



Aviation Investigation Final Report

Location:	ELOY, Arizona	Accident Number:	LAX03FA108
Date & Time:	March 7, 2003, 07:15 Local	Registration:	N8344K
Aircraft:	Stinson 108-1	Aircraft Damage:	Substantial
Defining Event:		Injuries:	1 Minor
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The engine lost total power when the number 4 cylinder exhaust valve fractured and separated during cruise flight. During the forced landing to a plowed field the airplane nosed over and came to rest inverted. Examination of the airplane at the accident site revealed a large amount of oil on the exterior of the fuselage. The number 3 and 4 cylinders assemblies dislodged from the engine. An engine examination revealed that the number 4 cylinder exhaust valve had fractured between the valve head and stem. Examination of the fracture face disclosed features consistent with fatigue.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: a loss of engine power caused by the fatigue failure of the number 4 cylinder exhaust valve.

Findings

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

Phase of Operation: CRUISE - NORMAL

Findings

1. (C) ENGINE ASSEMBLY, VALVE, EXHAUST - FATIGUE
2. (C) ENGINE ASSEMBLY, VALVE, EXHAUST - FRACTURED
3. (C) ENGINE ASSEMBLY, VALVE, EXHAUST - SEPARATION

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

Occurrence #3: NOSE OVER
Phase of Operation: LANDING - ROLL

Findings

4. TERRAIN CONDITION - PLOWED/FURROWED

Factual Information

HISTORY OF FLIGHT

On March 7, 2003, about 0715 mountain standard time, a Stinson 108-1, N8344K, nosed over during a forced landing in a field near Eloy, Arizona. The pilot/owner was operating the airplane under the provisions of 14 CFR Part 91. The private pilot, the sole occupant, sustained minor injuries. The airplane sustained substantial damage. The personal cross-country flight departed Ryan Field (RYN), Tucson, Arizona, about 0650, en route to Casa Grande, Arizona. Day visual meteorological conditions prevailed, and no flight plan had been filed. The primary wreckage was located at 32 degrees 36 minutes north latitude and 111 degrees 31 minutes west longitude.

The National Transportation Safety Board investigator-in-charge (IIC) interviewed the pilot at the scene. She was flying at 4,500 feet mean sea level (msl) when the engine started to make loud noises. She heard a bang, followed by a total loss of power.

The pilot made a forced landing on a plowed field. During rollout, the landing gear caught in the soft dirt, and the airplane nosed over and came to rest in an inverted position.

PERSONNEL INFORMATION

A review of Federal Aviation Administration (FAA) airman records revealed that the pilot held a private pilot certificate with an airplane single engine land rating.

The pilot held a third-class medical certificate that was issued on February 26, 2001, with the limitations that she must wear corrective lenses and must use hearing amplification.

The pilot reported a total flight time of 706.8 hours. She logged 16.7 hours in the last 90 days, and 4.5 in the last 30 days. She had 209.5 hours in this make and model.

AIRCRAFT INFORMATION

The airplane was a Stinson 108-1, serial number 108-1344. A review of the airplane's logbooks revealed a total airframe time of 1,878 hours at the last annual inspection. An annual inspection was completed on May 31, 2002. The tachometer read 488.0 at the last inspection. The tachometer read 588.9 at the accident scene.

The airplane had a Franklin 6A4-150-B4 engine, serial number 13608. Total time on the engine at the last annual inspection was 1,023.0 hours.

The pilot reported that she departed RYN with 40 gallons of automotive fuel. A search of the Federal Aviation Administration (FAA) records revealed that a Supplemental Type Certificate had been issued for the use of unleaded automobile gasoline on April 2, 1994. Examination of the maintenance and flight department records revealed no unresolved maintenance discrepancies against the airplane prior to departure.

Inspection of the engine logbook revealed that the number 4 cylinder assembly had been replaced due to a cracked head. The repair was accomplished on May 31, 2002, at the engine tachometer time of 488.03 hrs.

WRECKAGE AND IMPACT INFORMATION

Investigators from the Safety Board and the FAA examined the wreckage at the accident scene.

The exterior of the airplane was covered with oil. Investigators observed that the number 3 and 4 cylinder assemblies were out of their normal position. When recovery personnel flipped the airplane over onto its landing gear, a large amount of oil and metal fragments fell out from the engine cowling onto the ground.

Air Transport, Phoenix, Arizona, recovered the airplane and transported it to their facilities for further examination.

TESTS AND RESEARCH

Investigators examined the wreckage at Air Transport on March 8, 2003.

Investigators examined the engine. The number 3 and 4 cylinders were badly damaged and dislodged from the engine. Both cylinder assemblies were fractured approximately mid-barrel. Both connecting rods were connected at the crankshaft and displayed torsional twisting. The wristpin was still attached to the number 3 cylinder crankshaft.

