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FACE AK-94-50

TO: **Ted Petit, NIOSH, Division of Safety Research**

FROM: **Gary Bledsoe, Manager**
Occupational Injury Prevention Program

SUBJECT: **Logging Equipment Manager Dies in Helicopter Tail Rotor Strike -- Alaska**

SUMMARY

On November 20, 1994, a 43-year-old, male equipment manager (victim) died as a result of walking into the rotating tail rotor of a helicopter at a snow-covered, isolated landing pad, which was serving a logging camp (see Figures 1 and 2). The equipment manager was in the process of moving from the helicopter to his parked truck to pick-up his personal gear. He had just talked to the pilot about getting a ride to a nearby community. After the pilot told him he would be leaving in about ten minutes, the victim began to walk back along the starboard side of the helicopter boom. He then crossed underneath the boom and walked directly into the tail rotor located on the port side of the boom. The pilot heard a noise and saw the victim lying on the ground. CPR was performed on the victim for approximately 25 minutes. He was then declared dead at the scene.

Based on the findings of the epidemiological investigation, to prevent similar occurrences policy makers, regulators, and employers should:

- conduct a comprehensive review of safety practices related to aviation support activities at remote logging camps. The regulations, policies, and practices regarding “hot refueling” of rotary aircraft at remote sites should also be reviewed.

In addition, based on the findings of the epidemiological investigation, to prevent similar occurrences employers should:

- ensure that, when possible, paths for passengers to and from an aircraft landing pad at a work site are clearly marked with colored flags, cones, or ropes. Safety information should be posted at all sites routinely used as landing pads.

- ensure that all workers, who may be in the vicinity of aircraft, receive appropriate training (on a regular basis) related to ingress and egress safety, and other aspects of aviation safety related to ground operations.

INTRODUCTION

At 1:15 PM on November 20, 1994, a 43-year-old male equipment manager at a logging camp died after walking into the active tail rotor of a Bell Jet Ranger 206B helicopter. The victim suffered massive head injuries and was declared dead at the scene. The Alaska Division of Public Health, Section of Epidemiology was notified via the FAX notification by the Regional Operations Center of the Federal Aviation Administration on November 20, 1994. An investigation involving an Injury Prevention Specialist from the Alaska Department of Health and Social Services, Division of Public Health, Section of Epidemiology ensued on December 1, 1994. Also participating in the investigation was an Environmental Health Specialist from the NIOSH, Alaska Activity. We conducted the aviation site investigation and also an investigation of a crane fatality in the same vicinity and involving the same logging company. The incident was reviewed with Alaska Department of Labor officials (AKDOL) and statements of witnesses and company officials were obtained. The president of the logging company was also interviewed. Photographs and drawings of the incident site, autopsy and toxicology reports, as well as AKDOL reports were obtained.

The employee was an equipment manager working for a logging company. The company had 180 employees, including 6 at the incident site. The company maintained a written safety policy in the main office. However, copies of the plan were not available at all sites. A collateral safety duty worker was on the site, but no full-time safety personnel were available. Safety meetings were informally conducted but not always documented. The victim, a non-union employee, had 18 years of experience and had received helicopter safety training approximately four years prior to the incident.

This case was discussed with the assigned FAA and NTSB investigators. The FAA investigator indicated that pilots have a responsibility to ensure that passengers and ground personnel are prevented from approaching hazardous areas around aircraft. However, in the above case the victim was perceived to be well-trained in aircraft ground operations. He had received documented training in safe entry and exiting, hazardous areas on pads and slopes, ground proximity prohibited areas, and general safe operation. He was responsible for ground safety and taught other employees about this area of safety. Further, he was not a scheduled passenger and was not anticipated to be in the area by the pilot. The pilot was attending to the refueling of his aircraft, and suddenly noticed the victim beside him. The view of the FAA was that the victim was sufficiently trained to be aware of the hazard of a rotating tail rotor blade, and that the pilot should not be considered at fault in this incident. The pilot was operating the rotary craft under Part 135 rules for aerologging (non-scheduled domestic passenger flight). The helicopter company was under contract to transport personnel to and from logging camps. The NTSB investigator concurred with the FAA's conclusions, and further noted the special responsibilities of the pilot during a refueling operation. The pilot must be in control of the fuel at all times and cannot leave the fuel nozzle unattended. Even if the pilot had decided to escort the victim away from the helicopter, his actions would have been delayed while he shut down the refueling operation. Short of physically restraining the victim, the pilot may not have been able to prevent this incident.

