



# **Aviation Investigation Final Report**

Location: SNOHOMISH, Washington Accident Number: SEA97LA112

Date & Time: May 15, 1997, 16:10 Local Registration: N8491E

Aircraft: Bell 47G-3B Aircraft Damage: Substantial

**Defining Event:** 1 Minor

Flight Conducted Under: Part 91: General aviation - Instructional

### **Analysis**

The pilot was in a commercial helicopter pilot upgrade training program. He was not yet rated for helicopters, but did hold an instructor's endorsement granting helicopter solo privileges. At the time of the accident, he was aborting a practice landing in wind conditions which were conducive to an unanticipated right yaw (also known as loss of tail rotor effectiveness, or LTE) event. As he completed a turn to downwind, the helicopter made an uncommanded right turn. Despite the application of left pedal and forward cyclic by the pilot, the helicopter 'continued to rotate violently until impact on the left side.' FAA inspectors, who examined the helicopter at the accident site, reported that they found no evidence of a mechanical malfunction; they stated that the tail rotor system was intact.

## **Probable Cause and Findings**

The National Transportation Safety Board determines the probable cause(s) of this accident to be: the pilot's encounter with of a loss of tail rotor effectiveness (LTE) situation, and his subsequent inadequate remedial action. Related factors included: wind conditions that were conducive to an unanticipated right yaw event, and the pilot's limited experience in helicopters.

#### **Findings**

Occurrence #1: LOSS OF CONTROL - IN FLIGHT Phase of Operation: LANDING - ABORTED

**Findings** 

- 1. (F) WEATHER CONDITION UNFAVORABLE WIND
- 2. (C) LOSS OF TAIL ROTOR EFFECTIVENESS ENCOUNTERED PILOT IN COMMAND
- 3. (C) REMEDIAL ACTION INADEQUATE PILOT IN COMMAND
- 4. (F) LACK OF TOTAL EXPERIENCE IN KIND OF AIRCRAFT PILOT IN COMMAND

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Occurrence #2: IN FLIGHT COLLISION WITH TERRAIN/WATER

Phase of Operation: DESCENT - UNCONTROLLED

Page 2 of 6 SEA97LA112

#### **Factual Information**

On May 15, 1997, approximately 1610 Pacific daylight time, a Bell 47G-3B helicopter, N8491E, crashed approximately 1 1/2 miles southeast of Harvey Field, Snohomish, Washington. The helicopter was substantially damaged and the pilot, who held a commercial certificate with an airplane category rating and had solo privileges for helicopters, received minor injuries. The local 14 CFR 91 instructional solo practice flight, which the pilot was conducting as part of a commercial helicopter pilot upgrade training program, originated at Harvey Field. Visual meteorological conditions existed and no flight plan had been filed for the flight.

The pilot reported that he was attempting a practice landing on an island in the Snohomish River at the time of the accident. He stated that he got high on his approach, to the point where a steep descent to his intended landing spot would be required, and decided to terminate the approach. As he accelerated through about 40 MPH at about 40 to 50 feet above ground level, he began a turnout to the left, toward downwind. The pilot reported that after completing the downwind turn, the helicopter made an uncommanded turn to the right. The pilot stated that despite the application of left pedal and forward cyclic, "the helicopter continued to rotate violently until impact on the left side."

FAA inspectors responded to the accident site and performed an on-site examination of the helicopter wreckage. They reported to the NTSB that the on-site examination revealed no evidence of a mechanical malfunction in the helicopter, and that the tail rotor was found intact.

In a telephone conversation with the pilot on May 15, 1997, the pilot stated that at the time of the occurrence, he was heading "parallel with the trees" (roughly southeast.) The Seattle Sectional Aeronautical Chart depicts the Snohomish River coursing approximately to the south-southeast in the accident area. The pilot further reported on his accident reported that winds in the accident area were from 310 degrees at 8 to 12 knots. The reported relative wind direction and velocity is within a region conducive to a "weathercock stability" unanticipated right yaw (also referred to as loss of tail rotor effectiveness, or LTE) event as defined in FAA Advisory Circular (AC) 90-95, "Unanticipated Right Yaw in Helicopters." The AC states that unanticipated right yaw events can result in loss of control of the helicopter if the pilot does not apply timely corrective action (consisting of simultaneous application of full left pedal and forward cyclic, and if altitude permits, a reduction in power and collective pitch, followed by adjusting controls for normal forward flight as recovery is effected.)

