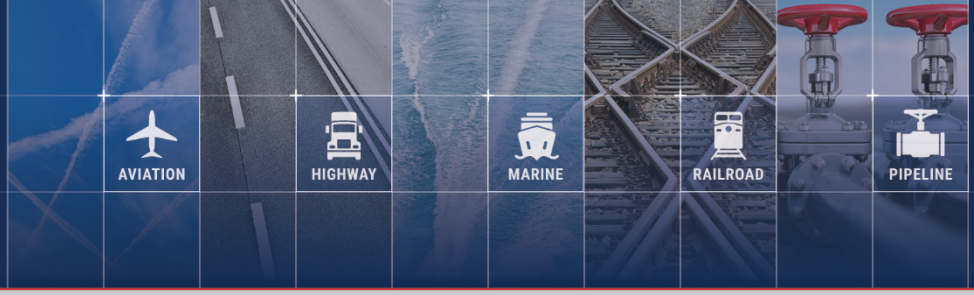

Aviation Investigation Final Report

Location:	Fort Worth, Texas	**Accident Number:**	CEN11FA359
Date & Time:	May 29, 2011, 11:45 Local	**Registration:**	N747CH
Aircraft:	Eurocopter AS 350 B2	**Aircraft Damage:**	Substantial
Defining Event:	Loss of control in flight	**Injuries:**	3 Minor
Flight Conducted Under:	Part 91: General aviation - Instructional		

Analysis

The pilot had recently purchased the helicopter and was receiving flight training from a certified flight instructor (CFI). During practice traffic pattern work, the helicopter's hydraulic system was turned off to simulate hydraulic failure on the flight control system. During the approach, the airport's ground controller reported that they were on the wrong radio frequency, so the CFI changed the radio to the correct frequency. The helicopter's airspeed slowed and the helicopter entered an uncommanded left yaw. The CFI tried to regain control by adding right pedal, trying to gain for forward airspeed, and reducing power. The helicopter did not respond to the CFI's control inputs. Subsequently, the helicopter impacted the ground, rolled on to its side, and a postcrash fire ensued. A postaccident examination of the helicopter revealed no preimpact mechanical malfunctions or failures that would have precluded normal operations. A review of the helicopter's flight manual reveals the note: "Caution, Do not attempt to carry out hover flight or any low speed maneuver without hydraulic pressure assistance. The intensity and direction of the control feedback forces will change rapidly. This will result in excessive pilot workload, poor aircraft control, and possible loss of control." Additionally, one or both pilots may have been distracted by the incorrect radio frequency.

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 due to his not maintaining adequate airspeed and altitude during a simulated hydraulic flight control failure. Contributing to the accident was the flight instructor's inadequate supervision and delayed remedial response.

Findings

Aircraft	Hydraulic, main system - Simulated malf/failure
Personnel issues	Delayed action - Instructor/check pilot
Aircraft	Airspeed - Not attained/maintained
Aircraft	Altitude - Not attained/maintained
Personnel issues	Aircraft control - Pilot
Personnel issues	Monitoring other person - Instructor/check pilot

Factual Information

History of Flight

Approach-VFR pattern base	Loss of control in flight (Defining event)
Approach-VFR pattern base	Collision with terr/obj (non-CFIT)

HISTORY OF FLIGHT

On May 29, 2011, about 1145 central daylight time, a Eurocopter AS 350 B2 helicopter, N747CH, impacted terrain while on approach to the Fort Worth Alliance Airport (AFW), Fort Worth, Texas. The private rated pilot, flight instructor, and passenger received minor injuries. The helicopter was substantially damaged during the accident and a postcrash fire ensued. The aircraft was registered to and operated by a Sovereign International Equities, LLC, Portland, Oregon under the provisions of 14 Code of Federal Regulations Part 91 as an instructional flight. Visual meteorological conditions prevailed for the flight, which operated without a flight plan.

The pilot had recently purchased the helicopter. The certified flight instructor (CFI), who was employed by the helicopter's previous owner, was to help ferry the helicopter from Puerto Rico to Texas, and then provide the new owners with flight instruction in the helicopter.