INVESTIGATION

At 1:15 PM on November 20, 1994, a 43-year-old male equipment manager at a logging camp died after walking into the active tail rotor of a Bell Jet Ranger 206B helicopter. The victim had parked his truck near the helicopter as the pilot was preparing to refuel. He walked around the helicopter pad to the port side of the aircraft to talk to a passenger (see Diagram 1 below). The pad environment prevented the pilot from landing on the painted landing pattern. The pad was covered with snow and various nearby stored materials further limited his landing site options. The helicopter was situated between stored materials and a school bus on the left, and fuel tanks, a fuel pump, and other stored materials on the right (see Figure 2). There were no flags, cones, or other markers indicating the proper engress and egress paths from the helicopter. The victim was looking for a ride to a nearby community, and the passenger told him to talk to the pilot. The pilot was on the starboard side of the aircraft preparing to start "hot" refueling. The victim asked him if he could get a ride. The pilot reports that he said yes, but wanted to leave in about 10 minutes. At that time he decided to shut the helicopter down for refueling. He was completing a "2-minute cool down" prior to shutting the engine off. At about 1.5 minutes into the cool down, the pilot heard a loud noise. He noticed the victim lying on the ground near the tail rotor. CPR was begun and continued for 25 minutes until the coroner, who was at the site, declared the victim dead

CAUSES OF DEATH

The autopsy indicated "laceration of left cerebral hemisphere," and "blunt trauma to head."

RECOMMENDATIONS/DISCUSSION

Recommendation #1: Policy makers, regulators, and employers should conduct a comprehensive review of safety practices related to aviation support activities at remote logging camps. The regulations, policies, and practices regarding "hot refueling" of rotary aircraft at remote sites should also be reviewed.

Discussion: A review of safety practices in remote logging camps is indicated by the high rate of occupational fatality regularly occurring in this environment. In this case, there were no warning signs, cone markers, or other usual safety warning and signage practices in effect. While "hot refueling" is apparently a common practice at remote aviation-supported logging operations, this time-saving practice merits a close re-evaluation. A knowledgable safety specialist and former combat helicopter pilot was consulted on this issue. His opinion was that "hot refeuling" is only an acceptable practice in special circumstances (e.g., wartime missions, medovac missions). This practice may save 5-10 minutes, but the increased hazard of rotating rotor blades calls the value of "hot refeuling" into question. Given the need for a pilot to focus full attention to refueling, the pilot was not able to provide assistance once approached by the would-be passenger. The practice of "hot refueling" needs to be reviewed by aviation, logging, and regulatory experts.

Recommendation #2: Employers should ensure that, when possible, paths for passengers to and from an aircraft landing pad at a work site are clearly marked with colored flags, cones, or ropes. Safety information should be posted at all sites routinely used as landing pads.

Discussion: The helicopter pad at the incident site had painted markings for the helicopter landing point. However, because of snowfall these markings were not visible. In areas where snow is a probable factor, marking could still be accomplished through easily movable markers, such as colored flags, cones, or ropes. Colored flags can be obtained on thin flexible wires that are easily reset, if necessary due to changing weather conditions. Also, colored cones, such as those used to mark road construction or ropes with color markers could also be used. These should be used to mark safe paths for passengers entering and exiting aircraft. If required, the markers could be quickly reset on a daily basis. While it may not be possible to maintain marked paths at all isolated landing pads in the logging or other industries, in the incident case, the pad was a well-established aircraft landing area that could have been readily maintained.

Recommendation #3: Employers should ensure that all workers, who may be in the vicinity of aircraft, receive appropriate training (on a regular basis) related to ingress and egress safety, and other aspects of aviation safety related to ground operations.

Discussion: The victim had received helicopter safety training in 1990, approximately four years prior to the incident. Helicopter and other aviation safety training should be maintained on an ongoing basis, as long as rotary or fixed wing aircraft are used in the vicinity of workers. It is recommended that employees exposed to this environmental hazard receive annual updates on ground operations and aviation safety. This training should include proper ingress and egress,

avoidance of rotors and propellers, hazardous material safety (e.g., aviation fuel), and communications with aircrew.

The Department of Health and Social Services, Division of Public Health, Section of Epidemiology, Occupational Injury Prevention Program wishes to thank the Alaska Department of Labor and the Occupational Safety and Health Compliance Officers and Consultative staff, the Federal Aviation Administration, the National Transportation Safety Board, and other experts for their assistance in this investigation.