



VERDICT AT INQUEST

File No.: 2008:0422:0023

An Inquest was held at the Supreme Court, in the municipality of Cranbrook in the Province of British Columbia, on the following dates April 26 - 28 before Mr. Mark Coleman, Presiding Coroner,

into the death of ROZENBOOM, Dirk Bentley, 45, Male, and the following findings were made:

Date and Time of Death: May 13th, 2008, 13:06

Place of Death: Cranbrook BC

Medical Cause of Death

(1) Immediate Cause of Death: a) Blunt force trauma

DUE TO

Antecedent Cause if any: b) Sudden deceleration in a helicopter in collision with terrain

DUE TO OR AS A CONSEQUENCE OF

Giving rise to the immediate cause (a) above, stating underlying cause last.

c)

(2) Other Significant Conditions Contributing to Death:

Classification of Death: [X] Accidental [] Homicide [] Natural [] Suicide [] Undetermined

The above verdict certified by the Jury on the 28th day of April AD, 2011.

Mark Coleman

Presiding Coroner's Printed Name

[Signature]

Presiding Coroner's Signature



VERDICT AT INQUEST

FINDINGS AND RECOMMENDATIONS AS A RESULT OF THE INQUEST INTO THE DEATH OF

FILE No.: 2008:0422:0023

ROZENBOOM

SURNAME

Dirk Bentley

GIVEN NAMES

PARTIES INVOLVED IN THE INQUEST:

Presiding Coroner: Mr. Mark Coleman

Coroner Counsel: Mr. Rodrick H. MacKenzie

Court Reporting/Recording Agency: Verbatim Words West Ltd.

Participants/Counsel: Families of Mr. Heeb, Mr. Rozenboom and Mr. Lehman / Jamie Thornback
Bighorn Helicopters / Darryl G. Pankratz
BC Hydro / Ms. Lorna Pawluk

The Sheriff took charge of the jury and recorded seven (7) exhibits. Fifteen (15) witnesses were duly sworn and testified.

PRESIDING CORONER'S SUMMARY:

The following is a brief summary of the circumstances of the death as set out in the evidence presented to the jury at the inquest. The following summary of the evidence as presented at the inquest is to assist the reader to more fully understand the Verdict and Recommendations of the jury. This summary is not intended to be considered evidence nor is it intended in any way to replace the jury's verdict.

On the afternoon of May 13, 2008, witnesses in the community of Cranbrook noticed a helicopter flying low over a residential area of the town. A short time later the helicopter was observed to crash onto 10th Street near 14th Avenue. Dirk Bentley Rozenboom was a passenger in the helicopter. He died in the crash along with a fellow passenger and the pilot. As well, a pedestrian walking along the street was struck and killed by the helicopter as it crashed.

Some of the witnesses noted that the helicopter appeared to be experiencing some sort of mechanical difficulty before it crashed. Testimony indicated a change in the sound of the engine and the noticeable slowing of the rotors. One of the eye witnesses was himself a helicopter pilot and he reported observations that were described as being consistent with an engine malfunction.

Some of the witnesses to the incident attempted to rescue the pedestrian, but it quickly became apparent that he was already deceased. No one could reach the helicopter itself due to the fact that it was engulfed in flames. It was subsequently determined that the occupants of the helicopter all died on impact.

The purpose of the helicopter flight over the town was to allow BC Hydro employees to conduct inspections of power lines. Testimony from representatives of the helicopter operator, Bighorn Helicopters, indicated that they believed the flight to be in compliance with Transport Canada regulations. BC Hydro had minimal formalized policy regarding helicopter operations at that time.

A Transportation Safety Board investigation attempted to discern the cause of the mechanical failure that had occurred. Approximately 60% of the helicopter was destroyed in the fire which complicated this process. In spite

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of this, key components of the engine were available and were examined. Two components in particular were examined as potential causes of engine failure. These were the power turbine governor and the fuel control unit. Examination of these items and other engine components failed to identify any specific cause of the engine failure. The Transportation Safety Board investigator did indicate that a latent failure of one of these two units could not be excluded, but ultimately, the cause of engine failure could not be determined. There was some evidence that the model of power turbine governor used in this engine had a history of failing prior to its listed "time before overhaul". Transport Canada followed-up with the Federal Aviation Administration (FAA) in the United States regarding this issue. The response from the FAA was that there had been recent improvements to the unit, resulting in acceptable levels of reliability.

