Aviation Investigation Final Report

Location:	Gustavus, Alaska	**Accident Number:**	ANC07LA022
Date & Time:	March 3, 2007, 16:10 Local	**Registration:**	N5134V
Aircraft:	Hughes 369D	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	2 None
Flight Conducted Under:	Part 135: Air taxi & commuter - Non-scheduled		

Analysis

The helicopter was being operated as a visual flight rules on-demand passenger flight under Title 14, CFR Part 135. The purpose of the flight was to tranquilize moose for capture and collaring. The company's chief pilot said a moose was shot with a tranquilizer dart from the helicopter, and that the helicopter was used to block the moose from moving into a hazardous area. The pilot of an airplane orbiting above said the moose charged the helicopter, and that as the helicopter attempted to evade the moose, the moose reared, or jumped, contacting the helicopter's tail rotor. The helicopter pilot reported a loss of directional control, and made a hovering autorotation to the ground. The flex coupling between the drive shaft and the tail rotor gearbox failed, and the spinning drive shaft cut the tail boom and separated the tail from the rest of the airframe. According to the chief pilot, the company's practice had been for the helicopter to hover/maneuver about 10 feet above the ground, and no closer to the darted animal than 10 feet horizontally. He said the pilot and scientist aboard felt the distances were appropriate. He said this was the first incident of extreme, erratic, behavior on the part of a darted animal, and that due to this incident, the company has revised its procedure, and now requires the pilot to maintain 30 feet of altitude above the ground and 30 feet horizontally from a darted animal.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The inadequate clearance from a tranquilized moose while hovering in ground effect, and the operator's inadequate procedures for such operations, which resulted in an in-flight collision with the moose. Factors associated with the accident were the moose, a sheared tail rotor drive shaft, and the resultant lack of tail rotor anti-torque control.

Findings

Occurrence #1: IN FLIGHT COLLISION WITH OBJECT
Phase of Operation: HOVER - IN GROUND EFFECT

Findings
1. (F) OBJECT - ANIMAL(S)
2. (C) CLEARANCE - INADEQUATE
3. (C) PROCEDURE INADEQUATE - COMPANY/OPERATOR MANAGEMENT

Occurrence #2: AIRFRAME/COMPONENT/SYSTEM FAILURE/MALFUNCTION
Phase of Operation: HOVER - IN GROUND EFFECT

Findings
4. (F) ROTOR DRIVE SYSTEM,TAIL ROTOR DRIVE SHAFT - SHEARED
5. (F) TAIL ROTOR/ANTI-TORQUE CONTROL - NOT AVAILABLE

Occurrence #3: FORCED LANDING
Phase of Operation: EMERGENCY DESCENT/LANDING

Findings
6. TERRAIN CONDITION - SNOW COVERED

Factual Information

On March 3, 2007, about 1610 Alaska standard time, a Hughes 369D helicopter, N5134V, sustained substantial damage while hovering in ground-effect, when its tail rotor was struck by a moose during a game management operation, about 1 mile southwest of the Gustavus Airport, Gustavus, Alaska. The helicopter was being operated by Temsco Helicopters Inc., Ketchikan, Alaska, as a visual flight rules (VFR) on-demand passenger flight under Title 14, CFR Part 135, when the accident occurred. The commercial certificated pilot and sole passenger were not injured. Visual meteorological conditions prevailed, and company flight following procedures were in effect.

During a telephone conversation with the National Transportation Safety Board (NTSB) investigator-in-charge (IIC) on March 5, the chief pilot for the operator said the helicopter was involved in a moose tagging operation for the Alaska State Department of Fish and Game. He said the moose was shot with a tranquilizer dart from the helicopter, and that the helicopter is used to block the moose's path to prevent them from running into water and drowning, or running into an area where the tranquilized animals cannot be handled safely. He said the helicopter was hovering, waiting for the animal to "go down." The chief pilot said that the pilot of an airplane was orbiting above, and saw the moose charge the helicopter. According to the chief pilot, the airplane pilot stated that as the helicopter attempted to evade the moose, the moose reared, or jumped, contacting the helicopter's tail rotor. The airplane pilot said that the helicopter made three complete 360 degree rotations before it landed.

The helicopter pilot reported that he was not aware that the moose contacted the tail rotor. He indicated he had a loss of directional control, and said that he made a hovering autorotation to the ground. According to the chief pilot, the flex coupling between the drive shaft and the tail rotor gearbox failed. He said the spinning drive shaft cut through the tail boom adjacent to the gearbox, and separated the tail from the rest of the airframe.

On April 2, the chief pilot told the IIC that their past practice had been for the helicopter to hover/maneuver about 10 feet above the ground, and no closer to the darted animal than 10 feet horizontally. He said this past practice had served them well, and the pilot and scientist aboard the helicopter felt the distances were appropriate. He said this was the first incidence of extreme, erratic, behavior on the part of a darted animal. In a written statement to the NTSB dated March 14, the chief pilot reported that due to this incident, the company had revised its procedure, and now requires the pilot to maintain 30 feet of altitude above the ground, and 30 feet horizontally from a darted animal.

Pilot Information

Certificate:	Commercial	**Age:**	26,Male
Airplane Rating(s):	None	**Seat Occupied:**	Left
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	
Instrument Rating(s):	Helicopter	**Second Pilot Present:**	No
Instructor Rating(s):	Helicopter	**Toxicology Performed:**	No
Medical Certification:	Class 2 Without waivers/limitations	**Last FAA Medical Exam:**	March 1, 2007
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	March 1, 2006
Flight Time:	2700 hours (Total, all aircraft), 415 hours (Total, this make and model), 2600 hours (Pilot In Command, all aircraft), 44 hours (Last 90 days, all aircraft), 23 hours (Last 30 days, all aircraft), 4 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Hughes	**Registration:**	N5134V
Model/Series:	369D	**Aircraft Category:**	Helicopter
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	1103D
Landing Gear Type:	Emergency float; Skid	**Seats:**	5
Date/Type of Last Inspection:	October 1, 2006 100 hour	**Certified Max Gross Wt.:**	3000 lbs
Time Since Last Inspection:		**Engines:**	1 Turbo shaft
Airframe Total Time:	9041 Hrs at time of accident	**Engine Manufacturer:**	Allison
ELT:	Installed, not activated	**Engine Model/Series:**	250C20B
Registered Owner:	Temsco Helicopter Inc.	**Rated Power:**	420 Horsepower
Operator:	TEMSCO HELICOPTERS INC	**Operating Certificate(s) Held:**	Commuter air carrier (135), On-demand air taxi (135)
Operator Does Business As:	Temsco Helicopters	**Operator Designator Code:**	HXSD

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:		**Distance from Accident Site:**	
Observation Time:		**Direction from Accident Site:**	
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	/	**Turbulence Type Forecast/Actual:**	/
Wind Direction:		**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:		**Temperature/Dew Point:**	-8°C / -16°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Gustavus, AK (PAGS)	**Type of Flight Plan Filed:**	Company VFR
Destination:		**Type of Clearance:**	None
Departure Time:	12:30 Local	**Type of Airspace:**	

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 None	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 None	**Latitude, Longitude:**	58.426666,-135.704437

Administrative Information

Investigator In Charge (IIC):	Lewis, Lawrence
Additional Participating Persons:	Charles Wisner; Juneau FSDO-05; Juneau, AK
Original Publish Date:	June 27, 2007
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=65367