National Transportation Safety Board
Aviation Accident Final Report

Location:	Milwaukee, WI	**Accident Number:**	CEN15FA328
Date & Time:	07/29/2015, 1810 CDT	**Registration:**	N425KJ
Aircraft:	SOCATA TBM 700	**Aircraft Damage:**	Destroyed
Defining Event:	Abnormal runway contact	**Injuries:**	2 Fatal
Flight Conducted Under:	Part 91: General Aviation - Personal		

Analysis

The airline transport pilot was landing at the destination airport after a cross-country flight in visual meteorological conditions. The tower controller stated that the airplane's landing gear appeared to be extended during final approach and that the airplane landed within the runway's touchdown zone. The tower controller stated that, although the airplane made a normal landing, he heard a squealing noise that continued longer than what he believed was typical. The pilot subsequently transmitted "go-around." The tower controller acknowledged the go-around and cleared the pilot to enter a left traffic pattern. The tower controller stated that he heard the engine speed accelerate while the airplane maintained a level attitude over the runway until it passed midfield. He then saw the airplane pitch up and enter a climbing left turn. The tower controller stated that the airplane appeared to enter an aerodynamic stall before it descended into terrain in a left-wing-down attitude. Another witness reported that he saw the airplane, with its landing gear extended, in a steep left turn before it descended rapidly into terrain.

A postaccident examination did not reveal any evidence of flight control, landing gear, or engine malfunction. An examination of the runway revealed numerous propeller slash marks that began about 215 ft past the runway's touchdown zone; however, there was no evidence that any portion of the airframe had impacted the runway during the landing. Additionally, measurement of the landing gear actuators confirmed that all three landing gear were fully extended at the accident site. Therefore, the pilot likely did not adequately control the airplane's pitch during the landing, which allowed the propeller to contact the runway. Due to the propeller strikes, the propeller was likely damaged and unable to provide adequate thrust during the go-around. Further, based on the witness accounts, the pilot likely did not maintain adequate airspeed during the climbing left turn, which resulted in the airplane exceeding its critical angle of attack and experiencing an aerodynamic stall at a low altitude.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:

The pilot's improper pitch control during the landing, which resulted in the propeller striking the runway, and his failure to maintain adequate airspeed during the subsequent go-around, which resulted in the airplane exceeding its critical angle of attack and experiencing an aerodynamic stall at a low altitude.

Findings

Aircraft	
	Propeller blade section - Damaged/degraded (Cause)
	Airspeed - Not attained/maintained (Cause)
	Angle of attack - Not attained/maintained (Cause)
Personnel issues	Aircraft control - Pilot (Cause)

Factual Information

History of Flight

Landing-aborted after touchdown	Abnormal runway contact (Defining event)
Initial climb	Loss of control in flight Aerodynamic stall/spin
Uncontrolled descent	Collision with terr/obj (non-CFIT)
Post-impact	Explosion (post-impact) Fire/smoke (post-impact)

On July 29, 2015, about 1810 central daylight time, a Socata TBM 700 single-engine turboprop airplane, N425KJ, collided with terrain following a loss of control during a go-around at Lawrence J. Timmerman Airport (MWC), Milwaukee, Wisconsin. The airline transport pilot and his passenger were fatally injured, and the airplane was destroyed. The airplane was registered to Trustey Management Corporation and was operated by the pilot under the provisions of 14 *Code of Federal Regulations* Part 91 on an instrument flight rules flight plan. Day visual meteorological conditions prevailed for the cross-country flight that departed Beverly Municipal Airport (BVY), Beverly, Massachusetts, at 1552 eastern daylight time with a destination of MWC.

According to Federal Aviation Administration (FAA) air traffic control (ATC) data, the flight was cleared for a visual approach to runway 33R at MWC. At 1808:12, while on a 2.5-mile final approach, the pilot asked the tower controller for the current wind conditions. At 1808:18, the tower controller told the pilot that the prevailing wind was from 230° at 10 knots. At 1808:21, the pilot replied, "Three zero one zero, thanks, or two three zero?" At 1808:24, the tower controller responded, "Two three, two thirty."

In a postaccident interview, the tower controller reported that he established visual contact with the airplane when it was on a 3-mile final approach to runway 33R. The tower controller stated that the airplane's landing gear appeared to be extended during final approach and that the airplane landed within the runway's touchdown zone. The tower controller further stated that, although the airplane made a normal landing, he heard a squealing noise that continued longer than what he believed was typical.

