Aviation Investigation Final Report

Location:	Delta Junction, Alaska	**Accident Number:**	ANC12FA084
Date & Time:	August 7, 2012, 16:45 Local	**Registration:**	N737TV
Aircraft:	McDonnell Douglas Helicopter 600N	**Aircraft Damage:**	Substantial
Defining Event:	Dynamic rollover	**Injuries:**	1 Fatal
Flight Conducted Under:	Part 135: Air taxi & commuter - Non-scheduled		

Analysis

The pilot was transporting personnel from a remote elevated helipad constructed of logs. Witnesses stated that the helicopter had just touched down, and the pilot turned his head to give the signal to board when the helicopter suddenly pitched up and back, striking trees at the edge of the helipad. The helicopter rolled down the hill. A postaccident examination of the helipad revealed that one of the logs that made up the rear portion of the helipad decking had been pulled from the structure and damaged.

Based on the lack of mechanical anomalies with the helicopter and the damage to the helipad decking, it is likely the pilot landed too far forward on the helipad, which allowed the tail of the left skid to fall into the open area between the logs and become entangled. It is likely that the pilot sensed the imbalance and applied collective pitch, which resulted in a dynamic rollover.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's failure to clear the left landing gear skid, which resulted in the entanglement of the left landing gear skid with a log, and his subsequent application of collective pitch, which resulted in a dynamic rollover.

Findings

Personnel issues	Aircraft control - Pilot
Personnel issues	Decision making/judgment - Pilot
Aircraft	(general) - Capability exceeded

Factual Information

History of Flight

Landing-aborted after touchdown	Dynamic rollover (Defining event)
Landing-aborted after touchdown	Collision with terr/obj (non-CFIT)

HISTORY OF FLIGHT

On August 7, 2012, about 1645 Alaska daylight time, a McDonnell Douglas MD600N helicopter, N737TV, sustained substantial damage while landing on a remote helipad near Pogo Mine, 38 miles Northeast of Delta Junction, Alaska. The helicopter was being operated by Aurora Aviation Services, Inc., Delta Junction, as a 14 CFR Part 135 visual flight rules (VFR) on-demand charter flight when the accident occurred. The certificated airline transport pilot was fatally injured. Visual meteorological conditions prevailed, and company flight following was in effect. The flight departed from the Pogo Mine.

The helicopter had been based at Pogo Mine since May, 2012. Its primary purpose was to support exploratory gold mining operations, by transporting personnel and equipment to remote drilling sites. Remote helipads were constructed at numerous drilling sites to provide improvised landing platforms.

The remote helipad at Rig 3 was located approximately 1 mile southeast of the Pogo Mine runway, in an area of steep, heavily forested terrain, at an elevation of about 2,700 feet MSL.

The helipad was constructed of logs interlaced and nailed together to provide an improvised landing platform. The platform was approximately 16 feet wide by 21 feet long. The logs forming the platform deck were placed only at the forward and aft section of the log frame. With two logs, approximately 8 inches in diameter forming the forward platform deck, followed by approximately 4 feet of open space, then a single 6 inch diameter log, followed by approximately 8 feet of open space, and then 4 logs, about 6 inches in diameter forming the rear platform deck. Large boulders were placed under the framework at various locations to support the platform.

The day of the accident the pilot had flown several missions into numerous helipads, and conducted several sling load operations. He was returning to the helipad at Rig 3 to transport personnel back to the mine.

During an on-scene interview with the National Transportation Safety Board (NTSB) investigator-in-charge (IIC) on August 8, a witness reported that just before the accident he radioed the pilot to request a pickup at the remote helipad located at Rig 3. He was kneeling

beside the helipad when the helicopter touched down. He said the pilot turned his head to give the signal to board, when suddenly the helicopter pitched up and back, striking trees at the edge of the helipad. The helicopter rolled down the hill, and came to rest on its left side. The engine was still running when the witness arrived on-scene.

During a separate on-scene interview with the NTSB IIC on August 8, another witness working in the vicinity heard the helicopter land at the helipad, followed shortly thereafter by a loud screeching noise and impact. After the accident, while running past the helipad en-route to the accident scene, he noticed a log on the rear left side of the helipad that was displaced upwards. He noted that the long spike that attaches the log to the foundation was pulled out, and the log was displaced aft.

