there would have been wreckage of the tail rotor drive shaft and cover scattered along the area to the right of the initial touchdown point. Since this wreckage was only found at the point where the aircraft became airborne for the second time, it is likely that the blade strike was induced by cyclic control input.

2.7 Latent Error

The AC had just completed a tour of instruction at the Rotary Wing Training School. During his time in Portage he would have flown countless autorotative approaches and was likely confident in his ability to overshoot from anywhere in the sequence. This confidence probably contributed to a late decision to overshoot and set up a chain of events that resulted in the loss of the aircraft.

2.8 Active Error

The AC elected to continue the approach despite the fact that the parameters of the ‘100 Foot Check’ were not met. When it became apparent that the landing could not be salvaged, he initiated the overshoot at a time when he would normally be commencing the flare. Consequently, the helicopter arrived at the ground with excessive speed and rate of descent. The AC said that, once on the ground, he was concerned with the run-on speed of the landing and as the aircraft came off the ground or just prior, he made an aft cyclic input to check the forward speed. This resulted in the rotor blade strike to the tail boom. Had the cyclic remained neutral, there would have been no tail boom strike, the RRPM would have recovered and the aircraft could have been landed safely or with much less damage.

2.9 Base Response

2.9.1 Alarm system deficiencies

At the time of the accident, 408 Sqn was in the process of moving into a new hangar and repairs to the crash alarm system were held off until they moved into the new hangar. The repairs have since been completed, and the system is fully serviceable in the Fire Hall, Sqn hangar, Base hospital and Base ops.

2.9.2 Ramp Access

There is a requirement for ramp access to be controlled due to the open nature of CFB Edmonton. Following notification by the base, the civilian ambulance reported to the access gate beside the fire hall. Entry to the airfield was delayed while they awaited clearance from the Tower to proceed onto the airfield. The military surgeon and ambulance experienced the same access problems. The doctor was forced to abandon the vehicle and gain access to the airfield side by going through one of the buildings connected to the ramp. Considering the life threatening impact of any delay in emergency medical support in the case of such an accident, CFB Edmonton and 408 Sqn need to amend the crash orders to ensure a speedy medical response to an aircraft accident. Once the construction of the ramp area is complete, the access gate will be within the tower's field of view. Consideration should be given to providing the tower with a remote gate control.

2.9.3 Medical Response

Due to a lack of sufficient resources, the base has been unable to commit to crash response from a medical standpoint. This is the reason the base must utilise 911 for emergency medical services. The fire hall personnel in Edmonton Garrison are qualified Emergency Medical Responders (EMR). This is a higher qualification than the base ambulance Medical Assistants and was one of the considerations when the base reduced its emergency medical capabilities. At the time of the accident, the Garrison response plan called for the fire hall personnel to make an on-scene determination if ambulance support is required. This does not compromise the provision of initial medical treatment as they are EMR trained and equipped, however, postponing the 911 call until the fire hall personnel have arrived on scene seems like an unnecessary delay in medical transport should the crew require advanced medical support. The following is a brief summary of the response times as passed by fire hall personnel:

1815Z – one bell initiated by tower
1818Z – fire trucks on scene
1822Z – fire hall dispatch calls the MPs to request ambulance (via 911)
1837Z – civilian ambulance on site (15 min response, but 22 min since impact)

The fire hall in fact placed the local ambulance service on standby at the time that the fire trucks were dispatched, but did not officially request them until 7 minutes after the ‘one bell’. Had the pilots sustained serious injury this delay may have proved decisive. Consideration should be given to amending the Base Crash Response Plan whereby the 911 call for the ambulance is made at the initiation of the ‘one bell’ emergency.

2.9.4 Toxicology Testing

The local hospital did not take toxicology samples from the crew following the accident. The base Flight Surgeon needs to liaise with the local hospital(s) to establish formal Standard Operating Procedures for DND medical response requirements (i.e. toxicology testing).

2.10 Co-Pilot Height Restriction

An anthropometric study of the Jet Ranger helicopter was conducted in 2000 due to an increase in the number of Rotary Wing candidates deemed too large to fly the Jet Ranger. As a result of this study, 1 CAD contracted to have some of the Jet Ranger right seats at 3 CFFTS (Canadian Forces Flight Training School) modified such that they provide greater headroom (thinner seat cushion). The co-pilot (CP) was one of the students that exceeded the seated height limitation and there is a letter in his CF 2034 (Medical File) that says he was unsuitable for training in the Jet Ranger (6681-13 (A1 ASCS), 14 Jun 00). However, the CP was able to complete the Jet Ranger training in Southport due to the introduction of the modified seat previously mentioned. One of the witnesses indicated that, on occasion, tall students have flown in an unmodified left seat during student mutual trips at 3 CFFTS. 408 Squadron was never notified of the CP’s restriction, and therefore did not consider the issue at all. The CP was aware, but said nothing because of the exceptions previously mentioned. According to the medical staff at 1 CAD, the member’s medical file would only be reviewed during a medical and as this restriction was considered operational and not medical, it might not catch the attention of the flight surgeon. Operational restrictions need to be carefully staffed to ensure all parties are aware of personnel limitations. Although the leased Jet Ranger in Edmonton did have low profile seats, this was more by chance than design. The leased aircraft just happened to be equipped with the older, thinner cushions, which in newer Jet Rangers have been replaced with thicker seat pads. Consideration should be given to providing modified seats to all the units that operate the Jet Ranger. 3 CFFTS should ensure that the seat limitations are applied to both seats in the Jet Ranger if required.