According to ATC transmissions, at 1809:56, shortly after the airplane had touched down, the pilot transmitted, "go-around." The tower controller acknowledged the go-around and cleared the pilot to enter a left traffic pattern. The tower controller stated that he heard the engine speed accelerate while the airplane maintained a level attitude over the runway until it passed midfield. He then saw the airplane pitch up and enter a climbing left turn. The tower controller stated that the airplane appeared to "stall" during the turn before it descended into terrain in a left-wing-down attitude.

Another witness reported that he saw the airplane, with its landing gear extended, in a steep

left turn before it descended toward the ground. He stated that the airplane maintained the steep left bank throughout the final descent and estimated that the airplane's final descent path was about 45° below a level flight attitude. The witness reported that, shortly after he lost sight of the airplane, he heard it impact terrain and saw a large explosion.

Pilot Information

Certificate:	Airline Transport	**Age:**	53, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	4-point
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 3 Without Waivers/Limitations	**Last FAA Medical Exam:**	06/13/2014
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	11/16/2014
Flight Time:	1875.1 hours (Total, all aircraft), 721.1 hours (Total, this make and model), 1656.5 hours (Pilot In Command, all aircraft), 64.4 hours (Last 90 days, all aircraft), 16.2 hours (Last 30 days, all aircraft), 3.3 hours (Last 24 hours, all aircraft)		

According to FAA records, the 53-year-old pilot held an airline transport pilot certificate with single-engine land, multi-engine land, and instrument airplane ratings. The airplane single-engine land rating was limited to commercial privileges. The pilot was type-rated for the Bombardier Challenger 300 and Embraer Phenom 300. His most recent FAA third-class medical certificate was issued on June 13, 2014, with no restrictions or limitations. On the application for his current medical certificate, the pilot reported having accumulated 1,594 total hours of flight experience, of which 112 hours were flown within the previous 6 months.

The pilot's flight history was established using his logbook. The final logbook entry was dated July 20, 2015, at which time he had accumulated 1,875.1 hours total flight time. The pilot had logged 1,656.5 hours as pilot-in-command, 1,363 hours in single-engine airplanes, and 512.1 hours in multi-engine airplanes. He had flown 268.1 hours during the year before the accident, 152.7 hours during the 6 months before the accident, 64.4 hours during the 90 days before the accident, and 16.2 hours during the month before the accident. Based on available information, the 3.3-hour accident flight was the only flight flown within 24 hours of the accident. The pilot had accumulated 721.1 hours in the accident airplane make/model. His last flight review and instrument proficiency check were completed in the accident airplane on November 16, 2014.

Aircraft and Owner/Operator Information

Aircraft Make:	SOCATA	**Registration:**	N425KJ
Model/Series:	TBM 700 850	**Aircraft Category:**	Airplane
Year of Manufacture:	2009	**Amateur Built:**	No
Airworthiness Certificate:	Normal	**Serial Number:**	518
Landing Gear Type:	Retractable - Tricycle	**Seats:**	6
Date/Type of Last Inspection:	12/29/2014, AAIP	**Certified Max Gross Wt.:**	7394 lbs
Time Since Last Inspection:		**Engines:**	1 Turbo Prop
Airframe Total Time:	656.7 Hours as of last inspection	**Engine Manufacturer:**	Pratt & Whitney Canada
ELT:	C126 installed, activated, did not aid in locating accident	**Engine Model/Series:**	PT6A-66D
Registered Owner:	Trustey Management Corporation	**Rated Power:**	850 hp
Operator:	Trustey Management Corporation	**Operating Certificate(s) Held:**	None

The airplane was a 2009 Socata TBM 700, serial number 518. The low-wing airplane was of conventional aluminum construction and was equipped with a retractable tricycle landing gear and a pressurized cabin that was configured to seat six individuals. The airplane was powered by an 850 shaft-horsepower Pratt & Whitney Canada PT6A-66D turbo-propeller engine, serial number PCE-RV0179, through a 4-blade, constant speed, full-feathering, Hartzell model HC-E4N-3/E9083SK propeller assembly. The airplane was approved for operations in instrument meteorological conditions and in known icing conditions. The airplane had a maximum allowable takeoff weight of 7,394 pounds. On December 2, 2009, the airplane was issued a standard airworthiness certificate and a registration number when it was imported into the United States after manufacture in France. The current airplane owner, Trustey Management Corporation, purchased the airplane on December 16, 2009.

