



National Transportation Safety Board Aviation Accident Final Report

Location:	Boulder City, NV	Accident Number:	LAX02LA123
Date & Time:	04/02/2002, 1645 PST	Registration:	N48908
Aircraft:	Cessna 152	Aircraft Damage:	Substantial
Defining Event:		Injuries:	2 None

Flight Conducted Under: Part 91: General Aviation - Instructional

Analysis

The airplane made an off airport forced landing following a loss of engine power immediately after departure. After takeoff, upon reaching 300 to 400 feet above ground level (agl), the engine experienced a rapid loss of power. The pilot maneuvered the airplane in a gliding configuration and, after determining that the airplane was unable to reach airport, opted to perform a forced landing in a dry riverbed. While in the landing flare, the airplane collided with vegetation and came to an abrupt stop after impacting a large bush. A review of the airplane's maintenance records disclosed that the engine had a history of ongoing problems with the idle mixture. In an effort to address those problems, the operator had the carburetor overhauled about a week prior the accident. The mixture discrepancy occurred again following the carburetor overhaul. After the accident, an engine examination revealed that spark plugs from the number one cylinder, as well as the top number two plug, appeared dark and sooty, with the bottom number two plug being oily. In addition, the bottom number three and four plugs were covered in lead deposits. Investigators performed an engine run, where it accelerated up to 1,600 revolutions per minute (rpm) and, despite black smoke emitting from the exhaust stack, ran smoothly; after leaning out the mixture, it accelerated up to 2,100 rpm and the exhaust cleared. A detailed examination of the carburetor revealed no mechanical malfunctions or anomalies other than an excessively low idle fuel flow.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: a loss of engine power due to an undetermined malfunction of the carburetor.

Findings

Occurrence #1: LOSS OF ENGINE POWER
Phase of Operation: TAKEOFF - INITIAL CLIMB

Findings

1. FUEL SYSTEM,CARBURETOR - EXCESSIVE FLOW/OUTPUT
2. (C) REASON FOR OCCURRENCE UNDETERMINED

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

Occurrence #3: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: EMERGENCY DESCENT/LANDING

Findings

3. TERRAIN CONDITION - HIGH VEGETATION

Factual Information

On April 2, 2002, about 1645 Pacific standard time, a Cessna 152, N48908, made an off airport forced landing following a loss of engine power immediately after departing Boulder City Municipal Airport, Boulder City, Nevada. Air Excel, Inc., was operating the rental airplane as a local instructional flight under the provisions of 14 CFR Part 91. The certified flight instructor (CFI) and student pilot were not injured; the airplane sustained substantial damage. Visual meteorological conditions prevailed, and a flight plan had not been filed.

In a written statement, the CFI stated that after departure, upon reaching 300 to 400 feet above ground level (agl), the engine experienced a rapid loss of power. He maneuvered the airplane in a gliding configuration and, after determining that the airplane was unable to maintain altitude, turned back toward the airport. While turning, he attempted to troubleshoot the partial loss of power, by confirming the throttle and mixture control were in the full forward position, the fuel selector was situated to "on," the magneto selector was positioned on "both," and the primer knob was locked; he manipulated the carburetor heat to the on position. As the airplane approached the airport, he realized that he would be unable to clear power lines located directly on his flight path. He opted to perform an off-airport landing and configured the airplane with full wing flaps. While in the landing flare, the airplane collided with vegetation and continued across a dry riverbed. The airplane came to an abrupt stop after impacting a large bush.

AIRCRAFT INFORMATION

The Cessna 152, serial number 15281043, was manufactured in 1977, and had accrued a total time in service of 7,073 hours. The most recent annual inspection was completed on January 18, 2002, 154.8 hours prior to the accident; a 100-hour inspection was performed on February 21, 2002, 61.4 hours prior to the mishap. The Lycoming O-235-L2C engine, serial number L-14245-15, had accrued 276.7 hours since the most recent major overhaul. Annual and 100-hour inspections were accomplished on the dates noted for the airframe.

A review of the operator's aircraft status sheet and maintenance department records disclosed that on two separate occasions (February 21, 2002 and March 14, 2002) the engine failed to quit after the pilot attempted to shutdown the engine by manipulating the mixture control to idle cutoff. For both discrepancies, a mechanic stated that he took corrective action by adjusting the idle speed and corresponding idle mixture as specified in the Cessna 152 service manual.

According to the operator, the airplane had completed several flights earlier in the day without mishap. There were no unresolved discrepancies at the time the pilot rented the airplane. He reported that, prior to departure, the airplane had an adequate amount of fuel for the intended training flight.

In a telephone conversation with a National Transportation Safety Board investigator, the CFI reported that the airplane had a history of ongoing problems with the idle mixture. He further stated that in an effort to address those problems, the operator had the carburetor overhauled about a week prior the accident. In addition, maintenance personnel had adjusted the newly overhauled carburetor several days before the accident.

TESTS AND RESEARCH

Engine Examination.

Following recovery, a Safety Board investigator examined the wreckage at Air Transport, Phoenix, Arizona. During the engine examination, investigators removed the top and bottom spark plugs, referencing their operational characteristics according to the Champion Aviation Check-A-Plug AV-27 Chart. Both spark plugs from the number one cylinder, as well as the top number two plug, appeared dark and sooty, consistent with carbon fouled conditions. The bottom number two plug was oily, which the chart states corresponds with oil fouled conditions; the top number three and four plugs were gray in color, indicating normal conditions; the bottom number three and four plugs were covered in lead deposits, consistent with lead fouled conditions.

