



# National Transportation Safety Board Aviation Accident Final Report

---

<b>Location:</b>	Amarillo, TX	<b>Accident Number:</b>	CEN13FA105
<b>Date &amp; Time:</b>	12/14/2012, 1805 CST	<b>Registration:</b>	N67PS
<b>Aircraft:</b>	BEECH E-90	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>	Loss of control in flight	<b>Injuries:</b>	2 Fatal
<b>Flight Conducted Under:</b>	Part 91: General Aviation - Personal		

---

## Analysis

During the cross-country instrument flight rules flight, the pilot was in contact with air traffic control personnel. The controller cleared the airplane to flight level 210 and gave the pilot permission to deviate east of the airplane's route to avoid weather and traffic. A review of radar data showed the airplane heading southward away from the departure airport and climbing to an altitude of about 14,800 feet mean sea level (msl). Shortly thereafter, the airplane turned north, and the controller queried the pilot about the turn; however, he did not respond. The airplane wreckage was located on ranch land with sections of the airplane's outer wing, engines, elevators, and vertical and horizontal stabilizers separated from the fuselage and scattered in several directions, which is consistent with an in-flight breakup before impact with terrain. A review of the weather information for the airplane's route of flight showed widely scattered thunderstorms and a southerly surface wind of 30 knots with gusts to 40 knots. An AIRMET active at the time advised of moderate turbulence below flight level 180. Three pilot reports made within 50 miles of the accident site indicated moderate turbulence and mountain wave activity. An assessment of the humidity and freezing level noted the potential for clear, light-mixed, or rime icing between 10,700 and 17,300 feet msl. Postaccident airplane examination did not reveal any mechanical malfunctions or anomalies with the airframe and engines that would have precluded normal operation. It's likely the airplane encountered heavy to extreme turbulence and icing conditions during the flight, which led to the pilot's loss of control of the airplane and its subsequent in-flight breakup.

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's loss of control of the airplane after encountering icing conditions and heavy to extreme turbulence and the subsequent exceedance of the airplane's design limit, which led to an in-flight breakup.

## Findings

<b>Aircraft</b>	Aircraft structures - Capability exceeded (Cause)
<b>Personnel issues</b>	Action - Pilot (Cause)
<b>Environmental issues</b>	Convective turbulence - Effect on personnel (Cause) Freezing rain/sleet - Effect on personnel (Cause)

## Factual Information

### HISTORY OF FLIGHT

On December 14, 2012, about 1805 central standard time, a Beech E-90 airplane, N67PS, impacted terrain following an inflight break-up near Amarillo, Texas. The commercial rated pilot and passenger were fatally injured. The airplane was substantially damaged. The airplane was registered to O'Neal Aviation LLC, Colorado Springs, Colorado, and operated by a private individual. Instrument meteorological conditions prevailed and an instrument flight plan was filed for the 14 Code of Federal Regulations Part 91 personal flight. The flight originated from the Rick Husband International airport (KAMA), Amarillo, Texas, about 1750, and destined for the Fort Worth Meacham Airport (KFTW), Fort Worth, Texas.

A review of the air traffic control communications and radar data revealed that the controller transferred the airplane from AMA departure, to the Albuquerque Air Route Traffic Control Center (ARTCC). The ARTCC controller reportedly cleared the airplane to flight level 210, and gave the pilot permission to deviate east of the airplane's route for weather and traffic avoidance. Shortly thereafter, the airplane appeared to turn to the north, and the pilot did not respond to the controller's query about the turn.

The Texas Department of Public Safety located the airplane wreckage about 20 miles south of KAMA on open, rolling hill, ranch land. The airplane's outer wing sections, engines, elevators, vertical and horizontal stabilizers were separated from the fuselage and located in several directions from the main wreckage.

### PILOT INFORMATION

The pilot held commercial pilot certificate with ratings for airplane single-engine land, multiengine land, and instrument-airplane. A third-class Federal Aviation Administration (FAA) medical was issued on October 2, 2012, with the limitation; must have glasses for near vision. On the application for a medical certificate the pilot listed his total time as 1,650 hours and 50 hours in the preceding six months.

