



National Transportation Safety Board Aviation Accident Factual Report

Location:	Burns Flat, OK	Accident Number:	CEN16FA307
Date & Time:	08/06/2016, 0820 CDT	Registration:	N110PX
Aircraft:	WILSON BUGATTI-DEMONGE 100P	Aircraft Damage:	Destroyed
Defining Event:	Loss of control in flight	Injuries:	1 Fatal
Flight Conducted Under:	Part 91: General Aviation - Flight Test		

On August 6, 2016, about 0820 central daylight time, an experimental amateur-built Wilson Bugatti-DeMonge 100P airplane, N110PX, impacted terrain shortly after takeoff from runway 35L at the Clinton-Sherman Airport (CSM), near Burns Flat, Oklahoma. The airline transport pilot was fatally injured, and the airplane was destroyed during impact and a subsequent postcrash fire. The airplane was registered to Le Reve Bleu LLC and was operated by the pilot as a 14 Code of Federal Regulations Part 91 test flight. Day visual meteorological conditions prevailed in the area about the time of the accident, and no flight plan was filed. The local flight was originating from CSM at the time of the accident.

A witness at the airport reported that the airplane lifted off the runway. During the initial climb, the airplane banked to the right and then to the left. The airplane's left bank increased, it descended nose down, and subsequently impacted terrain inverted. Review of a chase helicopter's video was consistent with the witness statements.

Pilot Information

Certificate:	Airline Transport	Age:	66, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	Seat Occupied:	Single
Other Aircraft Rating(s):	None	Restraint Used:	4-point
Instrument Rating(s):	Airplane	Second Pilot Present:	No
Instructor Rating(s):	Airplane Multi-engine; Airplane Single-engine; Instrument Airplane	Toxicology Performed:	Yes
Medical Certification:	Class 2 With Waivers/ Limitations	Last Medical Exam:	05/ 12/ 2015
Occupational Pilot:	No	Last Flight Review or Equivalent:	
Flight Time:	(Estimated) 10700 hours (Total, all aircraft)		

The 66-year-old pilot held a Federal Aviation Administration (FAA) airline transport pilot certificate with single-engine land, multi engine land, and instrument airplane ratings. He held a second-class FAA medical certificate issued on May 12, 2016. This medical certificate was issued with limitations: "Must wear corrective lenses. and Not valid for any class after 05/31/2017." The pilot reported on that medical certificate application 10,700 hours of total flight time and 25 hours of flight time in the previous six months.

Aircraft and Owner/Operator Information

Aircraft Manufacturer:	WILSON	Registration:	N110PX
Model/Series:	BUGATTI-DEMONGE 100P	Aircraft Category:	Airplane
Year of Manufacture:	2015	Amateur Built:	Yes
Airworthiness Certificate:	Experimental	Serial Number:	002
Landing Gear Type:	Retractable - Tailwheel	Seats:	1
Date/Type of Last Inspection:		Certified Max Gross Wt.:	2939 lbs
Time Since Last Inspection:		Engines:	2 Reciprocating
Airframe Total Time:		Engine Manufacturer:	Suzuki
ELT:		Engine Model/Series:	1300 cc
Registered Owner:	LE REVE BLEU LLC	Rated Power:	
Operator:	On file	Air Carrier Operating Certificate:	None

N110PX was an experimental amateur-built, twin-engine, single-seat, tailwheel monoplane built as a replica of the Bugatti-DeMonge 100P, a 1930's era air racer that was never flown. There was only one original airplane produced, and the accident airplane was the first and only replica produced to the date of this report. According to airworthiness documents, the airplane was constructed to duplicate the original airplane's structure, systems, and dimensions. The accident airplane was powered by two Suzuki Hyabusa reciprocating, clutched motorcycle engines mounted in tandem aft of the cockpit. The engines drove two coaxial two-blade contra-rotating Hercules fixed-pitch wooden propellers. The forward engine was installed with the output drive shaft forward and was directly connected to the propeller reduction gearbox through universal joints and drive shafts on the left side of the fuselage. The rear engine was installed with the output drive shaft aft and was indirectly connected to the propeller reduction gearbox through a chain drive and sprockets that drove the drive shafts and universal joints on the right side of the fuselage. Both engine gearboxes were set in 6th gear and could not be changed. The propeller reduction gearbox was contained in a single housing with two separate drive trains to drive the forward and aft contra rotating propellers. The forward engine engaged the left gearbox drivetrain and drove the forward propeller. The aft engine engaged the right drivetrain and drove the aft propeller.

