Transportation Safety Board of Canada

Bureau de la sécurité des transports du Canada

AMENDED REPORT

AVIATION OCCURRENCE REPORT

LOSS OF CONTROL - ROTORCRAFT

PRECISION HELICOPTERS INC.
BELL 206B C-GPGA
GRANDE PRAIRIE, ALBERTA 56 nm SW
18 JULY 1998

REPORT NUMBER A98W0155

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Summary

The pilot of the Bell 206B, serial number 1442, and a paramedic were dispatched to a tree-planting operation south-west of Grande Prairie, Alberta, to pick up a worker who was stung by a bee and suffering from anaphylactic shock. While en route, the pilot was informed that the worker was located in a yellow bus and was given the latitude and longitude of the bus's position. Approximately two nautical miles (nm) prior to reaching that position, the pilot spotted a yellow bus parked on a road. The pilot decided to have a closer look to see if it was the correct bus. The pilot descended the helicopter to about 40 feet above ground level (agl) and circled the bus at a speed of about 5 to 10 miles per hour. The pilot slowed the helicopter into a hover after the second circuit, then completed a third circuit. The pilot determined that the bus was not the correct bus and applied engine power and collective control inputs to climb away; however, the helicopter suddenly began to yaw to the right and the pilot attempted to control the rotation by applying full left pedal. The helicopter continued through a circle and began spinning. The pilot could not control the rotation, so the collective was lowered and engine power reduced for an autorotation landing. The helicopter came to rest in an upright position with damage to the right skid, main and tail rotor blades, power train, and vertical fin. There were no injuries to the pilot and passenger.

Ce rapport est égalemet disponible en français.

Other Factual Information

The pilot was certified and qualified for the flight in accordance with existing regulations, with about 1 800 hours total time, of which about 715 hours was on the Bell 206. The pilot had about 500 hours' experience as a helicopter flight instructor.

The weather was reported as clear skies, a temperature of 20 to 24 degrees Celsius, and the winds were generally light and variable; although gusts of 12 to 15 knots from the north-east were reported by other helicopter pilots in the area. The elevation of the occurrence site was about 4,300 feet above sea level (asl).

Records indicate that the helicopter was certified, equipped, and maintained in accordance with existing regulations and approved procedures. All flight controls were examined at the occurrence site for travel, rigging, and movement. In addition, the tail rotor control and drive system components were examined in detail at the maintenance base. There was no evidence found of any interference in the flight control system, or any discrepancies in the drive system which may have caused a loss of tail rotor authority. A witness confirmed that the helicopter circled the bus in a left turn three times, at an altitude of about 35 to 40 feet agl, and at a slow speed. As the helicopter completed the last turn, it suddenly yawed to the right and spun to the ground at a moderate rate of rotation.

On 06 July 1984, Bell Helicopter Textron Inc. issued an *Information Letter* to all model 206B owners and operators on the subject of low-speed flight characteristics which can result in unanticipated right yaw. In part, it states the following:

> Recent testing of the OH-58 (military version of the Bell 206) series helicopter operated by the US Army has revealed the occurrence of an unanticipated right yaw under certain low speed mission conditions. The Army has referred to the right yaw characteristic as a loss of tail rotor effectiveness (LTE). The following is a discussion of low speed flight characteristics which can result in an unanticipated right yaw if appropriate attention is not paid to controlling the aircraft. These characteristics are present only at airspeeds less than 30 knots and apply to all single rotor helicopters.
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> Unanticipated right yaw is the occurrence of an uncommanded right yaw rate which does not subside of its own accord and which, if not corrected, can result in the loss of aircraft control.
>
> If a sudden unanticipated right yaw occurs, the following recovery technique should be performed:
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> 1. Pedal - Full left; simultaneously, cyclic - forward to increase speed;
> 2. As recovery is affected, adjust controls for normal forward flight; and,
> 3. If spin cannot be stopped and ground contact is imminent, an autorotation may be the best course of action. Maintain full left pedal until the spin stops, then adjust to maintain heading.

Information from this letter was reproduced in the Bell Helicopter's magazine *Rotorbreeze*, in 1984 and 1987 issues. The U.S. Federal Aviation Administration (FAA) issued an *Advisory Circular* (AC) 90-95 entitled "Unanticipated right yaw in helicopters" dealing with the same information. The pilot was aware of the information contained in the *Advisory Circular*.

Analysis

An examination of the helicopter and control systems did not reveal any mechanical discrepancies which would have caused a reduction or loss of tail rotor authority. Pilot and witness information indicates that the right yaw was not violent, as would be expected with a tail rotor system malfunction or failure.

The pilot was aware of the low-speed flight characteristics of single rotor helicopters, which can result in an unanticipated right yaw, and the helicopter was flown in a manner which was conducive to a reduction of tail rotor authority. When the uncommanded right yaw occurred, the pilot applied full left pedal, but the helicopter continued to spin. Just prior to touchdown, the pilot did prepare for an autorotation, and this action may have contributed to the helicopter remaining upright, without major airframe breakup and probable injuries.

Findings

1. The aircraft systems were examined to the degree possible, and no evidence of a malfunction was found.

2. Bell Helicopter Textron Inc. has previously identified conditions under which all single rotor helicopters can encounter unanticipated right yaw from reduction of tail rotor effectiveness.

3. The pilot had considerable experience as a helicopter pilot and instructor, and acknowledged the information in AC90-95, but did not recognize the situation developing prior to the loss of control.

Causes and Contributing Factors

The pilot lost control of the helicopter because of an unanticipated right yaw caused by a reduction in tail rotor authority.

Safety Action

Transport Canada has indicated that information on loss of tail rotor effectiveness could be presented in *Aviation Safety Vortex*. An article describing the conditions leading up to the sudden right yaw and loss of control is planned for an early issue in 1999.

This report concludes the Transportation Safety Board's investigation into this occurrence. Consequently, the Board, consisting of Chairperson Benoît Bouchard, and members Maurice Harquail, Charles Simpson and W.A. Tadros, authorized the release of this report on 12 August 1999.