According to maintenance records, the airplane had been maintained under the provisions of an approved manufacturer inspection program. The most recent phase inspection was completed on December 29, 2014, at 656.7 hours total airframe time. The recording hour meter was destroyed during the postimpact fire, which precluded a determination of the airplane's total service time at the time of the accident. A postaccident review of the available maintenance records found no history of unresolved airworthiness issues.

The airplane had two fuel tanks, one located in each wing, and a total fuel capacity of 301 gallons (292 gallons usable). According to available fueling information, the fuel tanks were topped-off before the accident flight.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	**Condition of Light:**	Day
Observation Facility, Elevation:	MWC, 745 ft msl	**Distance from Accident Site:**	0 Nautical Miles
Observation Time:	1745 CDT	**Direction from Accident Site:**	
Lowest Cloud Condition:	Clear	**Visibility**	10 Miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	14 knots /	**Turbulence Type Forecast/Actual:**	/ None
Wind Direction:	270°	**Turbulence Severity Forecast/Actual:**	/ N/A
Altimeter Setting:	29.93 inches Hg	**Temperature/Dew Point:**	29°C / 6°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Beverly, MA (BVY)	**Type of Flight Plan Filed:**	IFR
Destination:	Milwaukee, WI (MWC)	**Type of Clearance:**	IFR
Departure Time:	1552 EDT	**Type of Airspace:**	Class D

At 1745, the MWC automated surface observing system reported: wind 270° at 14 knots, a clear sky, 10 miles surface visibility; temperature 29°C; dew point 6°C; and an altimeter setting of 29.93 inches of mercury.

According to air traffic control communications, at 1808:12, the pilot asked the tower controller for the current wind conditions while on final approach to runway 33R. The tower controller replied that the prevailing wind was from 230° at 10 knots.

Airport Information

Airport:	Lawrence J Timmerman Airport (MWC)	**Runway Surface Type:**	Asphalt
Airport Elevation:	745 ft	**Runway Surface Condition:**	Dry
Runway Used:	33R	**IFR Approach:**	Visual
Runway Length/Width:	4103 ft / 75 ft	**VFR Approach/Landing:**	None

Lawrence J. Timmerman Airport (MWC), a public airport located about 5 miles northwest of Milwaukee, Wisconsin, was owned and operated by Milwaukee County. The airport field elevation was 745 ft msl. The airport was served by two asphalt runways, runway 15L/33R (4,103 ft by 75 ft) and runway 4L/22R (3,201 ft by 75 ft). Runway 4L/22R was closed for maintenance at the time of the accident. The airport also had two turf runways, runway 15R/33L (3,231 ft by 270 ft) and runway 4R/22L (2,839 ft by 270 ft). The airport was equipped with an air traffic control tower that was operational at the time of the accident.

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:	1 Fatal	**Aircraft Fire:**	On-Ground
Ground Injuries:	N/A	**Aircraft Explosion:**	On-Ground
Total Injuries:	2 Fatal	**Latitude, Longitude:**	43.112222, -88.039444

A postaccident examination of runway 33R revealed numerous slash marks consistent with propeller blades striking the asphalt runway surface. The first propeller strike was identified about 1,384 ft from the runway 33R threshold, or about 215 ft past the runway's touchdown zone. There were 22 propeller strike marks identified over a distance of about 25 feet 7 inches. The propeller strike marks were located slightly right of the runway centerline. There were also numerous small asphalt pieces found adjacent to the slash markings.

The main wreckage was in an open field located on the west side of the airport property. The initial impact was identified by a small ground depression that contained pieces of red lens material that were consistent with the left wing navigational light. A large area of burnt ground and vegetation preceded the main wreckage. The wreckage debris path was oriented on a 180° heading and measured about 141 ft. The propeller, nose landing gear, right flap, and left aileron were located along the wreckage debris path.