Page 3 of 6 SEA97LA112

#### **Pilot Information**

Certificate:	Commercial	Age:	32,Male	
Airplane Rating(s):	Single-engine land; Single-engine sea; Multi-engine land	Seat Occupied:	Left	
Other Aircraft Rating(s):	Glider	Restraint Used:		
Instrument Rating(s):	Airplane	Second Pilot Present:	No	
Instructor Rating(s):	None	Toxicology Performed:	No	
Medical Certification:	Class 2 Valid Medicalno waivers/lim.	Last FAA Medical Exam:	March 25, 1997	
Occupational Pilot:	UNK	Last Flight Review or Equivalent:		
Flight Time:	775 hours (Total, all aircraft), 36 hours (Total, this make and model), 623 hours (Pilot In Command, all aircraft), 60 hours (Last 90 days, all aircraft), 28 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft)			

# **Aircraft and Owner/Operator Information**

Aircraft Make:	Bell	Registration:	N8491E
Model/Series:	47G-3B 47G-3B	Aircraft Category:	Helicopter
Year of Manufacture:		Amateur Built:	
Airworthiness Certificate:	Normal	Serial Number:	2712
Landing Gear Type:	Skid	Seats:	3
Date/Type of Last Inspection:	February 2, 1997 100 hour	Certified Max Gross Wt.:	2850 lbs
Time Since Last Inspection:	50 Hrs	Engines:	1 Reciprocating
Airframe Total Time:	4004 Hrs	Engine Manufacturer:	Lycoming
ELT:	Not installed	Engine Model/Series:	TV0-435-B1A
Registered Owner:	STEVE L. GABLE	Rated Power:	270 Horsepower
Operator:		Operating Certificate(s) Held:	None
Operator Does Business As:		Operator Designator Code:	
Operator Does Business As:			

Page 4 of 6 SEA97LA112

## 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:	
<b>Lowest Cloud Condition:</b>	Unknown	Visibility	20 miles
Lowest Ceiling:	Overcast / 15000 ft AGL	Visibility (RVR):	
Wind Speed/Gusts:	10 knots /	Turbulence Type Forecast/Actual:	/
Wind Direction:	310°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:		Temperature/Dew Point:	16°C
Precipitation and Obscuration:	No Obscuration; No Precipita	ation	
Departure Point:	, WA (S43)	Type of Flight Plan Filed:	None
Destination:		Type of Clearance:	None
Departure Time:	15:30 Local	Type of Airspace:	Class G

# **Airport Information**

Airport:		Runway Surface Type:	
Airport Elevation:		<b>Runway Surface Condition:</b>	
Runway Used:	0	IFR Approach:	None
Runway Length/Width:		VFR Approach/Landing:	Go around

# Wreckage and Impact Information

Crew Injuries:	1 Minor	Aircraft Damage:	Substantial
Passenger Injuries:		Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	1 Minor	Latitude, Longitude:	47.94017,-121.999305(est)

Page 5 of 6 SEA97LA112

#### **Administrative Information**

Investigator In Charge (IIC):

Additional Participating Persons:

Original Publish Date:

July 13, 1998

Last Revision Date:

Investigation Class:

Class

Note:

Investigation Docket:

https://data.ntsb.gov/Docket?ProjectID=42606

The National Transportation Safety Board (NTSB) is an independent federal agency charged by Congress with investigating every civil aviation accident in the United States and significant events in other modes of transportation—railroad, transit, highway, marine, pipeline, and commercial space. We determine the probable causes of the accidents and events we investigate, and issue safety recommendations aimed at preventing future occurrences. In addition, we conduct transportation safety research studies and offer information and other assistance to family members and survivors for each accident or event we investigate. We also serve as the appellate authority for enforcement actions involving aviation and mariner certificates issued by the Federal Aviation Administration (FAA) and US Coast Guard, and we adjudicate appeals of civil penalty actions taken by the FAA.

The NTSB does not assign fault or blame for an accident or incident; rather, as specified by NTSB regulation, "accident/incident investigations are fact-finding proceedings with no formal issues and no adverse parties ... and are not conducted for the purpose of determining the rights or liabilities of any person" (Title 49 Code of Federal Regulations section 831.4). Assignment of fault or legal liability is not relevant to the NTSB's statutory mission to improve transportation safety by investigating accidents and incidents and issuing safety recommendations. In addition, statutory language prohibits the admission into evidence or use of any part of an NTSB report related to an accident in a civil action for damages resulting from a matter mentioned in the report (Title 49 United States Code section 1154(b)). A factual report that may be admissible under 49 United States Code section 1154(b) is available here.

Page 6 of 6 SEA97LA112