Aviation Investigation Final Report

Location:	Ferron, Utah	**Accident Number:**	DEN02LA028
Date & Time:	February 24, 2002, 13:11 Local	**Registration:**	N47465
Aircraft:	Piper PA-32R-300	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	4 Minor
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

Approximately 30 minutes into the flight, the engine began to "miss, backfire heavily and sputter." The number 1 cylinder temperature "shot off the gauge" with a red light warning light illuminated. The engine lost power and the airplane began to descend. The pilot made a forced landing on a highway. During the landing roll, the airplane struck a truck parked on the shoulder, shearing off its left wing. The airplane then overturned and skidded 300 feet to a halt. Engine disassembly revealed the magneto idler gear that drives the dual magneto was missing 8 teeth. Three of the teeth were displaced from the gear and exhibited signatures consistent with mechanical overload, while the remaining 5 had been ground off. The respective idler gear shaft bore(s) at the back of the crankcase and at the accessory housing were missing approximately 1/3 of their circumferential material. The fracture surface(s) exhibited signatures consistent with overload. The overload forces appeared to have been applied inboard, evidenced by the symmetrical displacement of the bore material at each end of the subject idler gear shaft.

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 the ingestion of foreign object(s) into the meshing of the gears, causing a malfunction of the magneto idler gear and failure of maintenance personnel to

detect the signs of imminent failure during a mandatory oil filter examination to be performed at the time of an oil change, annual inspection, or engine overhaul. Contributing factors were unsuitable terrain for the forced landing, high crosswind weather conditions, and a parked vehicle in the landing area.

Findings

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

Findings
1. (C) ACCESSORY DRIVE ASSY,DRIVE GEAR - FOREIGN OBJECT DAMAGE
2. (C) IGNITION SYSTEM,MAGNETO - FAILURE,TOTAL
3. (C) UNSAFE/HAZARDOUS CONDITION - NOT DETECTED - OTHER MAINTENANCE PERSONNEL

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

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

Findings
4. (F) WEATHER CONDITION - HIGH WIND
5. (F) WEATHER CONDITION - CROSSWIND
6. (F) OBJECT - VEHICLE
7. (F) UNSUITABLE TERRAIN OR TAKEOFF/LANDING/TAXI AREA - NOT AVAILABLE

Factual Information

On February 24, 2002, at 1311 mountain standard time, a Piper PA-32R-300, N47465, was substantially damaged when it struck a truck parked on a highway shoulder during a forced landing near Ferron, Utah. The pilot and three passengers received minor injuries. Visual meteorological conditions prevailed, and a VFR flight plan had been filed (but not activated) for the personal flight being conducted under Title 14 CFR (Code of Federal Regulations) Part 91. The flight originated at Duchesne, Utah, approximately 1245, and was en route to Cedar City, Utah.

According to the pilot's accident report, he departed Riverside, California, on February 23, and flew to Duchesne to attend a wedding. The next afternoon, he departed Duchesne and was en route to Cedar City, Utah. Approximately 30 minutes into the flight, the engine began to "miss." Ten minutes later the engine began to "backfire heavily and sputter." The number 1 cylinder temperature "shot off the gauge" with a red warning light illuminated. The engine lost power and the airplane began to descend. The pilot transmitted a "Mayday" that was heard by a passing United Air Lines flight, and relayed to authorities. He started looking for an area to land and saw a road 5 miles to the east. The pilot wrote, "I had strong x [cross] -winds blowing me off my line of approach". He landed on Utah State Route 10, at milepost 3.5, near Ferron, and attempted to stay in the right lane to avoid a pickup truck that was parked on the shoulder of the highway. During the landing roll, the airplane struck the truck, shearing off its left wing. The airplane then overturned and skidded 300 feet to a halt.