Investigators measured the carburetor heat control to be out approximately 1 inch, with its corresponding butterfly valve partially open. The throttle control linkage was bent, but upon manipulating the throttle control knob, it moved from the full open stop to the closed stop. The mixture control linkage moved freely from the full rich to the cutoff stops. The air filter was removed, and noted to be free of debris and particulates. The gascolator was full of a blue fluid, consistent in odor and appearance to that of aviation fuel; the gascolator screen was clean.

After an initial failed attempt, investigators added ether in an effort to start the engine. The engine started, and continued to produce power as a technician manipulated the mixture and throttle controls to the full forward position. The engine accelerated up to 1,600 revolutions per minute (rpm) and, despite black smoke emitting from the exhaust stack, investigators noted it running smoothly. The technician then retarded the mixture control aft about 1 inch in attempts to lean out the fuel/air mixture. The engine accelerated to 2,100 rpm and the exhaust cleared, appearing less soiled. With the engine still at high rpm, the technician performed a magneto test, by selecting one magneto to provide the sole electrical energy required to produce spark in each cylinder; the engine rpm dropped 100 rpm on each magneto.

Carburetor Examination.

The carburetor, an MA-3A (serial number CR-2-7501), was removed and shipped to Precision Airmotive Corporation, the Federal Aviation Administration (FAA) type certificate holder, at Marysville, Washington. An examination was performed at their facilities under the auspice of a Safety Board investigator.

An external inspection disclosed that the fuel inlet screen was absent from the carburetor, and the outer casing was broken near the inlet area. After a new inlet fitting was installed, the carburetor was affixed to the bench tester and flow pressure was applied. At the idle cutoff position, fuel flow was measured at 1.5 pounds per hour (lb/hr), as compared to the master flow of 5.5lb/hr. Investigators loosened the mixture adjustment screw by turning it 2 1/2 times, which increased the fuel flow up to 5.5lb/hr. The remainder of the flows at higher settings all tested within specifications. Disassembly of the unit revealed no mechanical malfunctions or anomalies.

Pilot Information

Certificate:	Flight Instructor; Commercial	Age:	31, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	Seat Occupied:	Right
Other Aircraft Rating(s):	None	Restraint Used:	Seatbelt, Shoulder harness
Instrument Rating(s):	Airplane	Second Pilot Present:	No
Instructor Rating(s):	Airplane Single-engine	Toxicology Performed:	No
Medical Certification:	Class 1 Valid Medical--w/ waivers/lim.	Last FAA Medical Exam:	06/22/2001
Occupational Pilot:		Last Flight Review or Equivalent:	03/15/2002
Flight Time:	713 hours (Total, all aircraft), 126 hours (Total, this make and model), 615 hours (Pilot In Command, all aircraft), 209 hours (Last 90 days, all aircraft), 84 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft)		

Student Pilot Information

Certificate:	Student	Age:	, Male
Airplane Rating(s):	None	Seat Occupied:	Left
Other Aircraft Rating(s):	None	Restraint Used:	Seatbelt, Shoulder harness
Instrument Rating(s):	None	Second Pilot Present:	No
Instructor Rating(s):	None	Toxicology Performed:	No
Medical Certification:		Last FAA Medical Exam:	
Occupational Pilot:		Last Flight Review or Equivalent:	
Flight Time:			

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	Registration:	N48908
Model/Series:	152	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	No
Airworthiness Certificate:	Utility	Serial Number:	15281043
Landing Gear Type:	Tricycle	Seats:	2
Date/Type of Last Inspection:	02/21/2002, 100 Hour	Certified Max Gross Wt.:	1670 lbs
Time Since Last Inspection:	61.4 Hours	Engines:	1 Reciprocating
Airframe Total Time:	7073 Hours at time of accident	Engine Manufacturer:	Lycoming
ELT:	Installed, not activated	Engine Model/Series:	O-235-L2C
Registered Owner:	AIR EXCEL, INC.	Rated Power:	110 hp
Operator:	AIR EXCEL, INC.	Operating Certificate(s) Held:	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	LAS, 2127 ft msl	Distance from Accident Site:	16 Nautical Miles
Observation Time:	1656 PST	Direction from Accident Site:	120°
Lowest Cloud Condition:	Clear	Visibility	10 Miles
Lowest Ceiling:	None	Visibility (RVR):	
Wind Speed/Gusts:	7 knots /	Turbulence Type Forecast/Actual:	/
Wind Direction:	100°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	29.76 inches Hg	Temperature/Dew Point:	31° C / -3° C
Precipitation and Obscuration:			
Departure Point:	Boulder City, NV (61B)	Type of Flight Plan Filed:	None
Destination:		Type of Clearance:	None
Departure Time:	1640 PST	Type of Airspace:	Class E

Airport Information

Airport:	Boulder City Municipal Airport (61B)	Runway Surface Type:	Asphalt
Airport Elevation:	2201 ft	Runway Surface Condition:	Dry; Rough; Vegetation
Runway Used:	27L	IFR Approach:	None
Runway Length/Width:	4800 ft / 75 ft	VFR Approach/Landing:	Forced Landing

Wreckage and Impact Information

Crew Injuries:	2 None	Aircraft Damage:	Substantial
Passenger Injuries:	N/A	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	2 None	Latitude, Longitude:	35.947222, -114.860833

Administrative Information

Investigator In Charge (IIC):	HOWARD D PLAGENS	Report Date:	07/07/2005
Additional Participating Persons:	Ron Williams; Federal Aviation Administration; Las Vegas, NV		
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 pubinq@ntsb.gov , or at 800-877-6799. Dockets released after this date are available at http://dms.nts.gov/pubdms/ .		

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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](#).