



National Transportation Safety Board

Washington, D.C. 20594
Safety Recommendation

Date: June 25, 1998

In reply refer to: A-98-43

Honorable Jane F. Garvey
Administrator
Federal Aviation Administration
Washington, D.C. 20591

On December 26, 1995, a Piper PA-46-310P, N800SJ, lost engine power during cruise flight and crashed at Ocala, Florida, while attempting to perform an emergency landing.¹ The pilot and one of the passengers were seriously injured. The National Transportation Safety Board's examination of the engine disclosed detonation damage to the No. 6 cylinder piston and scoring of the piston sidewalls at five of the six cylinders. The engine turbocharger's turbine-inlet temperature (T.I.T.) gauge was tested and found to read low; at the 1,750°F test point (maximum continuous T.I.T.), the gauge indicated only about 1,640°F.

The Safety Board determined that the probable cause of the accident was "oil starvation resulting in connecting rod failure in three of the six cylinders due to lack of lubrication." At the request of the Safety Board, maintenance personnel checked the calibration of T.I.T. gauges in nine PA-46 series airplanes (seven PA-46-350P models and two PA-46-310P models). Three of the gauges indicated correctly at the 1,750°F test point; the other gauges indicated 60° to 110° low.

On April 26, 1996, Piper issued Service Bulletin (SB) No. 995A, "Turbine Inlet Temperature (T.I.T.) System Calibration and Probe Replacement." Under "PURPOSE" the bulletin states the following:

Field reports indicate that the accuracy of the existing [T.I.T.] probe may decrease over time in service. The corrosive and very hostile environment experienced in the exhaust system has dictated that Piper establish a 250 hour service life for the T.I.T. probe. In addition, a new calibration procedure has been established to check the accuracy of the indicator and wiring. Failure to calibrate the T.I.T. system or to replace the T.I.T. probe as prescribed, may lead to inaccurate or erroneous T.I.T. indications, and possible engine damage.

¹ For more detailed information, read Brief of Accident MIA96FA049 (enclosed).

This Service Bulletin consists of two (2) PARTS which address the T.I.T. system:

PART I provides for the application of a new calibration procedure for the T.I.T. system (one time).

PART II requires an initial replacement of the T.I.T. probe at the compliance time listed above and requires repetitive replacement by establishing a normal service life. (On PA-46-350P aircraft only.)

Failure to comply with this Service Bulletin may result in damage to or shorten the life of the powerplant. Compliance must occur at or within the compliance times indicated.

The calibration procedure is applicable to Lewis T.I.T. gauges, Piper Part Number 471-008 or 548-011 and is required each time a T.I.T. gauge is replaced or if a system error is suspected. SB 995A indicates that T.I.T. probe replacement must occur at cylinder changes, at engine overhauls, or if other T.I.T. system maladies become apparent.

The PA-46-310P Pilot's Operating Handbook (POH) indicates that the airplane's cruise fuel mixture setting should be established at 50° lean of peak T.I.T. The POH outlines a procedure for doing so and indicates that although the procedure differs from conventional leaning procedures, the airplane should never be operated in cruise with a fuel mixture setting other than 50° lean of peak T.I.T. The POH contains the following precautionary note in connection with establishing the peak T.I.T.:

Maximum continuous T.I.T. is 1750°F. Temporary operation up to 1800°F is permitted in order to define peak T.I.T. In no case should the aircraft be operated more than 30 seconds with a T.I.T. in excess of 1750°F.

The Safety Board agrees with the importance of adhering to Piper's cruise fuel mixture setting procedure. However, in view of the accident involving N800SJ and the critical importance of adhering to the engine turbocharger's T.I.T. limitation, the Safety Board is concerned that use of inaccurate T.I.T. gauges to define the peak T.I.T. may result in or contribute to inadvertent engine damage and an in-flight loss of power. Therefore, the Safety Board believes that the FAA should issue an airworthiness directive, applicable to both Piper PA-46-310P and PA-46-350P model airplanes, requiring compliance with Piper SB 995A, "Turbine Inlet Temperature (T.I.T.) System Calibration and Probe Replacement."

Therefore, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Issue an airworthiness directive, applicable to both Piper PA-46-310P and PA-46-350P model airplanes, requiring compliance with Piper Service Bulletin No. 995A, "Turbine Inlet Temperature (T.I.T.) System Calibration and Probe Replacement." (A-98-43)

Chairman HALL, Vice Chairman FRANCIS, and Members HAMMERSCHMIDT, GOGLIA, and BLACK concurred in this recommendation.