The main wreckage consisted of the fuselage, empennage, both wings, and the engine. The main wreckage was oriented on a north heading. A majority of the fuselage, including the cockpit, cabin, and the left wing were consumed by the postimpact fire. The cockpit Garmin G1000 avionic components, including the nonvolatile memory cards, were destroyed by the postimpact fire. Flight control continuity could not be established due to impact and fire damage; however, all observed separations were consistent with overstress or were consumed during the postimpact fire.

The landing gear selector switch was found in the "DOWN" position. Measurements of the landing gear actuators were consistent with all three landing gear being fully extended at the time of impact. Examination of the nose wheel tire and right main tire did not reveal any flat spots. The right main and nose wheel assemblies rotated freely, and no anomalies were noted with the right brake components. A majority of the left main tire was consumed during the postimpact fire. The fuselage skid plates, installed on the lower wing spar carry-through structure, did not exhibit any evidence of being scraped. The lower VHF antenna had separated from the fuselage and was located along the wreckage debris path. The lower VHF antenna did not exhibit any evidence of being scraped. The trailing edge of the right flap and the corresponding flap track fairings did not exhibit any evidence of being scraped. The left flap was partially consumed during the postimpact fire. Measurements of the flap actuator jack screws established that the flaps were extended to 34°, which was consistent with a normal

landing flap configuration.

The propeller assembly and the forward section of the reduction gearbox had separated from the engine and were found along the wreckage debris path. All four propeller blades remained attached to the hub assembly and exhibited S-shaped bends, tip curls, chordwise scratching, and leading edge damage. The fractured propeller shaft exhibited features consistent with torsional overload. The engine exhaust exhibited evidence of torsional bending associated with impact. The downstream face of the compressor turbine disc and blades exhibited rotational scoring from contact with the adjacent static components. The upstream face of the compressor turbine disc and blades were unremarkable. The first-stage power turbine vane and baffle exhibited rub marks on both sides from contact with the power turbine and compressor turbine discs and blades. The first-stage power turbine disc and blades exhibited rotational scoring on the upstream face. Examination of the engine oil filter and magnetic chip detectors did not reveal any significant particulate contamination. The observed damage to the propeller and engine components were consistent with the engine operating at a medium to high power output at the time of final impact.

Communications

A review of available air traffic control information indicated that the accident flight received normal services and handling. Transcripts of the voice communications recorded between the accident pilot and the tower controller are included in the docket materials associated with the investigation.

Medical And Pathological Information

The Milwaukee County Medical Examiner's Office, located in Milwaukee, Wisconsin, performed an autopsy on the pilot. The cause of death was attributed to thermal injuries and the inhalation of combustion products during the postaccident fire. The autopsy report also noted multiple blunt-force injuries. The FAA's Bioaeronautical Sciences Research Laboratory located in Oklahoma City, Oklahoma, performed toxicology tests on specimens obtained during the autopsy. The test results included 23% carbon monoxide and 1.3 ug/ml cyanide detected in blood. There was no ethanol detected in vitreous. Ibuprofen was detected in urine. Ibuprofen, sold under multiple brand names, is a nonsteroidal anti-inflammatory analgesic drug.

Additional Information

According to National Transportation Safety Board (NTSB) Safety Alert No. SA-019, Prevent Aerodynamic Stalls at Low Altitude, many aerodynamic stalls occur in visual meteorological conditions when a pilot becomes momentarily distracted from the primary task of flying, such

as while maneuvering in the airport traffic pattern, during an emergency, or when fixating on ground objects. The safety alert further states that reducing angle-of-attack by lowering the airplane's nose at the first indication of a stall is the most important immediate response for stall avoidance and stall recovery.

Administrative Information

Investigator In Charge (IIC):	Andrew T Fox	**Report Date:**	08/02/2017
Additional Participating Persons:	Paul Sweeney; Federal Aviation Administration, Milwaukee FSDO; Milwaukee, WI Daniel Oskar; Federal Aviation Administration, Milwaukee FSDO; Milwaukee, WI Yann Torres; Bureau d'Enquêtes et d'Analyses Earl Chapman; Transportation Safety Board of Canada Philippe Santoro; Daher; Pompano Beach, FL Jeffrey Davis; Pratt & Whitney Canada; Bridgeport, WV		
Publish Date:	08/02/2017		
Note:	The NTSB traveled to the scene of this accident.		
Investigation Docket:	http://dms.ntsb.gov/pubdms/search/dockList.cfm?mKey=91666		