### AIRCRAFT INFORMATION

The Beechcraft E-90 King Air is a twin-turboprop airplane powered by two Pratt & Whitney PT6A-28 engines. The airplane is typically configured for 5-7 passengers and two pilots. The airplane was maintained under the manufacturer's maintenance program.

A review of the airplane's maintenance records revealed that the airframe's phase 3 and 4 inspections were completed on March 23, 2012. At the time of the inspection, the airframe had a total time of 8,600.2 hours. The airplane's phase 1 and 2 inspections were completed on May 23, 2012, at which time; the left engine had accumulated 8,456.7 total hours and 1,988.0 hours since overhaul; the right engine had accumulated 8,545.7 total hours and 2,781.7 hours since overhaul. The airplane's total time was 8,607.3 hours, at the time of the inspection.

The airplane was equipped with a Garmin GDL 69 that can deliver XM WX satellite weather to the airplane's Garmin 530 GPS/NAV/COM navigation system. The airplane was also equipped with a Bendix/King model KGP 560 eGPWS (enhanced Ground Proximity Warning System).

## METEOROLOGICAL INFORMATION

The Area Forecast for Texas panhandle area, issued at 1345 CST forecasted: scattered clouds or a broken ceiling at 8,000 feet mean sea level (msl) with cloud tops to 15,000 feet msl, surface visibility of 3-5 miles, blowing dust, widely scattered thunderstorms with light rain, thunderstorms possibly severe, cumulonimbus tops to FL350, southerly surface wind of 30 knots with gusts to 40 knots; for the eastern half of the Texas panhandle until 2000 CST – ceiling broken at 3,500 feet msl with layered clouds to FL250, scattered light rain showers and widely scattered thunderstorms with light rain developing between 1400 and 1600 CST, thunderstorms possibly severe, southerly surface wind of 20 knots with gusts to 30 knots.

Two Airmen's Meteorological Information (AIRMET) advisories were active at the accident location at the accident time. One advised of moderate turbulence below FL180 and a second advised of strong surface winds with sustained magnitudes greater than 30 knots expected.

There were three pilot reports (PIREPs) within 50 miles the accident site that were reviewed from 3 hours of the accident time; the reports included moderate turbulence and mountain wave activity.

The Aviation Weather Center in Kansas City, Missouri, issued several convective Significant Meteorological Information (SIGMETs) for Texas that were valid at the accident time. The Storm Prediction Center (SPC) in Norman, Oklahoma, also issued Convective Outlook reports that concerned the Texas panhandle.

At 1753, the automated weather observation facility located at KAMA, reported wind from 210 degrees at 10 knots, with a peak wind at 1714 CST from 260 degrees at 33 knots, visibility 10 miles, broken clouds at 10,000 feet, temperature 47 Fahrenheit (F), dew point 38 F, and a barometric pressure of 29.61 inches of mercury.

A regional Next-Generation Radar (NEXRAD) mosaic obtained for 1805 CST and identified a north-south oriented line of high (>50 dBZ) values of reflectivity east of the accident site in western Oklahoma. Only light values of reflectivity were depicted near the accident location.

Atmospheric data was retrieved from a weather balloon at 1721 CST. The AMA sounding indicated almost the entire troposphere was stable or conditionally unstable. No temperature inversions were noted below 35,000 feet. The relative humidity was greater than 90 percent between about 11,000 and 13,000 feet. The freezing level was approximately 8,400 feet. Assessments of icing made noted the potential for moderate clear icing around 12,700 feet, with a potential for light mixed and rime icing at altitudes between 10,700 and 13,500 feet. Another area of potential light rime icing was identified between 15,600 and 17,300 feet.

A wind profile identified a west-southwesterly wind near the surface with a magnitude of 17 knots. The wind remained west-southwesterly/southwesterly but increased in magnitude to 51 knots through about 11,000 feet. Above this level the wind backed slightly and increased in magnitude to 63 knots through 20,000 feet. Calculations indicated the potential for several layers of significant clear-air turbulence below about 13,000 feet.

## COMMUNICATIONS and RADAR INFORMATION

The pilot was last in contact with an Albuquerque ARTCC controller, who cleared the airplane to flight level 210, and gave the pilot permission for a course deviation. The pilot did not respond to the controller's query about a turn to the north. There was no further communications with the pilot and nor distress calls from the pilot.

