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825-A09A0016-D2-A1

30 October 2009

Fred Jones  
President and CEO  
Helicopter Association of Canada  
430 - 55 Metcalfe Street  
Ottawa Ontario  
K1P 6L5

*NOV - 9 2009*

**Re: AVIATION SAFETY ADVISORY A09A0016-D2-A1**  
**Low Usage of Head Protection by Helicopter Pilots**

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Dear Mr. Jones,

On 12 March 2009, a Sikorsky S-92A, registered C-GZCH and operated by Cougar Helicopters, with 16 passengers and 2 flight crew, was en route from St. John's Newfoundland and Labrador, to the Hibernia oil production platform when, 20 minutes after departure from St. John's, the flight crew noticed an indication of low oil pressure to the main gearbox. The crew declared an emergency and diverted the flight back to St. John's. Approximately 30 nm from St. John's, the helicopter impacted the water and sank in 178 meters of water. There was one survivor and 17 fatalities. Although not fatally injured during the impact sequence, both pilots received severe injuries due in part to striking their heads/faces against the instrument panel. Neither pilot on the occurrence flight was wearing head protection<sup>1</sup>. The TSB investigation into this occurrence (A09A0016) is ongoing.

While the Canadian Aviation Regulations do not require that helicopter pilots wear head protection, approximately 10% of the Cougar Helicopter pilots were routinely wearing head protection at the time of the occurrence. Whether or not this percentage represents an industry-wide norm for head protection usage is unknown. However, the majority of pilots surveyed during the A09A0016 investigation cited discomfort as the reason they did not wear head protection. In addition, very few pilots had fully considered that partial incapacitation due to a head or face injury could compromise their ability to help their passengers after an accident. On 8 May 2009, Cougar Helicopters Inc. implemented a cost sharing program aimed at increasing the use of head protection. Management agreed to cover a portion of the cost for any pilot wishing to purchase a prescribed make and model of head protection. The operator stated that approximately 50% of their pilots have participated thus far and they anticipate 75% participation.

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<sup>1</sup> TSB defines head protection as the use of an approved helmet, complete with visor.

According to US military research <sup>2</sup>, the risk of fatal head injuries can be as high as six times greater for helicopter occupants not wearing head protection. In addition, the second most frequently injured body region in survivable crashes is the head <sup>3</sup>. The effects of non-fatal head injuries range from momentary confusion and inability to concentrate, to a full loss of consciousness <sup>4</sup> and these outcomes can effectively incapacitate pilots. Incapacitation can compromise a pilot's ability to quickly escape from a helicopter and assist passengers in an emergency evacuation.

The National Transportation Safety Board (NTSB) has acknowledged that the use of head protection can reduce the risk of injury and death. A review of 59 emergency medical services accidents that occurred between 11 May 1978 and 3 December 1986 was completed in 1988. This review resulted in recommendations to the Federal Aviation Administration (# A-88-009) and to the American Society of Hospital Based Emergency Aeromedical Services (# A-88-014) to require and encourage, respectively, that crew members and medical personnel wear protective helmets to reduce the chance of injury and death.

Transport Canada (TC) also acknowledged the safety benefits of head protection use in its 1998 Safety of Air Taxi Operations Task Force (SATOPS) <sup>5</sup> report in which it committed to implementing the following recommendation:

- Recommend Transport Canada continue to promote in the Aviation Safety Vortex newsletter the safety benefits of helicopter pilots wearing helmets, especially in aerial work operations, and promote flight training units to encourage student pilots to wear helmets.

In addition, SATOPS directed the following recommendation to air operators:

- Recommend that helicopter air operators, especially aerial work operators, encourage their pilots to wear helmets, that commercial helicopter pilots wear helmets and that flight training units encourage student helicopter pilots to wear helmets.

The TSB has documented a number of occurrences where the use of head protection likely would have reduced or prevented the injuries sustained by the pilot. Extracts from these TSB occurrence files are contained in Appendix A. Conversely, the TSB has documented occurrences in which the use of head protection reduced or prevented injuries sustained by the pilot. Extracts from these TSB occurrence files are contained in Appendix B.

Despite their well-documented safety benefits, the majority of helicopter pilots continue to fly without head protection. Likewise, most Canadian helicopter operators do not actively promote head protection use amongst their pilots. The low frequency of head protection use within the helicopter industry is perplexing given the nature of helicopter flying and the known benefits of head protection.

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<sup>2</sup> Crowley, J.S. (1991) Should Helicopter Frequent Flyers Wear Head Protection? A Study of Helmet Effectiveness. *Journal of Occupational and Environmental Medicine*, 33(7), 766-769.

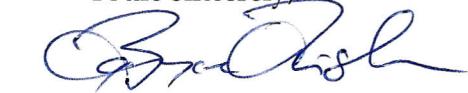
<sup>3</sup> Shanahan, D., Shanahan, M. (1989) Injury in U.S. Army Helicopter Crashes October 1979 – September 1985. *The Journal of Trauma*, 29(4), 415-423.

<sup>4</sup> Retrieved 31Aug09 from <http://www.braininjury.com/injured.html>.

<sup>5</sup> Transport Canada publication TP 13158.

As shown in this occurrence, without ongoing and accurate communication of the benefits of head protection usage, helicopter pilots will continue to operate without head protection, increasing the risk of head injury to the pilot and consequent inability to provide necessary assistance to crew or passengers. Therefore, Transport Canada and the Helicopter Association of Canada (HAC) may wish to consider creating an advocacy program designed to substantially increase head protection use amongst helicopter pilots. Such a program could include, but is not limited to, initiatives that: ensure helicopter pilot training curricula highlight head protection use, promote the advantages of cost sharing programs between operators and pilots, and encourage informed debate by publishing articles that promote head protection use in publications such as the Transport Canada Aviation Safety Letter and HAC newsletters.