The CFI reported that he was giving the pilot instruction with normal and emergencies procedures in the helicopter. During the last traffic pattern, the hydraulic system was turned off, to simulate a hydraulic system failure. The CFI added that the ground controller reported that they were on the wrong radio frequency, so he moved to correct the radio frequency. During the approach, the helicopter slowed and started a left yaw. The CFI stated that he tried to regain control by adding right pedal, looking for forward airspeed, and reducing power. The helicopter did not respond to the CFI control inputs, descended and impacted terrain.

PERSONNEL INFORMATION

The CFI held commercial pilot and flight instructor certificates for rotorcraft-helicopter, and a private pilot certificate for airplane single-engine land. His last first-class Federal Aviation Administration (FAA) medical was issued on May 28, 2010. The CFI reportedly had approximately 3,466 total flight hours, and about 789 hours in a Eurocopter AS 350.

The pilot sitting in the right seat held a private pilot rotorcraft-helicopter rating. His FAA third-class medical was issued on August 23, 2010. The pilot's logbook was not located during the course of the investigation; however, he estimated his total flight time at 4,200 hours, with about 9 hours in the accident helicopter.

The rear seat passenger also held private pilot certificates for airplane, single-engine land and rotorcraft-helicopter ratings.

AIRCRAFT INFORMATION

The accident helicopter was 2004 Eurocopter AS350B2, “A-star”, which is a single-engine helicopter powered by a Turbomeca Arriel turboshaft engine. The helicopter had just been purchased from Caribbean Heli-Jets, Puerto Rico, by the LLC. Under the previous owner, the helicopter was maintained in accordance with the manufacturer’s recommended maintenance plan, and had accumulated approximately 2,168 hours.

METEOROLOGICAL INFORMATION

The automated weather station at KAFW, reported at 1145, wind at from 160 degrees at 20 knots gusting to 27 knots, temperature 86 degrees Fahrenheit, dew point 68 degrees Fahrenheit, visibility 10 miles, a clear sky, and an altimeter pressure setting 29.76 inches of Mercury.

COMMUNICATIONS

The pilot’s were in contact with the AFW tower controller. During the airborne traffic pattern work, the private pilot inadvertently contacted ground control; the ground controller advised them that they were on the wrong frequency. Otherwise, communication between AFW tower and the accident helicopter were routine, additionally, no emergency or distress calls were received.

RADAR INFORMATION

The Alliance approach radar did not display the accident helicopter during its traffic pattern work, or during the accident sequence.

AIRPORT INFORMATION

Fort Worth Alliance Airport (AFW) is a public use airport, located about 14 miles north of Fort Worth, Texas. The airport has class D airspace with a continuous operated control tower. The airport features two parallel concrete runways. Runway 16L-34R is 9,600-foot long and 150 foot wide. Runway 16R-34L is 8,220 foot and 150 foot wide. The field elevation is 722 feet mean sea level (msl). The airport is located about 16 miles northwest of the Dallas-Fort Worth International airport (DFW), and underneath DFW’s class B airspace.

WRECKAGE AND IMPACT INFORMATION

Inspectors from Federal Aviation Administration (FAA) examined the helicopter wreckage on-site. All major components of the airplane were accounted for at the scene. The main

wreckage came to rest on its right side. The right side skids were torn from the fuselage, the tailboom horizontal stabilizers were damaged, the main rotor blades remained attached to their respective hubs, but exhibited severe impact and heat damage; one of the two tail rotor paddles (blades) separated on impact. A post crash fire partially consumed the cabin area.

TEST AND RESEARCH

The National Transportation Safety Board Investigator-In-Charge (IIC), inspectors FAA, and technical representatives from the airframe and engine manufacturers examined the helicopter wreckage, after recovery, at a salvage yard.

Examination of the helicopter did not reveal any preimpact mechanical malfunctions.

The helicopter's 30 alpha switch central console and caution warning panel were sent to the NTSB Materials Laboratory in Washington, D.C., for further examination. Both units received heavy thermal damage by the postcrash fire. The Materials Laboratory examination revealed some evidence of filament sagging on several of the bulbs, most likely due to age. There were no broken filaments and there was no evidence of hot filament stretching found on any of the filaments of the examined bulbs. Additionally, the position of the push-type buttons on the systems control panel could not be determined, due to the unit's fire damage.