A review of radar returns shows the airplane departing and climbing away from AMA. The airplane's track depicted a gentle S-type turn as the airplane headed in a southerly direction. The last several radar returns had the airplane's altitude as 14,700, 14,700, and 14,800 feet, before the airplane entered a right turn. The radar then had the airplane descending from 14,800 to 14,600 as the turn continued; then the altitude dropped to 11,200 feet, before the altitude data ends.

#### WRECKAGE AND IMPACT INFORMATION

The National Transportation Safety Board, inspectors from the Federal Aviation Administration (FAA), and a technical representative from the Beechcraft Corporation examined the airplane wreckage on site.

The airplane came to rest in open, rolling ranch land. All major components of the airplane were accounted for on scene. Pieces of the airplane including parts of the wings, the two engines, and tail section had separated from the fuselage, and were located within a 1 mile diameter of the fuselage.

The fuselage received heavy impact damage; the fuselage was deformed into an oval shape from its original semi cylindrical shape. The empennage section had been torn from the rear of the fuselage, the wing spar carry thru section was broken; the right inboard section of the wing remained with the fuselage. About a 9 foot section of the outboard section of the right wing was located approximately 115 feet, on a 55 degree heading from the fuselage. The right wing nacelle and engine had also separated from the wing. The right engine was about 240 feet on a 90 degree heading from the fuselage. The inboard section of the left wing separated from the fuselage near the wing root and was located adjacent to the primary fuselage ground scar. The outboard section of the left wing was located about 510 feet on a 300 degree heading from the fuselage; the left engine was located about 140 feet, on a 40 degree heading from the fuselage. Both engines turbine blades appeared bent, consistent with rotation at the time of impact.

The left and right ailerons had separated from their respective attachment points. Each aileron had been torn into pieces and was located in the debris field.

The vertical stabilizer separated from the fuselage and was located about 610 feet from the main wreckage. The rudder had separated from the vertical stabilizer and was in three pieces; with the base section located about 235 feet beyond the vertical stabilizer; the top section of the rudder, without the counterweight, was found another 315 feet beyond the rudder base section.

Both the right and left hand horizontal stabilizers were located near each other, and about 685 feet from the fuselage and 145 feet from the vertical stabilizer. The fuselage's aft bulkhead, which included the elevator torque fittings, was located just a few feet from the left and right horizontal stabilizers.

All of the examined fracture surfaces exhibited features consistent with overstress failures and

no evidence of fatigue. Control cables separations were also consistent with overload failure.

The airplane fragments and debris field is consistent with an in-flight break up, before impact with terrain.

## MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy on the pilot was not conducted.

The FAA Bioaeronautical Sciences Research Laboratory, Oklahoma City, Oklahoma, was not able to perform toxicological tests on the specimens for carbon monoxide or cyanide. The specimens were negative for ethanol in muscle and liver. Diphenhydramine was detected in the liver.

Diphenhydramine is an antihistamine used to treat a number of conditions including allergic symptoms and the common cold. Diphenhydramine is available as a non-prescription drug that is commonly marketed under the trade name Benadryl.

## TEST AND RESEARCH

The eGPWS unit, which was damaged in the accident, was sent to the NTSB's Vehicle Recorder Division, in Washington, DC. The unit was examined for the potential download of non-volatile memory (NVM) information on the accident flight. The eGPWS does not continuously record, but stores data to NVM only when certain criteria are met, additionally, if an alert or warning related to the EGPWS function activates, the unit retains data points for 20 seconds prior to the activation of the warning, and 10 seconds afterwards.

Data downloaded from the airplane's eGPWS revealed the unit recorded 22 seconds of information in the airplane's descent; during the right turn, the airplane descended from 13,966 feet to 5,904 feet. The airplane's descent rate was over 18,000 feet per minute (fpm), and after 19 seconds, the descent rate exceeded the eGPWS parameter of 32,000 fpm.

The airplane's remote directional gyro unit was located and had sustained impact damage during the accident. The external cover was removed exposing the gyro and gimbal. The gyro had broken from its mount and was lying inside the cover. Both the gyro and gimbal had marks consistent with the gyro's rotation at the time of impact. The airplane's attitude reference gyro was sent to the NTSB Material Laboratory in Washington DC, for examination. The examination also revealed marks on the gyro's that were consistent with rotation at the time of impact.