Yours sincerely,



*for* Mark Clitsome  
Director, Air Investigations Branch

cc: Mr. Martin Eley, Director General Civil Aviation, Transport Canada  
Ms. Nicole Girard, Director, Policy and Regulatory Services, Transport Canada  
Mr. Thomas Haueter, Director Office of Aviation Safety, NTSB  
Mr. David King, Chief Inspector of Air Accidents, AAIB  
Mr. Rick Burt, VP Offshore Oil and Gas, Cougar Helicopters Inc.

## Appendix A – TSB Occurrences - Head Protection Not Used

Occurrence Number	Finding or Relevant Excerpt(s)
A98W0086	The pilot was not wearing a helmet, nor was he using the available shoulder harness. His facial injuries were the result of his striking the instrument glare shield during the impact sequence.
A95A0040	The pilot was not wearing his helmet during the flight. Although the pilot also suffered some head injuries, these head injuries were determined to be relatively minor.
A94W0147	Finding: A protective flight helmet likely would have prevented the pilot's head injuries.
A94Q0101	Because he was not wearing a helmet, the pilot suffered a concussion resulting in memory loss.
A93Q0237	Finding: If the occupants had been wearing helmets, their head injuries likely would have been less severe.
A91W0046	The pilot, who was not wearing a helmet nor the installed shoulder harness, suffered head and shoulder injuries.
A87P0089	Finding: The captain received minor head injuries which may have been prevented had he worn a helmet.
A87P0025	Had the pilot been wearing a helmet, some of the injuries to his head may have been prevented.
A87P0023	...the pilot sustained minor facial injuries. He was not wearing a safety helmet at the time of the accident.
A86C0060	Had the pilot been wearing a helmet, it is possible that his injuries would not have been fatal.
A85P0011	Finding: The availability and wearing of a shoulder harness and a helmet would have prevented the injury.

## Appendix B – TSB Occurrences - Head Protection Used

Occurrence Number	Finding or Relevant Excerpt(s)
A07P0209	Finding: The pilot's flight helmet prevented life-threatening head injuries during the collision with terrain; many Canadian helicopter operators encourage their pilots to wear helmets in most operational environments.
A07W0150	The helmet and visor likely reduced his level of injury.
A05P0103	Finding: The pilot's helmet protected his head from severe injury, allowing him to extricate himself from the sunken wreckage.
A05A0155	...the risk of head injury was mitigated somewhat for the pilots because they wear helmets as required by the OM...
A02P0320	Their helmets sustained damage from multiple strikes with the cockpit interior during the oscillations on the ground that likely would have caused serious injuries to an unprotected head.
A02O0105	Finding: The pilot not wearing a helmet received minor cuts to the face whereas the pilot wearing a helmet had no cuts.
A99C0127	The pilot, who was wearing his helmet, suffered a blow to the head during the occurrence and experienced some soreness in his neck afterwards.
A97P0044	The pilot's head injuries would have been more severe, and likely fatal, had he not been wearing a helmet.
A96W0185	Finding: The pilot's helmet was effective in reducing head injury.
A92P0109	The pilot reported that his helmet prevented head injuries in this occurrence.
A88A0287	Finding: The pilot prevented a serious head injury by wearing a helmet.
A87P0093	Finding: The pilot was wearing a shoulder harness and safety helmet and escaped unhurt.
A87C0031	Finding: The pilot was wearing a protective helmet and shoulder harness which probably prevented serious injuries.
A85P0033	Finding: The pilot received only minor injuries in a serious accident because he was wearing a shoulder harness and helmet.



## TYPES OF TSB SAFETY COMMUNICATIONS

### GENERAL

The purpose of a safety communication is to ensure that identified risks are communicated to those persons or organizations best able to effect change to convince them to take remedial action.

### SAFETY INFORMATION LETTERS

Safety information letters are generally concerned with safety deficiencies posing relatively low risks, and are used to inform regulatory or industry stakeholders of unsafe conditions that do not require immediate remedial action. Safety information letters are used to pass information for the purposes of safety promotion or to support or clarify issues that are being examined by a stakeholder.

### SAFETY ADVISORY LETTERS

Safety advisory letters are concerned with safety deficiencies that pose low to medium risks, and used to inform regulatory or industry stakeholders of unsafe conditions. A safety advisory letter suggests remedial action to reduce risks to safety.

### SAFETY CONCERNs

Safety concerns focus on an identified unsafe condition for which there is insufficient evidence to validate a systemic safety deficiency. However, the risks posed by this unsafe condition warrant highlighting. A safety concern provides a marker to the industry and the regulator that the Board has insufficient information to warrant further recommendations at this time; however, as more data and analysis become available, the Board will return to this unsafe condition if it is not readily redressed.

### SAFETY RECOMMENDATIONS

The *Canadian Transportation Accident Investigation and Safety Board Act* (CTAISB Act) makes specific provision for the Board to make recommendations to correct identified safety deficiencies. Recommendations are used to address those systemic safety deficiencies posing the highest risks to the transportation system and, therefore, warranting the highest levels of regulatory and corporate attention.

### RESPONSES TO TSB SAFETY COMMUNICATIONS

The CTAISB Act requires that federal ministers provide formal responses as to actions taken or planned in response to TSB recommendations. The Act does not mandate responses by other stakeholders to whom Board recommendations are issued. Notwithstanding, these stakeholders are requested to provide a response, and normally do so.

Although responses to other forms of safety communications are not requested or expected, the TSB often receives responses to safety advisory and safety information letters, and the substance of these responses are reflected in the Board's investigation report.