On April 4, 2002, the engine was examined by a Textron-Lycoming investigator at the facilities of Air Transport in Phoenix, Arizona. After removing the single drive dual magneto from its mounting pad, extensive damage to the accessory gears was noted. Removal of the accessory case disclosed the magneto idler gear (photo 5) was missing eight (8) teeth, 3 of which were displaced from the gear and exhibited signatures consistent with mechanical overload, and the remaining five (5) had been ground off (photo 6). The magneto idler gear drives the dual magnetos. The idler gear shaft bore at the back of the crankcase (photo 7) and the accessory housing (photo 8) were missing approximately 1/3 of their circumferential material, and the inside surfaces were polished, burnished and elongated (photo 11). The fracture surface(s) exhibited signatures consistent with overload. The overload forces appeared to have been applied inboard, evidenced by the symmetrical displacement of the bore material at each end of the subject idler gear shaft. The oil sump contained the three gear teeth and a piece of aluminum debris with gear tooth impressions matching the size and shape of the missing teeth (photo 9). The oil suction screen contained similar material (photo 10). It appeared the idler gear had been misaligned for some time of the mating surfaces. The oil filter contained slivers and particles of non-ferrous material similar to aluminum (photo 12).

The airplane maintenance records were reviewed. At the time of the accident, the engine had

accumulated 3,856.2 hours total time-in-service, and 1,256.6 hours since its last major overhaul. The tachometer read 2152.7 hours and the Hobbs meter read 2317.4 hours. The overhaul entry did not indicate the scope and detail of the work performed, the date it occurred, nor who performed the work. Between March 31, 1997, and October 15, 2001, there were seven maintenance entries indicating the oil and oil filter had been changed, but neither entry indicated whether the filter had been inspected as outlined in Lycoming Mandatory Service Bulletin SB-480D.

Pilot Information

Certificate:	Private	**Age:**	44,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Front
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 3 Valid Medical--no waivers/lim.	**Last FAA Medical Exam:**	September 5, 2001
Occupational Pilot:	UNK	**Last Flight Review or Equivalent:**	September 5, 2001
Flight Time:	625 hours (Total, all aircraft), 500 hours (Total, this make and model), 550 hours (Pilot In Command, all aircraft), 25 hours (Last 90 days, all aircraft), 10 hours (Last 30 days, all aircraft), 4 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N47465
Model/Series:	PA-32R-300	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	32R-7880008
Landing Gear Type:	Retractable - Tricycle	**Seats:**	6
Date/Type of Last Inspection:	October 15, 2001 Annual	**Certified Max Gross Wt.:**	3600 lbs
Time Since Last Inspection:	25 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	3850 Hrs as of last inspection	**Engine Manufacturer:**	Lycoming
ELT:	Installed, not activated	**Engine Model/Series:**	IO-540-K1G5D
Registered Owner:	David R. Powers, Trustee	**Rated Power:**	300 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:	PUC,5953 ft msl	**Distance from Accident Site:**	36 Nautical Miles
Observation Time:	13:10 Local	**Direction from Accident Site:**	20°
Lowest Cloud Condition:	Unknown	**Visibility**	10 miles
Lowest Ceiling:	Overcast / 6000 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	14 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	290°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.02 inches Hg	**Temperature/Dew Point:**	7°C / -7°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Duchesne, UT (U69)	**Type of Flight Plan Filed:**	VFR
Destination:	Cedar City, UT (CDC)	**Type of Clearance:**	None
Departure Time:	12:45 Local	**Type of Airspace:**	Class G

Wreckage and Impact Information

Crew Injuries:	1 Minor	**Aircraft Damage:**	Destroyed
Passenger Injuries:	3 Minor	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	4 Minor	**Latitude, Longitude:**	39.100303,-111.16072(est)

Administrative Information

Investigator In Charge (IIC):	Scott, Arnold
Additional Participating Persons:	J R Barton; Federal Aviation Adminstration; Salt Lake City, UT
Original Publish Date:	January 16, 2003
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=54273