Engine throttle control was accomplished through two levers installed side-by-side on the left side of the cockpit with the left throttle lever controlling the forward engine and the right throttle lever controlling the aft engine. Engagement of the hydraulic clutches on the engines was accomplished independently by two levers mounted side-by-side on the right side of the cockpit. Each engine could be run without propeller movement until the respective clutch was engaged.

The airplane's maximum gross weight was listed as 2,939 pounds and its empty weight was 2,470 pounds. The airplane received its FAA Special Airworthiness Certificate in the experimental category on August 4, 2015.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	KCSM, 1922 ft msl	Observation Time:	0753 CDT
Distance from Accident Site:	1 Nautical Miles	Direction from Accident Site:	351°
Lowest Cloud Condition:	Clear	Temperature/Dew Point:	23° C / 21° C
Lowest Ceiling:	None	Visibility	10 Miles
Wind Speed/Gusts, Direction:	9 knots, 40°	Visibility (RVR):	
Altimeter Setting:	30.06 inches Hg	Visibility (RVV):	
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Burns Flat, OK (CSM)	Type of Flight Plan Filed:	None
Destination:	Burns Flat, OK (CSM)	Type of Clearance:	VFR
Departure Time:	0820 CDT	Type of Airspace:	

At 0753, the recorded weather at CSM was wind 040° at 9 knots, visibility 10 statute miles, sky condition clear, temperature 23° C, dew point 21° C, and altimeter 30.06 inches of mercury.

Airport Information

Airport:	CLINTON-SHERMAN (CSM)	Runway Surface Type:	Concrete
Airport Elevation:	1922 ft	Runway Surface Condition:	
Runway Used:	35L	IFR Approach:	None
Runway Length/Width:	13503 ft / 150 ft	VFR Approach/Landing:	None

CSM was a public, towered airport, which was owned by the Oklahoma Space Industry

Development Authority/ State of Oklahoma. It was located about 2 miles west of Burns Flat, Oklahoma. The airport had an estimated elevation of 1,922.1 ft above mean sea level. Two runways, 17R/ 35L and 17L/ 35R serviced the airport. Runway 17R/ 35L was a 13,503 ft by 75 ft runway with a concrete surface. Runway 17L/ 35R was a 5,193 ft by 75 ft runway with a concrete surface. Airport operations personnel examined the runway after the accident and no liberated airplane parts were found.

Wreckage and Impact Information

Crew Injuries:	1 Fatal	Aircraft Damage:	Destroyed
Passenger Injuries:	N/ A	Aircraft Fire:	On-Ground
Ground Injuries:	N/ A	Aircraft Explosion:	None
Total Injuries:	1 Fatal	Latitude, Longitude:	35.364167, -99.204444

The airplane wreckage was found about 1,900 ft and 335° from the departure threshold of runway 35L. The airplane came to rest inverted on an approximate 330° heading. A depression was observed in the ground about 110° and 23 ft from the wreckage. Sections of clear plastic were found in the depression and the surface of sections of the depression contained a blue color transfer consistent with the color of the airplane. The airplane, forward of its empennage, was discolored, deformed, and charred, with sections consumed by fire. The rudder's skin was consumed by fire. The lower section of the right main landing gear separated from its strut and the lower section was found resting on vegetation northwest of the main wreckage. Splintered wooden propeller blade fragments were found resting on the ground in the area around the wreckage.

An on-scene examination of the wreckage was conducted. The rudder control cables were traced from the rudder to the rudder pedals. The elevators' push/ pull tubes were attached to the control arms for each elevator. Forward of the empennage, the elevator tubes were found to be consumed by fire. Sections of the aileron tubes were found to be consumed by fire outboard of the fuselage. However, outboard sections of the aileron's control tubes were found connected to each aileron. Control continuity for the elevators and ailerons could not be established due to the fire damage. The propulsion drivetrain was traced from the engines to the gearbox and propellers, and no preimpact anomalies were detected. There were no observed damage or witness marks to indicate that the chain and sprockets for the aft engine became disengaged under power. The engines sustained thermal damage. The engines could not be rotated by hand and their clutches were not examined on scene. However, no external indications of engine anomalies were observed. The propeller gearbox was intact but had sustained thermal damage and sooting. The propeller hub was attached and charred. A portion of the left driveshaft remained attached to the universal joint and the right drive shaft was separated from the universal joint. There were no external indications of gearbox anomalies observed.

