# Aviation Investigation Final Report

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| **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:** | | **Injuries:** | 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

## 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.)

## Pilot Information

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| **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 Medical--no 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

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| **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:** | |

## Meteorological Information and Flight Plan

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| **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:** | 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 Precipitation | | |
| **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

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| **Airport:** | | **Runway Surface Type:** | |
| **Airport Elevation:** | | **Runway Surface Condition:** | |
| **Runway Used:** | 0 | **IFR Approach:** | None |
| **Runway Length/Width:** | | **VFR Approach/Landing:** | Go around |

## Wreckage and Impact Information

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| **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) |

## Administrative Information

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| **Investigator In Charge (IIC):** | Nesemeier, Gregg |
| **Additional Participating Persons:** | DEBORAH COX; RENTON , WA |
| **Original Publish Date:** | July 13, 1998 |
| **Last Revision Date:** | |
| **Investigation Class:** | Class |
| **Note:** | |
| **Investigation Docket:** | https://data.ntsb.gov/Docket?ProjectID=42606 |