



National Transportation Safety Board

Aviation Accident Data Summary

Location:	Lodi, WI	Accident Number:	CEN16LA273
Date & Time:	07/18/2016, 1915 CDT	Registration:	N393SX
Aircraft:	BRANDT SONEX	Injuries:	1 None
Flight Conducted Under:	Part 91: General Aviation - Personal		

Analysis

During a local flight, the pilot of an experimental amateur-built airplane had a partial engine power loss. He said that the engine sounded different but remained running. He turned the airplane back to the airport and noted he was high and fast. He indicated that he bled off airspeed, as he wanted to avoid buildings before landing. He subsequently reduced power and performed a landing with calm wind present. The airplane's nose and left main landing gear collapsed after touchdown, the airplane skidded to the north side of the runway, and exited the runway into a ditch where it sustained the substantial damage. The airplane was powered by an engine that the pilot/builder assembled from a kit. The airplane accumulated 25 hours of flight time at the time of the accident. The kit manufacturer engine assembly and installation manual had specific rocker shaft instructions that included procedures on how to adjust and install rocker arms. An examination revealed that the threaded shaft of a rocker arm swivel pad had separated at a point on the shaft where there was a cross drilled hole. The remaining rocker arms did not exhibit the appearance of arm adjustment in accordance with the kit manufacturer's assembly manual. Detailed examination of the failed valve adjuster showed it separated into two portions approximately mid length in the shank area between the two threaded areas. This location was coincident with a hole drilled crosswise through the shank of the valve adjuster. The fracture surfaces exhibited crack arrest patterns consistent with a fatigue fracture. The origin of the fatigue fracture appears to be coincident with the edge of the cross-drilled hole. Examination of the exemplar valve adjuster and specifically the cross-drilled hole revealed a roughly finished surface with a pronounced burr around the circumference of the hole. A professional materials engineering publication, in part, stated, "The fatigue strength of components can be reduced merely by the presence of a drilled hole; it is further reduced by failure to remove burrs (incurred during drilling) from the hole edges. Fractures originating at drilled holes are common in complex parts containing internal, intersecting machined passages because of the difficulty and expense of providing adequate break-edge radii at such locations. It could not be determined if the failure of the rocker arm was due to the misassembly of the rocker arm assembly and/or the toolmarks left by the manufacturing process.

Flight Events

Prior to flight - Aircraft maintenance event
Enroute - Powerplant sys/comp malf/fail
Enroute - Loss of engine power (partial)
Emergency descent - Off-field or emergency landing
Landing - Collision during takeoff/land

Probable Cause

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

The separated rocker arm assembly for undetermined reasons, which resulted in the partial loss of engine power and led to the landing gear collapsing during the subsequent forced landing.

Findings

Aircraft-Aircraft power plant-Engine (reciprocating)-Recip eng cyl section-Failure - C
Personnel issues-Task performance-Maintenance-Installation-Owner/builder
Personnel issues-Task performance-Maintenance-Fabrication-Other/unknown

Pilot Information

Certificate:	Sport Pilot	Age:	71
Airplane Rating(s):	Single-engine Land	Instrument Rating(s):	None
Other Aircraft Rating(s):	None	Instructor Rating(s):	None
Flight Time:	(Estimated) 180 hours (Total, all aircraft), 180 hours (Pilot In Command, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	BRANDT	Registration:	N393SX
Model/Series:	SONEX	Engines:	1 Reciprocating
Operator:	On file	Engine Manufacturer:	Aerovee
Operating Certificate(s) Held:	None	Engine Model/Series:	
Flight Conducted Under:	Part 91: General Aviation - Personal		

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	KMSN, 866 ft msl	Weather Information Source:	Weather Observation Facility
Lowest Ceiling:		Wind Speed/Gusts, Direction:	Calm / ,
Temperature:	27° C	Visibility	10 Miles
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Lodi, WI (9WN5)	Destination:	Lodi, WI (9WN5)

Airport Information

Airport:	LODI LAKELAND (9WN5)	Runway Surface Type:	Grass/turf
Runway Used:	09	Runway Surface Condition:	Dry
Runway Length/Width:	1875 ft / 105 ft		

Wreckage and Impact Information

Crew Injuries:	1 None	Aircraft Damage:	Substantial
Passenger Injuries:	N/A	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Latitude, Longitude:	43.333333, -89.520833 (est)		

Administrative Information

Investigator In Charge (IIC):	Edward F Malinowski	Adopted Date:	05/23/2017
Note:	The NTSB did not travel to the scene of this accident.		
Investigation Docket:	http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=93635		

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.

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