Medical And Pathological Information

An autopsy was performed on the pilot by the Office of the Chief Medical Examiner in Oklahoma City, Oklahoma, and toxicological samples were taken. The autopsy listed multiple blunt force injuries as the cause of death and accident as the manner of death.

The FAA Bioaeronautical Sciences Research Laboratory's Civil Aerospace Medical Institute (CAMI) prepared a Final Forensic Toxicology Accident Report on the samples taken during the autopsy. The report indicated that the samples sustained putrefaction and subsequently, in part, stated:

178 (mg/ dL, mg/ hg) Ethanol detected in Muscle
38 (mg/ dL, mg/ hg) Ethanol detected in Brain
N-Butanol detected in Muscle
Propanol (N-) detected in Muscle
Propanol (N-) detected in Brain

The CAMI description of Ethanol indicated that it is "primarily a social drug with a powerful central nervous system depressant. After absorption, ethanol is uniformly distributed throughout all tissues and body fluids. The distribution pattern parallels the water content and blood supply of each organ. Postmortem production of ethanol also takes place due to putrefaction processes, but vitreous humor and urine do not suffer from such production to any significant extent in relation to blood. Vitreous humor would normally have about 12% more ethanol than blood if the system is in the post absorptive state, and urine would normally have about 25% more ethanol than blood. The average rate of elimination of ethanol from blood is 18 mg/ dL (15-20 mg/ dL) per hour."

The CAMI description of N-Butanol indicated that it is "an alcohol. It is also produced postmortem, along with ethanol and other alcohols."

The CAMI description of N-Propanol indicated that it is "an alcohol. It is also produced postmortem, along with ethanol and other alcohols."

Fire

Review of a chase helicopter's video showed that there was no inflight fire and that the accident airplane's fire started after the ground impact.

Tests And Research

The airplane was fitted with GoPro cameras for the flight. Six of these cameras were found in the area of the wreckage and were sent to the National Transportation Safety Board (NTSB)

Recorder Laboratory. The airplane wreckage was released and subsequent to the release, a mechanical engineer in the recorder laboratory examined the cameras, convened a Video Group as its Chairman, and subsequently produced an Onboard Image Recorder Factual Report.

The Onboard Image Recorder Factual Report stated that the cameras exhibited witness marks consistent with various levels of impact damage. The cameras recorded video data on micro secure data (microSD) cards. Five of the six microSD cards contained retrievable video data for the entire flight and one microSD card contained retrievable data for a portion of the flight before impact.

The report, in part, described the timing and correlation of the cameras' data and the group's observations of the accident flight recorded video and a previous flight's recorded video. The description of the accident flight, in part, indicated that the pilot was in a conscious state during the recording. No pilot or ground crew conversations pertinent to the investigation were captured. All preflight activities appeared to be consistent with known procedures. The pilot was seated and belted during the recording. He moved the left/forward ignition master switch to its "on" position and depressed the starter button. Then a sound consistent with a running engine was heard and the front propeller rotated counter-clockwise. The pilot depressed the right/rear starter button. No additional engine sound was heard and the pilot moved the right/rear ignition master switch to its "on" position. The pilot then depressed the starter button again, the rear propeller spun clockwise, and the sound consistent with a running engine was heard. The pilot appeared to manipulate the area consistent with the location of the engine clutch engagement lever and the front propeller began to spin counter-clockwise. The pilot movements were consistent with flight control check. The engine and gearbox gauge indications, which included engine oil temperature, engine oil pressure, fuel pressure, water temperature, volts, gearbox oil temperature, and gearbox oil pressure for both engines were within their respective green ranges at the start of the taxi to runway 35L and through the remainder of the recording. The airplane crossed the runway edge marking for runway 35L, the pilot added power, and the airplane tracked the right side of the runway centerline. The pilot added power and the airspeed indication became alive during the takeoff roll. The airspeed was about 60 knots during the roll abeam taxiway E. The airspeed indicated 80 knots after the airplane passed abeam taxiway D. The pilot applied backpressure to the control stick when the indicated airspeed was above 80 knots. The airplane crossed abeam taxiway C and it became airborne. The left/forward throttle lever was about 3/4 knob-width behind the right/rear throttle lever. The airplane laterally transitioned from the right side of the runway centerline to the left side of the centerline. The pilot moved the gear selector switch to the "up" position, a red light nearby illuminated, and the light extinguished about five seconds later. The runway centerline was visible below and to the right of the airplane. A change in pitch was heard in the ambient engine sounds. The rpm indication for the left/forward engine began to climb and the right rear engine appeared to remain stabilized. The pilot looked downward in the cockpit area near the hydraulic valve lever. The end of runway 35L became visible and the airplane was left of runway centerline. The pilot's right arm appeared to reach in the direction of the hydraulic valve lever. The left forward throttle lever appeared to be a knob and a half width distance from the right/rear throttle lever. The left/forward rpm indications trended upward, the pilot returned his left hand to the throttles, and his right hand to the control stick. The airplane entered an uncommanded slight left roll. The left/forward engine rpm indication reached