2.11 Additional Information

There is no requirement to keep POL products and a civilian toolbox in the storage compartment of a helicopter that is primarily restricted to local operations (para 1.17 refers). The ELT did not sound during the impact sequence. The component tested serviceable when examined at QETE. Since impact forces should have been sufficient to activate the ELT, it is likely that the ELT had not been set to the ‘Arm’ position prior to the flight.

3 CONCLUSIONS

3.1 Findings

3.1.1 The aircraft was serviceable at the time of the accident.

3.1.2 Weather was not a contributory factor.

3.1.3 The aircraft captain (AC) was a current instructor qualified on type.

3.1.4 The co-pilot was a recent wings graduate awaiting CH146 conversion.

3.1.5 The crew was conducting a proficiency flight.

The AC was sitting in the right seat and was the flying pilot at the time of the accident.

The aircraft struck the ground during a delayed overshoot from a practice autorotation. A flare to reduce groundspeed and build rotor RPM was not attempted due to the overshoot attempt.

3.1.6 Subsequent to the initial ground contact, the AC made control inputs that caused the tail boom strike and loss of tail rotor effectiveness, which in turn resulted in an inability to control the aircraft once it became airborne again.

3.1.7 A known fault in the electrical system between the tower and the base prevented the crash bell from sounding in the hospital and some areas of the fire hall.

The 911 call was delayed until the fire hall personnel had arrived on scene.

3.1.8 Ambulance response was delayed while awaiting clearance to proceed onto the airfield.

3.1.9 Lack of clear instruction to the civilian hospital delayed the taking of aircrew toxicology samples.

The squadron was unaware of the co-pilot's medical height restriction.

3.1.10 Tall students have flown in an unmodified left seat during student mutual trips at 3 CFFTS.

3.1.11 POL products and a civilian toolbox were stored in the luggage compartment of the aircraft.

3.1.12 The ELT did not activate on impact.

3.2 Causes

The AC did not initiate an overshoot when the parameters of the '100 Foot Check' were not met.

The AC did not successfully execute either the overshoot or the autorotative landing and following initial contact with the ground he made control inputs that caused the tail boom strike and loss of tail rotor effectiveness, which in turn resulted in an inability to control the aircraft once it became airborne again.

4 SAFETY ACTION

4.1 Safety Action Taken

4.1.1 The practice of storing POL and uncontrolled tools in the B206 Jet Ranger has been discontinued.

4.1.2 The circuitry for the crash alarm warning bells has been repaired.

4.1.3 The Aircraft Captain discussed the accident with the unit Commanding Officer and underwent a standards review ride with an instructor from 400 Sqn, Borden.

4.1.4 CFB Edmonton has revised emergency response plans and SOPs to ensure that there is always a Med A or Flight Surgeon available to liaise directly with the receiving hospital to initiate the toxicology testing with the attending physician.

4.1.5 The 408 Sqn Crash Response Plan has been revised at Chapter 1 Section 11 (f) to appoint an assembly area marshaller to meet responding agencies in order to facilitate immediate access to the flight line.

4.1.6 The CFB/ASU Edmonton Emergency Response Plan and Fire Hall SOGs have been amended to ensure the ambulance is called on the ‘one bell’ emergency.

4.2 Safety Action Recommended

It is recommended that:

A system of tracking anthropometric restrictions be developed to ensure that aircrew limitations are identified to all concerned parties.

The availability and use of the modified Jet Ranger seat in the CF be standardised and that personnel requiring the seat are identified to all concerned parties.

4.3 DFS Comments

This was a preventable accident. Pilots tread a fine line between success and failure when practicing autorotations to touchdown, but rigid adherence to meeting the parameters of the '100 foot' check will tip the balance significantly in their favour. Because it is not "hard" information, no finding or statement of cause mentions the pilot's overconfidence, but it is clear that he was too experienced and capable to make a mistake like this unless overconfidence (or complacency) was a factor. Also potentially present was a desire to demonstrate superior ability by taking a difficult manoeuvre beyond the point where it would have been terminated had nobody been watching. These are difficult predispositions, or what we would call using the Human Factors Analysis and Classification System, "preconditions", to predict, detect, or measure, but that's exactly what we need to do to prevent accidents like this one. We have to look for them as supervisors, and we have to look for them in ourselves. I will be including these thoughts in the discussion of this accident in next year's annual DFS briefing.

The medical response delay for this accident is worrisome. Had the crew suffered serious injury, the time delay for the arrival of emergency medical personnel could have been critical in their recovery. Reductions in medical personnel have impacted our capability to provide basic emergency response. It is therefore of paramount importance that we structure our response plans to ensure our meagre resources are employed to their maximum effectiveness.

R.E.K. Harder
Colonel
Director of Flight Safety