By: 
Jim Hall
Chairman

Enclosure

National Transportation Safety Board
Washington, D.C. 20594

Brief of Accident

Adopted 04/15/98

MIA96FA049
FILE NO. 1991 12/26/95 Ocala, FL AIRCRAFT REG NO. N800SJ TIME (LOCAL) - 22:45 EST

		FATAL	SERIOUS	MINOR/NONE
MAKE/MODEL	- Piper-PA-46-310P			
ENGINE MAKE/MODEL	-Continental TSIO-520-BE	CREW 0	1	0
AIRCRAFT DAMAGE	-Substantial	PASS 0	1	5
NUMBER OF ENGINES	-1			
OPERATING CERTIFICATES	-NONE			
TYPE OF FLIGHT OPERATION	-Personal			
REGULATION FLIGHT CONDUCTED UNDER	-14 CFR 91			

LAST DEPARTURE POINT	- KISSIMMEE, FL	CONDITION OF LIGHT	- Night (dark)
DESTINATION	- BIRMINGHAM, AL	WEATHER INFO SOURCE-	Weather observation facility
AIRPORT PROXIMITY	- Off airport/airstrip	BASIC WEATHER	- Visual (VMC)
AIRPORT NAME	- Ocala Regional/JIM TAYLOR	LOWEST CEILING	- None
RUNWAY IDENTIFICATION	- Unk/Nr	VISIBILITY	- 10.000 SM
RUNWAY LENGTH/WIDTH (Feet)	- Unk/Nr	WIND DIR/SPEED	- 350 /003 KTS
RUNWAY SURFACE	- Unk/Nr	TEMPERATURE (F)	- 33
RUNWAY SURFACE CONDITION	- Unk/Nr	OBSTR TO VISION	- None
		PRECIPITATION	- None

PILOT-IN-COMMAND AGE - 44

FLIGHT TIME (Hours)

CERTIFICATES/RATINGS

Private
Single-engine land, Multiengine land
INSTRUMENT RATINGS
Airplane

TOTAL ALL AIRCRAFT - 1500
LAST 90 DAYS - 2
TOTAL MAKE/MODEL - 500
TOTAL INSTRUMENT TIME - Unk/Nr

During cruise flight at 14,000 feet mean sea level, the engine failed. The flight was vectored to a nearby airport but the pilot flew toward another airport and crashed in a residential area. Examination of the engine revealed 1.8 quart of oil were drained and 3 of the 6 connecting rods were failed due to lack of lubrication. Also, detonation damage to the No. 6 cylinder piston was noted and scoring of piston sidewalls was noted at 5 of the 6 cylinders. Evidence of heat discoloration was noted to the connecting rod journals for 3 of the 6 cylinders. The aircraft TIT gauge, which had been miscalibrated by 30 to 40 degrees when the airplane was manufactured, was found to indicate 110 degrees Fahrenheit low near the maximum continuous point of 1,750 degrees. The air/oil separator hose to the scavenge pump was plugged about 10 inches along its length with a substance with a high lead content resulting in the recurring pilot report of excessive oil consumption. Due to the pilot complaint of excessive oil consumption 4 of the 6 cylinders were removed and replaced within the previous 6 months. About 1 month before the accident one of the cylinder pistons was removed and replaced after examination revealed piston sidewall damage consistent with detonation.

MIA96FA049
FILE NO.1991

12/26/95 Ocala, FL

AIRCRAFT REG NO. N800SJ

TIME (LOCAL) - 22:45 EST

Occurrence# 1 LOSS OF ENGINE POWER (TOTAL) - MECH FAILURE/MALF
Phase of operation CRUISE - NORMAL

Findings

1. ENGINE INSTRUMENTS, TIT GAGE - FALSE INDICATION
 2. MAINTENANCE, CALIBRATION - IMPROPER - MANUFACTURER
 3. MAINTENANCE, CALIBRATION - NOT PERFORMED - OTHER MAINTENANCE PERSONNEL
 4. ENGINE ASSEMBLY, PISTON - SCORED
 5. FLUID, OIL - STARVATION
 6. ENGINE ASSEMBLY, CONNECTING ROD - FAILURE, TOTAL
-

Occurrence# 2 IN FLIGHT COLLISION WITH OBJECT
Phase of operation EMERGENCY DESCENT/LANDING

Findings

7. OBJECT - TREE(S)
 8. ATC CLEARANCE - DISREGARDED - PILOT IN COMMAND
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The National Transportation Safety Board determines the probable cause(s) of this accident was:
oil starvation resulting in connecting rod failure in three of the six cylinders due to lack of lubrication.
Contributing to the accident was the failure of the pilot to adhere to a ATC vector toward the nearest airport
following engine failure which resulted in the airplane flying past the vectored airport and subsequent collision with
trees.