about 10,000 rpm and the pilot pulled back the left/ forward throttle lever near the closed position. Engine sounds decreased, the left/ forward rpm indication decreased, and the airspeed was around the start of the green arc about 70 knots. The ambient engine sound surged. The pilot appeared to have pushed the right/ rear throttle forward. The left/ forward engine rpm indicated an increase in rpm near its redline. The left/ forward throttle lever was positioned near its closed position. The airplane exhibited an uncommanded right roll and some flutter was observed on the left aileron. The airspeed was below the green arc about 65 knots. The right roll was arrested and the airplane appeared level. About a second later, the airplane entered an uncommanded left roll. The airspeed indication was about 65 knots. The control stick was in a neutral position. The left/ forward rpm indication was near redline and the right/ rear engine indication was about 4,500 rpm. As the airplane rolled through 90° of left bank, the pilot placed both hands on the control stick and commanded a right roll with a positive pitch attitude. The airplane continued to roll left, the nose dropped, and a green field came into view out of the front of the windscreen. The airplane rolled inverted and the recording continued until the subsequent ground impact. The altimeter during the recording did not exhibit an increase in altitude. However, an estimate from a chase helicopter video showed that airplane reached a maximum altitude between 80 and 100 ft above ground level. Additionally, a plot of observed parameters during the accident flight video was produced. The Onboard Image Recorder Factual Report is appended to the docket associated with this investigation.

An NTSB aerospace engineer, who was a member of the video group, reviewed the video recordings, assisted in observed video documentation, and produced an Airplane Performance Study. The performance study, in part, reviewed instrument readings as a function of camera elapsed time. The readings included indicated airspeed (VIAS), indicated angle-of-attack (α), left/ forward and right/ rear engine throttle lever angles (TLA), and the corresponding engine speeds (rpm).

A plot of the tabulated TLA's, rpm's, and VIAS's as a function of camera elapsed time was produced and the data showed that the engine speed for the forward engine began increasing from 6,000 rpm about 7 seconds elapsed time without any apparent TLA input from the pilot. The pilot responded by reducing TLA for the forward engine at 31 seconds elapsed time, about two seconds before the forward engine reached its maximum operating speed (red line) of 9,500 rpm.

The pilot continued to reduce TLA to a minimum of about 40° for the forward engine until, about 38 seconds elapsed time, he increased the forward TLA by 10°. The airplane's airspeed was observed decaying. The forward engine reached red line for a second time about 42 seconds elapsed time.

The input TLA and engine rpm for the right/ rear engine appeared more consistent than for the left/ forward engine. The rpm for the rear engine remained at approximately 5,800 rpm for most of the recording until, about 31 seconds elapsed time, the pilot began increasing the rear engine TLA by 7° through the next ten seconds. During this time, the rear engine rpm remained constant despite the 7° increase in TLA. The right engine rpm reduced to about 4,500 rpm after the pilot pulled the TLA back to 45° about 41 seconds elapsed time.

The airspeed plot showed that the airplane decelerated below the published stall speed of 70 knots equivalent airspeed (based on a gross weight of 2,850 lb and a normal load factor of 1.04) about 41 seconds elapsed time and remained below the stall speed for the remainder of the recording. The video evidence reflected a sequence of events consistent with an aerodynamic stall.

The performance study used the tabulated airspeed and an estimated operational gross weight of 2,650 lb and determined the airplane lift coefficient that was extracted from the data as a function of indicated angle-of-attack. Where angle of attack data was available, the lift from the observed accident data compared consistently with design estimates derived by the Le Reve Bleu team. The Airplane Performance Study is appended to the docket associated with this investigation.

Additional Information

Examination of the terrain from the accident site to one quarter mile north of the accident site revealed that a suitable field for an emergency landing was present there.

Administrative Information

Investigator In Charge (IIC):	Edward F Malinowski
Additional Participating Persons:	Aaron Varland; Federal Aviation Administration; Oklahoma City, OK Stanley G Shumway; Annapolis, MD
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=93776