



# Aviation Investigation Final Report

<b>Location:</b>	STEVENSVILLE, Maryland	<b>Accident Number:</b>	NYC94LA129
<b>Date &amp; Time:</b>	July 15, 1994, 14:45 Local	<b>Registration:</b>	N515TN
<b>Aircraft:</b>	PITTS                      S-1S	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>		<b>Injuries:</b>	1 Minor
<b>Flight Conducted Under:</b>	Part 91: General aviation - Personal		

## Analysis

THE AIRPLANE'S ENGINE LOST TOTAL POWER JUST AFTER TAKEOFF WHEN THE PILOT REDUCED THE THROTTLE. THE PILOT RE-APPLIED FULL THROTTLE WITH NO RESULT. DURING THE FORCED LANDING IN A FIELD, THE AIRPLANE'S WING STRUCK A TREE, AND THE AIRPLANE NOSED OVER. EXAMINATION OF THE ENGINE REVEALED THAT THE CRANKSHAFT GEAR (13S19646) BECAME DISCONNECTED FROM THE CRANKSHAFT DUE TO A BROKEN BOLT. METALLURGICAL EXAMINATION OF THE ACCESSORY GEAR RETAINING BOLT (P/N STD-2213), AND DOWEL PIN (P/N STD-1065) REVEALED THAT THEY SEPARATED AS A RESULT OF HIGH CYCLE FATIGUE MECHANISM, MOST LIKELY CAUSED BY INSUFFICIENT TORQUE OF THE BOLT.

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: Inadequate maintenance by which undertorquing of the accessory gear retaining bolt resulted in fatigue failure of the bolt and the subsequent loss of engine power.

### Findings

Occurrence #1: LOSS OF ENGINE POWER(TOTAL) - MECH FAILURE/MALF  
Phase of Operation: CLIMB

#### Findings

1. ACCESSORY DRIVE ASSY - UNDERTORQUED

2. MAINTENANCE - INADEQUATE - OTHER MAINTENANCE PERSONNEL
3. ACCESSORY DRIVE ASSY - FATIGUE
4. ACCESSORY DRIVE ASSY - DISCONNECTED

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Occurrence #2: FORCED LANDING  
Phase of Operation: DESCENT - EMERGENCY

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Occurrence #3: ON GROUND/WATER COLLISION WITH OBJECT  
Phase of Operation: LANDING - ROLL

Findings

5. OBJECT - TREE(S)

## Factual Information

On July 15, 1994, at 1445 eastern daylight time, a Pitts S-15, N515TN, registered to and piloted by Teresa Nagy, sustained substantial damage when it impacted the terrain at the Kentmore Airport, Stevensville, Maryland. The pilot received minor injuries. Visual meteorological conditions prevailed, and no flight plan was filed. The flight was operated under 14 CFR Part 91.

The airplane's engine lost partial power just after takeoff. The pilot was attempting to return to the airport, when the engine lost total power. The pilot made a forced landing in a field, the airplane's wing struck a tree, and the airplane nosed over.

According to the pilot's statement on the NTSB Form 6120.1/2:

I applied power and began climb at 100 IAS...at approximately 500 feet I began to gently reduce power...just prior to the power reduction I thought I heard a "surge" but no vibration or any indication of problem. When I reduced the power the engine stopped, I immediately re applied full throttle-no result....

The engine was removed from the airplane, and retained for further examination. On October 6, 1994, the engine from N515TN, was disassembled under the supervision of NTSB Investigator, Margaret Napolitan, at Lycoming Engine's facilities, Williamsport, Pennsylvania.

The engine disassembly revealed that engine continuity could not be established as result of the crankshaft gear (13S19646) becoming disconnected from the crankshaft. The accessory gear retaining bolt (STD-2213) was fractured, and a crack was observed in the root of the adjacent thread. According to Lycoming, "...this is consistent with overtorqueing of the bolt." The head of the bolt was worn from coming in contact with the oil pump drive after it was fractured and while it was encapsulated in the crankshaft gear counterbore. The lockplate (LW-18639) was worn, a portion of it was missing, and was not recovered. The dowel (STD-1065), used to position the gear for internal timing, was fractured. The fracture surface of the dowel displayed crack arrest lines (beach marks).

The engine disassembly also revealed that the connecting rods were not torqued to the specified 40 foot pounds. Several bolts used in various locations were not the correct parts, and safety wire was not used were required.

The following parts to include, two pieces of the accessory gear retaining bolt, P/N STS-2213; the separated dowel pin. P/N STD-1065; and lockplate, P/N STD-1065, were sent to the NTSB Materials Laboratory, Washington, DC.

Examination of the accessory gear retaining bolt, revealed that the fracture on the head portion of the bolt and the bolt identification markings were completely obliterated by post separation mechanical damage.

The fracture face on the threaded portion of the bolt, revealed features typical of fatigue cracking over approximately 90 percent of the bolt cross section. A secondary crack was found located in the root of the third tread from the fracture surface.