Any helicopter that suffers an engine failure can, if it is operating at a sufficient combination of height and speed, be landed by initiating auto-rotation. Autorotation is a process in which the pilot is able to maneuver the helicopter in such a way as to allow the rotor to maintain sufficient rate of rotation that the helicopter can be landed safely. In practice, the likelihood of a safe landing is dependent on many factors including the pilot's skill and the terrain. There are circumstances under which autorotation is not possible. Every helicopter has a height-velocity diagram that indicates the altitude and speed combinations for which autorotation is confirmed to be possible. In this incident the helicopter, a Bell 206B, was operating at an altitude and velocity that would not permit autorotation in the event of an engine failure. This helicopter is a single-engine helicopter. It is acknowledged that twin-engine helicopters greatly reduce the risks associated with engine failure.

There are two different sections of the *Canadian Aviation Regulations* (CARs) that would apply to low altitude helicopter operations. One of the sections, 602.15, allows for low-altitude flight for certain types of activities including for the purpose of aerial inspection and flight inspection. The terms "aerial inspection" and "flight inspection" have specific definitions that would not have applied under the circumstances in this case, although those definitions are not provided within the section of the regulations in which the terms appear. In this instance, section 602.15 would not have applied given that the flight was part of a commercial operation. Instead, section 722.2 of the regulations would apply. This section indicates a requirement for specific forms of authorization prior to undertaking a low altitude operation over a built-up area. It has been noted that the term "built-up area" is not specifically defined anywhere in the regulations. In spite of this there can be no doubt that a residential neighbourhood in Cranbrook qualifies as a built-up area. Underlying all of the regulations pertaining to low altitude flights is a statement indicating that all work is to be undertaken in a manner that ensures there is no hazard created to persons or property on the surface.

Since this incident, a number of changes have been implemented. Bighorn Helicopters has created a Safety Management System relating to their operations. Transport Canada requires such systems for some operators such as large commercial airlines. Operators like Bighorn Helicopters are not yet required to have a Safety Management System. Bighorn has also purchased a twin-engine helicopter for use in low altitude, low speed operations.

BC Hydro has developed a Helicopter Management System which includes a strict approval process and standard operating procedures relating to the use of helicopters. A BC Hydro representative indicated that only twin-engine helicopters are used for low altitude, low speed line inspections and that helicopters are no longer used at all for line inspections over built-up areas.

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Pursuant to Section 38 of the Coroners Act, the following recommendations are forwarded to the Chief Coroner of the Province of British Columbia for distribution to the appropriate agency:

JURY RECOMMENDATIONS:

To: Transport Canada
Civil Aviation AA RBQ
330 Sparks Street, Tower C
Ottawa, ON
K1A 0N5

1. Improve the readability and clarity of the C.A.R.S. for the benefit of users. This could include, but not be limited to, production and distribution of the Minimum Altitudes and Distances logic chart developed by the Enforcement Branch of Transport Canada.

Coroner's Comment: The jury heard from multiple witnesses that the Canadian Aviation Regulations are large and complex. The jury also heard that Transport Canada's enforcement personnel created a chart for their internal use to make interpretation of the regulations easier.

2. Improve and clarify C.A.R.S. definitions particularly as it pertains to 'built up areas' and 'aerial inspection'.
3. Helicopters operating in built up areas at altitudes and distances less than those specified in C.A.R.S. 602.14 (2), should be multi-engine.

4. Mandate as a priority Safety Management Systems (SMS) for the commercial aviation industry.

Coroner's Comment: The Jury heard that Transport Canada currently requires SMS for some forms of commercial aviation but not all. The requirement is intended to be phased in over time.

5. Support and enhance the Safety Deficiency Reporting (SDR) system.

Coroner's Comment: The jury heard testimony regarding the system that is used to track reports of problems with mechanical components. There was some concern expressed that the current system could not account for all such problems.

6. Remind and assist operators concerning waiver requirements concerning C.A.R.S. 702.22(1), 702.22(2), 702.22(3).

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7. Mandate Data Trackers with “real” time or “frequent” time stamps on all commercial helicopters.

Coroner’s Comment: The jury heard that the helicopter was equipped with a data tracker that recorded information such as the helicopters location, altitude and velocity. The tracker recorded this data only every two minutes.

To: Transport Safety Board, Transport Canada

8. That families affected by the loss or injury of loved ones be entitled to be kept apprised of the developments and findings of an accident investigation.