Aviation Investigation Final Report

Location:	Troy, Texas	**Accident Number:**	FTW04CA207
Date & Time:	August 5, 2004, 15:45 Local	**Registration:**	N47713
Aircraft:	Bell 47G-3B-1	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	2 None
Flight Conducted Under:	Part 91: General aviation - Instructional		

Analysis

The 10,120-hour flight instructor was demonstrating autorotations when the helicopter landed hard and bounced back into the air, as the main rotor blades struck the tail boom. As the helicopter started to rotate, the throttle was reduced and the helicopter landed upright in a field. The flight instructor further stated the wind after the accident was from 350 degrees, approximately 10 knots. Weather reported near the time of the accident was wind from 040 degrees at 6 knots, visibility 10 statue miles, sky condition clear, temperature 84 degrees Fahrenheit, dew point 70 degrees Fahrenheit, and an altimeter setting of 29.94 inches of Mercury. The density altitude was calculated by the NTSB investigator-in-charge to be 2,485 feet mean sea level.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The flight instructor's improper flare, resulting in a hard landing. A contributing factor was the high density altitude.

Findings

Occurrence #1: HARD LANDING
Phase of Operation: LANDING - FLARE/TOUCHDOWN

Findings
1. AUTOROTATION - SIMULATED - PILOT IN COMMAND(CFI)

2. (C) FLARE - IMPROPER - PILOT IN COMMAND(CFI)
3. (F) WEATHER CONDITION - HIGH DENSITY ALTITUDE

Factual Information

On August 5, 2004, at 1545 central daylight time, a Bell 47G-3B-1 single-engine helicopter, N47713, was substantially damaged during a simulated autorotation landing near Troy, Texas. The helicopter was registered to Tumbleweed Aviation LLC, of Jackson, Louisiana, and operated by Brazos Helicopter LLC, of Bruceville, Texas. The flight instructor (CFI) and commercial pilot receiving instruction were not injured. Visual meteorological conditions prevailed and a flight plan was not filed for the 14 Code of Federal Regulations Part 91 instructional flight. The cross-country flight originated from a private heliport near McClennan County, Texas, at 1445, destined for Temple, Texas.

The 10,120-hour CFI reported in the Pilot/Operator Aircraft Accident Report (NTSB Form 6120.1/2) that after performing a series of practice autorotations and stuck pedal recoveries, the flight continued en route to Temple, Texas. The flight instructor and pilot receiving instruction decided to execute one last precision touchdown practice autorotation to a field.

At an altitude of 1,200 feet above ground level (agl), the CFI initiated the autorotation at an airspeed of 60 miles per hour (mph). At an altitude approximately 75 feet agl, the pilot "raised the nose" of the helicopter "to begin the termination of the auto[rotation]." At an altitude approximately 20 feet agl, "initial collective pitch was applied to cushion the sink rate and slow the remainder of the groundspeed." After the pilot increased the throttle, he applied "all remaining collective pitch" and noticed the sink rate was not decreasing. Subsequently, the helicopter impacted the ground and then bounced back into the air.

The CFI stated that the main rotor blades severed the tail boom as the helicopter became airborne. As the helicopter started to rotate, throttle was reduced and the helicopter landed upright in the field. The CFI further stated the wind after the accident was from 350 degrees, approximately 10 knots.

Examination of the helicopter by an Federal Aviation Administration (FAA) inspector, who responded to the site of the accident, revealed the tail boom was separated from the fuselage, both main rotor blades damaged, and the landing skids were spread apart.

The CFI reported in the NTSB Form 6120.1/2 section, Recommendation (How could this accident have been prevented?) that one should "perform autorotation practice only when wind direction indicators are easily visible." Also, one should "pay more attention to aircraft performance degradation due to high density altitude."

At 1655, the automated weather observing system at Draughon-Miller Central Texas Regional Airport (TPL), near Temple, Texas, located 8 miles southwest of the accident site, reported wind from 040 degrees at 6 knots, visibility 10 statue miles, sky condition clear, temperature 84

degrees Fahrenheit, dew point 70 degrees Fahrenheit, and an altimeter setting of 29.94 inches of Mercury.

The density altitude was calculated by the NTSB investigator-in-charge to be 2,485 feet mean sea level.

Pilot Information

Certificate:	Commercial; Flight instructor; Private	**Age:**	49,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	
Instrument Rating(s):	None	**Second Pilot Present:**	Yes
Instructor Rating(s):	Helicopter	**Toxicology Performed:**	No
Medical Certification:	Class 2 Valid Medical--w/ waivers/lim	**Last FAA Medical Exam:**	August 5, 2003
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	March 1, 2003
Flight Time:	10120 hours (Total, all aircraft), 2850 hours (Total, this make and model), 10050 hours (Pilot In Command, all aircraft), 78 hours (Last 90 days, all aircraft), 28 hours (Last 30 days, all aircraft), 3 hours (Last 24 hours, all aircraft)		

Flight instructor Information

Certificate:	Commercial; Flight instructor; Foreign	**Age:**	31,Male
Airplane Rating(s):		**Seat Occupied:**	Left
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	
Instrument Rating(s):	Helicopter	**Second Pilot Present:**	Yes
Instructor Rating(s):	Helicopter	**Toxicology Performed:**	No
Medical Certification:	Class 1 Valid Medical--no waivers/lim.	**Last FAA Medical Exam:**	January 7, 2004
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	July 9, 2004
Flight Time:	3250 hours (Total, all aircraft), 3 hours (Total, this make and model), 470 hours (Pilot In Command, all aircraft), 70 hours (Last 90 days, all aircraft), 25 hours (Last 30 days, all aircraft), 3 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Bell	**Registration:**	N47713
Model/Series:	47G-3B-1	**Aircraft Category:**	Helicopter
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	2954
Landing Gear Type:	Skid	**Seats:**	3
Date/Type of Last Inspection:	May 18, 2004 100 hour	**Certified Max Gross Wt.:**	2850 lbs
Time Since Last Inspection:	93.6 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	9257.7 Hrs at time of accident	**Engine Manufacturer:**	Lycoming
ELT:		**Engine Model/Series:**	VO-435-A1F
Registered Owner:	Tumbleweed Aviation LLC	**Rated Power:**	260 Horsepower
Operator:	Brazos Helicopters LLC	**Operating Certificate(s) Held:**	None

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:	10 knots / 0 knots	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	340°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:		**Temperature/Dew Point:**	41°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	McCleannian Co., TX	**Type of Flight Plan Filed:**	None
Destination:	Temple, TX	**Type of Clearance:**	None
Departure Time:	14:45 Local	**Type of Airspace:**	Class G

Wreckage and Impact Information

Crew Injuries:	2 None	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 None	**Latitude, Longitude:**	31.294445,-97.296943

Administrative Information

Investigator In Charge (IIC):	McGill, C Frank
Additional Participating Persons:	Jesse Sanchez; San Antonio, Texas; San Antonio, TX
Original Publish Date:	October 28, 2004
Last Revision Date:	
Investigation Class:	Class
Note:	This accident report documents the factual circumstances of this accident as described to the NTSB.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=59840