The examination of the bolt revealed no material defects at the fracture origin. Material of the bolt and its hardness were found to be within the specified requirements.

Examination of the dowel pin revealed that most of the fracture contained well defined crack arrest positions consistent with a fatigue fracture mechanism. The fracture features in the final fracture zone were typical of overstress separations. A band of fretting wear was found in the area adjacent to the fracture surface.

### Pilot Information

<b>Certificate:</b>	Private	<b>Age:</b>	46,Female
<b>Airplane Rating(s):</b>	Single-engine land	<b>Seat Occupied:</b>	Center
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	
<b>Instrument Rating(s):</b>	None	<b>Second Pilot Present:</b>	No
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	No
<b>Medical Certification:</b>	Class 3 Valid Medical-w/ waivers/lim	<b>Last FAA Medical Exam:</b>	December 21, 1992
<b>Occupational Pilot:</b>	UNK	<b>Last Flight Review or Equivalent:</b>	
<b>Flight Time:</b>	640 hours (Total, all aircraft), 61 hours (Total, this make and model), 345 hours (Pilot In Command, all aircraft), 17 hours (Last 90 days, all aircraft), 14 hours (Last 30 days, all aircraft), 3 hours (Last 24 hours, all aircraft)		

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	PITTS	<b>Registration:</b>	N515TN
<b>Model/Series:</b>	S-1S S-1S	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>		<b>Amateur Built:</b>	Yes
<b>Airworthiness Certificate:</b>	Experimental (Special)	<b>Serial Number:</b>	7-0255
<b>Landing Gear Type:</b>	Tailwheel	<b>Seats:</b>	1
<b>Date/Type of Last Inspection:</b>	June 10, 1994 Annual	<b>Certified Max Gross Wt.:</b>	1150 lbs
<b>Time Since Last Inspection:</b>	9 Hrs	<b>Engines:</b>	1 Reciprocating
<b>Airframe Total Time:</b>	144 Hrs	<b>Engine Manufacturer:</b>	LYCOMING
<b>ELT:</b>	Not installed	<b>Engine Model/Series:</b>	O-360-A4G
<b>Registered Owner:</b>	TERESA & JOHN NAGY	<b>Rated Power:</b>	180 Horsepower
<b>Operator:</b>		<b>Operating Certificate(s) Held:</b>	None
<b>Operator Does Business As:</b>		<b>Operator Designator Code:</b>	

## Meteorological Information and Flight Plan

<b>Conditions at Accident Site:</b>	Visual (VMC)	<b>Condition of Light:</b>	Day
<b>Observation Facility, Elevation:</b>		<b>Distance from Accident Site:</b>	
<b>Observation Time:</b>		<b>Direction from Accident Site:</b>	
<b>Lowest Cloud Condition:</b>	Unknown	<b>Visibility</b>	5 miles
<b>Lowest Ceiling:</b>	Unknown	<b>Visibility (RVR):</b>	
<b>Wind Speed/Gusts:</b>	8 knots /	<b>Turbulence Type Forecast/Actual:</b>	/
<b>Wind Direction:</b>	90°	<b>Turbulence Severity Forecast/Actual:</b>	/
<b>Altimeter Setting:</b>		<b>Temperature/Dew Point:</b>	33°C / 25°C
<b>Precipitation and Obscuration:</b>	N/A - None - Haze		
<b>Departure Point:</b>	(3W3)	<b>Type of Flight Plan Filed:</b>	None
<b>Destination:</b>	EASTON , MD (ESN)	<b>Type of Clearance:</b>	None
<b>Departure Time:</b>	14:52 Local	<b>Type of Airspace:</b>	

## Airport Information

<b>Airport:</b>	KENTMORE AIRPARK 3W3	<b>Runway Surface Type:</b>	Grass/turf
<b>Airport Elevation:</b>	12 ft msl	<b>Runway Surface Condition:</b>	Dry
<b>Runway Used:</b>	10	<b>IFR Approach:</b>	
<b>Runway Length/Width:</b>	2000 ft / 75 ft	<b>VFR Approach/Landing:</b>	Forced landing

## Wreckage and Impact Information

<b>Crew Injuries:</b>	1 Minor	<b>Aircraft Damage:</b>	Substantial
<b>Passenger Injuries:</b>		<b>Aircraft Fire:</b>	None
<b>Ground Injuries:</b>	N/A	<b>Aircraft Explosion:</b>	None
<b>Total Injuries:</b>	1 Minor	<b>Latitude, Longitude:</b>	38.989299,-76.299659(est)

## Administrative Information

<b>Investigator In Charge (IIC):</b>	Yurman, Alan
<b>Additional Participating Persons:</b>	LEO KUNEMAN; BALTIMORE , MD
<b>Original Publish Date:</b>	March 27, 1995
<b>Last Revision Date:</b>	
<b>Investigation Class:</b>	<a href="#">Class</a>
<b>Note:</b>	
<b>Investigation Docket:</b>	<a href="https://data.ntsb.gov/Docket?ProjectID=38792">https://data.ntsb.gov/Docket?ProjectID=38792</a>

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