ADDITIONAL INFORMATION

According to the Eurocopter AS 350 B2 Flight Manual (Emergency Procedures) and Flight Manual Supplement, Hydraulic Pressure Failure Training Procedures:

To simulate a loss of hydraulic power, depressing the "HYD TEST" pushbutton on the central console produces the same effects as a real failure:

The hydraulic pump pressure is by-passed
The main rotor accumulators give limited time hydraulic assistance back-up.
The red HYD Light comes on, the horn sounds.

The simulation of a hydraulic failure is the same as a real failure with the exception that the main rotor load compensator is depressurized and tail rotor pedal control feedback forces are higher than normal when pushing on the right pedal.

Note: The instructor must ensure that the "HYD TEST" pushbutton on center console is selected OFF (upper position) before the collective hydraulic cut-off switch is selected OFF to ensure that the tail rotor compensator is pressurized, and to enable the pilot to restore the hydraulic power system by re-setting the hydraulic cut-off switch to ON during the training exercise should it become necessary.

The manual also notes that the hydraulic failure safety speed is 40 to 60 knots.

The manual also states: “Caution: Do not attempt to carry out hover flight or any low speed maneuver without hydraulic pressure assistance. The intensity and direction of the control feedback forces will change rapidly. This will result in excessive pilot workload, poor aircraft control, and possible loss of control."

Pilot Information

Certificate:	Private	**Age:**	54,Male
Airplane Rating(s):	None	**Seat Occupied:**	Right
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	
Instrument Rating(s):		**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	August 23, 2010
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	4200 hours (Total, all aircraft), 9 hours (Total, this make and model), 25 hours (Last 90 days, all aircraft)		

Flight instructor Information

Certificate:	Commercial; Flight engineer	**Age:**	36,Male
Airplane Rating(s):	Single-engine land	**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 With waivers/limitations	**Last FAA Medical Exam:**	May 12, 2011
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	
Flight Time:	3466 hours (Total, all aircraft), 789 hours (Total, this make and model)		

Aircraft and Owner/Operator Information

Aircraft Make:	Eurocopter	**Registration:**	N747CH
Model/Series:	AS 350 B2	**Aircraft Category:**	Helicopter
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	3794
Landing Gear Type:	Skid	**Seats:**	6
Date/Type of Last Inspection:	Continuous airworthiness	**Certified Max Gross Wt.:**	4961 lbs
Time Since Last Inspection:		**Engines:**	1 Turbo shaft
Airframe Total Time:	2168 Hrs at time of accident	**Engine Manufacturer:**	TURBOMECA
ELT:	Installed, not activated	**Engine Model/Series:**	ARRIEL 1D1
Registered Owner:	Sovereign International Equities, LLC	**Rated Power:**	712 Horsepower
Operator:	Sovereign International Equities, LLC	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KAFW	**Distance from Accident Site:**	
Observation Time:	11:45 Local	**Direction from Accident Site:**	
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	20 knots / 27 knots	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	160°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.76 inches Hg	**Temperature/Dew Point:**	30°C / 20°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Fort Worth, TX (AFW)	**Type of Flight Plan Filed:**	Unknown
Destination:	Fort Worth, TX (AFW)	**Type of Clearance:**	None
Departure Time:		**Type of Airspace:**	

Airport Information

Airport:	Fort Worth Alliance Airport AFW	**Runway Surface Type:**	
Airport Elevation:	722 ft msl	**Runway Surface Condition:**	
Runway Used:		**IFR Approach:**	Visual
Runway Length/Width:		**VFR Approach/Landing:**	Traffic pattern

Wreckage and Impact Information

Crew Injuries:	2 Minor	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 Minor	**Aircraft Fire:**	On-ground
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	3 Minor	**Latitude, Longitude:**	32.979469,-97.310638(est)

Administrative Information

Investigator In Charge (IIC):	Hatch, Craig
Additional Participating Persons:	Thomas Mcgregor; FAA FSDO; Fort Worth, TN Lindsay Cunningham; American Eurocopter; Grand Prairie, TX Bryan Larimore; Turbomeca USA; Grand Prairie, TX
Original Publish Date:	April 20, 2012
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=79250

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.