



National Transportation Safety Board Aviation Accident Final Report

Location:	WILDWOOD, NJ	Accident Number:	NYC00LA214
Date & Time:	08/01/2000, 1430 EDT	Registration:	N6195Z
Aircraft:	Piper PA-25	Aircraft Damage:	Substantial
Defining Event:		Injuries:	1 None

Flight Conducted Under: Part 91: General Aviation -

Analysis

The pilot had performed a local banner-towing flight and after 45 minutes he decided to return to the airport. While en route, the pilot advanced the throttle to initiate a climb; however, he got no response from the engine. The engine began losing power, and smoke appeared from under the cowling. The oil temperature gauge was approaching red line speed, and the RPM gauge was decreasing; however, the oil pressure remained constant at 80 psi. The pilot performed an emergency landing in a field, and after touchdown, the airplane struck a tree with its right wing. Examination of the engine revealed a hole burned through the top of the #3 cylinder, consistent with detonation. Advisory Circular AC65-12A stated that detonation can burn a hole completely through a piston.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The partial loss of power caused by detonation of the #3 piston.

Findings

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

Findings

1. (C) MISC,ENGINE PRE-IGNITION AND/OR DETONATION

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

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

Findings

2. OBJECT - TREE(S)

Factual Information

On August 1, 2000, at 1430 Eastern Daylight Time, a Piper PA-25, N6195Z, was substantially damaged during an emergency landing on a grass strip near Wildwood, New Jersey. The certificated commercial pilot was not injured. Visual meteorological conditions prevailed and no flight plan was filed for the local banner-towing flight conducted under 14 CFR Part 91.

According to the pilot, he departed the Paramount Air Airport (JY04), Green Creek, New Jersey, around 1330. After about 45 minutes, he had "completed his run," and decided to return to JY04. While en route, the pilot advanced the throttle to initiate a climb; however, he got "no response from the engine." As he continued the flight toward JY04, the airplane was "loosing power," and smoke appeared from under the cowling. The pilot dropped the banner he was towing to reduce drag on the airplane, and noticed the engine was "overtopping fast." The oil temperature gauge was "approaching red line speed," and the RPM gauge was decreasing; however, the oil pressure remained constant at 80 psi. The pilot prepared for an emergency landing on a grass strip, performed one "circle pass" over the field, and added one notch of flaps. After touchdown, the airplane struck a tree with its right wing, which spun the airplane around 180 degrees.

The pilot reported that just before landing, the oil temperature gauge had exceeded its red line value of 240 degrees, and was indicating 270 degrees.

On August 1, 2000 an on-scene examination of the airplane was conducted by a Federal Aviation Administration (FAA) inspector. The examination revealed that the engine was "very stiff to rotate." The spark plugs were light gray in color, and all produced a spark, when current was applied to them. In addition, metal residue was observed on both oil screens when extracted from the engine.

The engine was removed from the accident site and disassembled in a hangar on August 22, 2000, under the supervision of an FAA inspector. According to the inspector's written statement, the cylinders were removed and observation of the #3 cylinder revealed a hole burned through the top of the piston "consistent with detonation." The oil sump was removed and a fragment of a piston ring and metal residue was observed. The oil pump drive gear and shaft were removed; however, the oil pump idler gear had seized and had to be forcibly removed. The idler gear was unable to be rotated by hand. The engine case halves were then separated and engine rotation could be observed. Visual examination of the bearing shells revealed metal residue.

According to FAA publication AC65-12A, detonation is "the instantaneous and explosive burning of the fuel/air mixture. The explosive burning during detonation results in an extremely rapid pressure rise. This rapid pressure rise and the high instantaneous temperature, combined with the high turbulence generated, cause a 'scrubbing' action on the cylinder and the piston. This can burn a hole completely through a piston."

The advisory circular further stated, "...the presence of severe detonation during its operation is indicated by dished piston heads, collapsed valve heads, broken ring lands, or eroded portions of valves, pistons, or cylinder heads."

Factors affecting detonation were described as design, cylinder cooling, magneto timing, mixture distribution, and carburetor settings.

Pilot Information

Certificate:	Commercial	Age:	32, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	Seat Occupied:	Front
Other Aircraft Rating(s):	None	Restraint Used:	
Instrument Rating(s):	Airplane	Second Pilot Present:	No
Instructor Rating(s):	Airplane Single-engine; Instrument Airplane	Toxicology Performed:	No
Medical Certification:	Class 2 Valid Medical--no waivers/lim.	Last FAA Medical Exam:	09/20/1999
Occupational Pilot:		Last Flight Review or Equivalent:	
Flight Time:	389 hours (Total, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	Registration:	N6195Z
Model/Series:	PA-25 PA-25	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	No
Airworthiness Certificate:	Restricted	Serial Number:	25-229
Landing Gear Type:	Tailwheel	Seats:	1
Date/Type of Last Inspection:	06/19/2000, Annual	Certified Max Gross Wt.:	2900 lbs
Time Since Last Inspection:	53 Hours	Engines:	1 Reciprocating
Airframe Total Time:	1848 Hours	Engine Manufacturer:	Lycoming
ELT:	Installed, not activated	Engine Model/Series:	O-320
Registered Owner:	PARAMOUNT AIR SERVICE	Rated Power:	160 hp
Operator:	PARAMOUNT AIR SERVICE	Operating Certificate(s) Held:	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	WWD, 23 ft msl	Distance from Accident Site:	6 Nautical Miles
Observation Time:	1435 EDT	Direction from Accident Site:	170°
Lowest Cloud Condition:	Clear / 0 ft agl	Visibility	10 Miles
Lowest Ceiling:	None / 0 ft agl	Visibility (RVR):	0 ft
Wind Speed/Gusts:	9 knots /	Turbulence Type Forecast/Actual:	/
Wind Direction:	160°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	30 inches Hg	Temperature/Dew Point:	29° C / 23° C
Precipitation and Obscuration:			
Departure Point:	GREEN CREEK, NJ (JY04)	Type of Flight Plan Filed:	None
Destination:		Type of Clearance:	None
Departure Time:	1330 EDT	Type of Airspace:	Class G

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
Total Injuries:	1 None	Latitude, Longitude:	

Administrative Information

Investigator In Charge (IIC):	ROBERT HANCOCK	Report Date:	05/08/2001
Additional Participating Persons:	DAVE GRASSO; PHILADELPHIA, PA		
Publish Date:			
Investigation Docket:	NTSB accident and incident dockets serve as permanent archival information for the NTSB's investigations. Dockets released prior to June 1, 2009 are publicly available from the NTSB's Record Management Division at pubinquiry@ntsb.gov , or at 800-877-6799. Dockets released after this date are available at http://dms.nts.gov/pubdms/ .		

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.

The Independent Safety Board Act, as codified at 49 U.S.C. Section 1154(b), precludes the admission into evidence or use of any part of an NTSB report related to an incident or accident in a civil action for damages resulting from a matter mentioned in the report. A factual report that may be admissible under 49 U.S.C. § 1154(b) is available [here](#).