During a separate on-scene interview with the NTSB IIC on August 8, another witness working approximately 500 feet northwest of the accident site, reported hearing the helicopter land, followed by a tremendous crash, and debris flying in the air. On his way past the helipad, to render aid, he observed one of the logs that made up the rear portion of the helipad decking had been pulled from the structure and was damaged. He also reported that on several previous occasions, he had observed the pilot land forward on the remote helipad, allowing the tail of the landing gear skids to fall into the open area of the platform decking. The pilot would then reposition the helicopter up and aft so the tails of the landing gear skids came to rest on top of the four logs that formed the rear portion of the helipad.

MEDICAL AND PATHOLOGICAL INFORMATION

A post mortem examination was conducted under the authority of the Alaska state Medical Examiner, Anchorage, Alaska, on August 9, 2012. The cause of death for the pilot was attributed to blunt force, traumatic injuries.

The Federal Aviation Administration (FAA) Civil Aeromedical Institute performed toxicology examinations for the pilot on September 28, 2012, which was negative for alcohol and drugs.

WRECKAGE AND IMPACT INFORMATION

On August 8, two NTSB investigators, along with two FAA aviation safety inspectors from the Fairbanks Flight Standards District Office (FSDO), and a representative from Aurora Aviation Services Inc. examined the wreckage at the accident site.

The helicopter was configured for left seat flight control operation.

All of the helicopters major components were found at the main wreckage site. The accident site was in an area of steep, heavily forested terrain at an elevation of about 2,700 feet mean sea level.

The main debris path was on approximately a 200 degree heading, and downhill (All headings/

bearings noted in this report are magnetic).

Scattered downslope in a line from the initial impact point, and the final resting point of the main wreckage, were small portions of wreckage debris, broken Plexiglass, and personal effects.

The helicopter fuselage and passenger cabin was lying on its left side with the nose oriented to the southeast.

The cockpit was severely damaged with extensive deformation. The canopy was segmented and separated with all canopy glass windscreens and overhead transparencies shattered or missing.

The aft cabin and passenger compartment was slightly bent and buckled inward along the upper roof area.

The right hand fore and aft landing gear struts fractured at the foot assemblies where the strut attaches to the landing gear skid. The right hand landing gear skid was located on the left side, and just aft of the main wreckage site.

The left hand forward landing gear strut fractured at the foot assembly, the aft landing gear strut remained attached to the landing gear skid. The left hand landing gear skid fractured just aft of the front foot assembly and was located uphill of the main wreckage site.

The NOTAR tail boom assembly was severed just aft of the tail boom attach points. The tail boom came to rest upright, with the aft portion of the boom pointing towards the fuselage.

The MD 600N helicopter has six all metal main rotor blades. Each main rotor blade is color coded for easy identification. Each main rotor blade is attached to the main rotor hub by means of a strap pack assembly. The accident helicopter's yellow and black blades stayed attached to the main rotor hub assembly. The red blade separated when the pitch housing and strap pack assembly was torn from the main rotor hub assembly. The blue, white and green blades were fractured at the blade root just outboard of the doublers. All blades exhibited damage consistent with sudden stoppage associated with multiple ground and tree strikes while under power.

No evidence of preimpact mechanical anomalies was found.

PERSONNEL INFORMATION

The pilot, age 64, held an airline transport pilot certificate with a rotorcraft-helicopter rating, and held commercial pilot privileges for airplane single-engine land. He also held a type rating for a Eurocopter/MBB BO-105 helicopter. His most recent second-class medical was issued on April 2, 2012, with the limitation that he must wear corrective lenses.

According to the Pilot/Operator Aircraft Accident Report, (NTSB Form 6120.1) submitted by Aurora Aviation Services Inc., the pilot's total aeronautical experience was about 19,500 flight hours, of which about 306 were in the accident helicopter make and model. In the preceding 90 and 30 days prior to the accident, the pilot flew a total of 306 and 100 flight hours.

The operator's pilot training records showed no deficiencies, and that the accident pilot had completed all required training, including a required CFR Part 135 VFR competency check ride on May 12, 2012, that was observed by a FAA aviation safety inspector.

AIRCRAFT INFORMATION

The helicopter was a 1997 model year, McDonnell Douglas 600N, equipped with a Rolls Royce M250-C47M engine. According to the operators records, at the time of the accident the helicopter had about 9,730 flight hours. The most recent annual inspection of the airframe and engine was completed on April 1, 2012. The last recorded inspection of the engine and airframe was a 100-hour inspection, completed on July 13, 2012, about 90 hours before the accident.