## History of Flight

Enroute-climb to cruise	Turbulence encounter Structural icing Loss of control in flight (Defining event)
Uncontrolled descent	Aircraft structural failure

## Pilot Information

Certificate:	Commercial; Private	Age:	57
Airplane Rating(s):	Multi-engine Land; Single-engine Land	Seat Occupied:	Left
Other Aircraft Rating(s):	None	Restraint Used:	Seatbelt, Shoulder harness
Instrument Rating(s):	Airplane	Second Pilot Present:	No
Instructor Rating(s):	None	Toxicology Performed:	Yes
Medical Certification:	Class 3 With Waivers/Limitations	Last FAA Medical Exam:	10/02/2012
Occupational Pilot:	No	Last Flight Review or Equivalent:	
Flight Time:	(Estimated) 1650 hours (Total, all aircraft)		

## Aircraft and Owner/Operator Information

Aircraft Make:	BEECH	Registration:	N67PS
Model/Series:	E-90	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	No
Airworthiness Certificate:	Normal	Serial Number:	LW-112
Landing Gear Type:	Retractable - Tricycle	Seats:	10
Date/Type of Last Inspection:	05/23/2012, AAIP	Certified Max Gross Wt.:	
Time Since Last Inspection:		Engines:	2 Turbo Prop
Airframe Total Time:	8607 Hours as of last inspection	Engine Manufacturer:	U/A CANADA
ELT:	C91A installed, activated, did not aid in locating accident	Engine Model/Series:	PT6A-27-28
Registered Owner:	ONEAL AVIATION LLC	Rated Power:	680 hp
Operator:	ONEAL AVIATION LLC	Operating Certificate(s) Held:	None

## Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument Conditions	Condition of Light:	Night
Observation Facility, Elevation:	KAMA	Distance from Accident Site:	20 Nautical Miles
Observation Time:	1753 CST	Direction from Accident Site:	160°
Lowest Cloud Condition:	Thin Broken / 10000 ft agl	Visibility	10 Miles
Lowest Ceiling:	Broken / 10000 ft agl	Visibility (RVR):	
Wind Speed/Gusts:	10 knots /	Turbulence Type Forecast/Actual:	/
Wind Direction:	210°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	29.61 inches Hg	Temperature/Dew Point:	8° C / 3° C
Precipitation and Obscuration:			
Departure Point:	Amarillo, TX (KAMA)	Type of Flight Plan Filed:	IFR
Destination:	Fort Worth, TX (KFTW)	Type of Clearance:	IFR
Departure Time:	1750 CST	Type of Airspace:	

## Wreckage and Impact Information

Crew Injuries:	1 Fatal	Aircraft Damage:	Substantial
Passenger Injuries:	1 Fatal	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	2 Fatal	Latitude, Longitude:	34.949167, -101.580833 (est)

## Administrative Information

Investigator In Charge (IIC):	Craig Hatch	Report Date:	05/08/2014
Additional Participating Persons:	Art Castillo; FAA FSDO; Lubbock, TX Gordon Morris; FAA FSDO; Lubbock, TX Kris Wetherell; Beechcraft; Wichita, KS		
Publish Date:	05/08/2014		
Investigation Docket:	<a href="http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=85824">http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=85824</a>		

The National Transportation Safety Board (NTSB), established in 1967, is an independent federal agency mandated by Congress through the Independent Safety Board Act of 1974 to investigate transportation accidents, determine the probable causes of the accidents, issue safety recommendations, study transportation safety issues, and evaluate the safety effectiveness of government agencies involved in transportation. The NTSB makes public its actions and decisions through accident reports, safety studies, special investigation reports, safety recommendations, and statistical reviews.

The Independent Safety Board Act, as codified at 49 U.S.C. Section 1154(b), precludes the admission into evidence or use of any part of an NTSB report related to an incident or accident in a civil action for damages resulting from a matter mentioned in the report. A factual report that may be admissible under 49 U.S.C. § 1154(b) is available [here](#).