Investigators removed the engine for disassembly. They removed the top and bottom spark plugs. Except for the number 3 and 4 cylinder spark plugs, the remaining spark plugs were clean with no mechanical deformations. The spark plug electrodes were gray in color, which corresponded to normal operation according to the Champion Aviation Check-A-Plug AV-27 Chart. The number 3 and 4 cylinder spark plugs sustained mechanical damage, and metal debris and oil fouled the electrodes.

The number 4 cylinder exhaust valve had fractured between the valve head and stem. The valve head was not recovered.

Except for cylinders number 3 and 4, an inspection of the remaining cylinder assemblies revealed no mechanical deformation on the valves, cylinder walls, or internal cylinder heads.

Investigators were unable to manually rotate the engine due to the extensive damage to the number 3 and 4 cylinder assemblies.

The IIC sent photographs of the fractured surface of the valve stem to the Safety Board Materials Laboratory, Washington, DC, for evaluation.

According to the evaluation results, the fracture was consistent with fatigue cracking, with the primary initiation from one side of the stem from at least two origins. Propagation appeared to be almost all the way through before a small region of the final fracture was created.

ADDITIONAL INFORMATION

The IIC released the wreckage to the owner's representative.

Pilot Information

Certificate:	Private	Age:	55,Female
Airplane Rating(s):	Single-engine land	Seat Occupied:	Left
Other Aircraft Rating(s):	None	Restraint Used:	
Instrument Rating(s):	None	Second Pilot Present:	No
Instructor Rating(s):	None	Toxicology Performed:	No
Medical Certification:	Class 3 Valid Medical-w/ waivers/lim	Last FAA Medical Exam:	February 25, 2003
Occupational Pilot:	UNK	Last Flight Review or Equivalent:	January 12, 2002
Flight Time:	707 hours (Total, all aircraft), 210 hours (Total, this make and model), 589 hours (Pilot In Command, all aircraft), 17 hours (Last 90 days, all aircraft), 5 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Stinson	Registration:	N8344K
Model/Series:	108-1	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	
Airworthiness Certificate:	Normal	Serial Number:	1344
Landing Gear Type:	Tailwheel	Seats:	4
Date/Type of Last Inspection:	May 31, 2002 Annual	Certified Max Gross Wt.:	2230 lbs
Time Since Last Inspection:	100 Hrs	Engines:	1 Reciprocating
Airframe Total Time:	1878 Hrs at time of accident	Engine Manufacturer:	Franklin
ELT:	Installed, not activated	Engine Model/Series:	6A4150-B4
Registered Owner:	Allen J. & Cynthia S. PAWLOWSKI	Rated Power:	150 Horsepower
Operator:		Operating Certificate(s) Held:	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	Condition of Light:	Day
Observation Facility, Elevation:	PHX,1135 ft msl	Distance from Accident Site:	44 Nautical Miles
Observation Time:	06:56 Local	Direction from Accident Site:	320°
Lowest Cloud Condition:	Few / 25000 ft AGL	Visibility	10 miles
Lowest Ceiling:	None	Visibility (RVR):	
Wind Speed/Gusts:	/	Turbulence Type Forecast/Actual:	/
Wind Direction:		Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	29.94 inches Hg	Temperature/Dew Point:	11°C / 4°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Tucson, AZ (RYN)	Type of Flight Plan Filed:	None
Destination:	Casa Grande, AZ (CGZ)	Type of Clearance:	None
Departure Time:	06:50 Local	Type of Airspace:	Class E

Wreckage and Impact Information

Crew Injuries:	1 Minor	Aircraft Damage:	Substantial
Passenger Injuries:		Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	1 Minor	Latitude, Longitude:	32.61111,-111.525001

Administrative Information

Investigator In Charge (IIC):	Jones, Patrick
Additional Participating Persons:	Jack Major; Federal Aviation Administration; Scottsdale, AZ
Original Publish Date:	December 28, 2004
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=56602

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The NTSB does not assign fault or blame for an accident or incident; rather, as specified by NTSB regulation, “accident/incident investigations are fact-finding proceedings with no formal issues and no adverse parties ... and are not conducted for the purpose of determining the rights or liabilities of any person” (Title 49 *Code of Federal Regulations* section 831.4). Assignment of fault or legal liability is not relevant to the NTSB’s statutory mission to improve transportation safety by investigating accidents and incidents and issuing safety recommendations. In addition, statutory language prohibits the admission into evidence or use of any part of an NTSB report related to an accident in a civil action for damages resulting from a matter mentioned in the report (Title 49 *United States Code* section 1154(b)). A factual report that may be admissible under 49 *United States Code* section 1154(b) is available [here](#).