The aft most section of the landing gear skids were fitted with Supplemental Type Certificate (STC) "Bear Paws". The Bear Paws are constructed of high strength polymer, are attached to the rear of the landing gear skids and provide a 19 inch wide footprint to aid in landing on soft or uneven terrain.

An examination of the helicopter's maintenance logs showed no mechanical discrepancies.

METEOROLOGICAL INFORMATION

The closest weather reporting facility is Allen Army Airfield, approximately 41 miles southwest of the accident site. About 20 minutes after the accident, at 1653, an aviation routine weather report (METAR) at Allen Army Airfield, Ft. Greely, Alaska, reported in part, wind from 310 degrees, at 13 knots, gusting to 21 knots, visibility, 10 statute miles, scattered clouds at 7,000 feet, scattered clouds at 20,000 feet, temperature, 65 degrees F; dew point 7, degrees F; altimeter, 29.84 inHG.

TESTS AND RESEARCH

The wreckage was recovered from the accident site and transported to Alaska Claims Services, Inc., in Wasilla, Alaska.

On September 5, 2012 a wreckage exam and layout was done under the direction of the NTSB IIC. Also present was an air safety investigator from MD Helicopters, Inc., an air safety investigator from The Boeing Company, and an air safety investigator from Rolls-Royce

Corporation. During the examination, no preaccident airframe or engine anomalies were noted.

Garmin GPS

At the time of the accident, the pilot was using a Garmin GPSMAP 496 portable global positioning system (GPS) receiver, capable of storing route-of-flight data. The unit was sent to the NTSB's Vehicle Recorders Division for examination.

A NTSB electrical engineer was able to extract the GPS data for the accident flight, which included, in part, time, latitude, longitude, and GPS altitude. Groundspeed and course information were derived from the extracted parameters. A flight track map overlay, and tabular data corresponding to the accident flight are available in the public docket for this accident.

Pilot Information

Certificate:	Airline transport	**Age:**	64,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):		**Restraint Used:**	
Instrument Rating(s):	Airplane; Helicopter	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 2 Without waivers/limitations	**Last FAA Medical Exam:**	April 2, 2012
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	May 12, 2012
Flight Time:	19500 hours (Total, all aircraft), 306 hours (Total, this make and model), 306 hours (Last 90 days, all aircraft), 100 hours (Last 30 days, all aircraft), 5 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	McDonnell Douglas Helicopter	**Registration:**	N737TV
Model/Series:	600N	**Aircraft Category:**	Helicopter
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	RN017
Landing Gear Type:	High skid	**Seats:**	6
Date/Type of Last Inspection:	July 13, 2012 100 hour	**Certified Max Gross Wt.:**	4100 lbs
Time Since Last Inspection:	90 Hrs	**Engines:**	1 Turbo shaft
Airframe Total Time:	9730 Hrs at time of accident	**Engine Manufacturer:**	Rolls Royce
ELT:	C91 installed, not activated	**Engine Model/Series:**	C-47 Series
Registered Owner:	Aurora Aviation Services Inc.	**Rated Power:**	808 Horsepower
Operator:	Aurora Aviation Services Inc.	**Operating Certificate(s) Held:**	On-demand air taxi (135)

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	PABI,1291 ft msl	**Distance from Accident Site:**	41 Nautical Miles
Observation Time:	16:53 Local	**Direction from Accident Site:**	216°
Lowest Cloud Condition:	Scattered / 7000 ft AGL	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	13 knots / 21 knots	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	310°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.84 inches Hg	**Temperature/Dew Point:**	18°C / -14°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Delta Junction, AK (76AK)	**Type of Flight Plan Filed:**	Company VFR
Destination:	Delta Junction, AK (76AK)	**Type of Clearance:**	None
Departure Time:	16:25 Local	**Type of Airspace:**	

Airport Information

Airport:	Pogo Mine Airstrip 76AK	**Runway Surface Type:**	
Airport Elevation:	1350 ft msl	**Runway Surface Condition:**	
Runway Used:		**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Fatal	**Latitude, Longitude:**	64.442222,-144.884719(est)

Administrative Information

Investigator In Charge (IIC):	Banning, David
Additional Participating Persons:	Jim Watson; Federal Aviation Administration; Fairbanks, AK John Chalstrom; Federal Aviation Administration; Fairbanks, AK Keith Warren; Aurora Aviation Services; Delta Junction, AK Adrian Booth; The Boeing Company; Mesa, AZ John Hobby; MD Helicopters Inc; Mesa, AZ Jon Michael; Rolls-Royce; Indianapolis, IN
Original Publish Date:	August 13, 2013
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=84608