Aviation Investigation Final Report

Location:	Fillmore, California	**Accident Number:**	WPR19LA016
Date & Time:	October 27, 2018, 10:45 Local	**Registration:**	N6834R
Aircraft:	Cessna T210	**Aircraft Damage:**	Substantial
Defining Event:	Loss of engine power (total)	**Injuries:**	2 Minor
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The pilot stated that, after a normal departure, he climbed the airplane to a cruise altitude about 4,000 ft mean sea level (msl) and configured it for cruise flight. Thereafter, the engine experienced a sudden total loss of power. Despite his attempts to troubleshoot the failure, he could not restart the engine and performed a forced landing in a dry riverbed. After touchdown, the nose landing gear impacted a rock and collapsed, and the airplane nosed over and came to rest inverted.

Examination revealed a cloth towel blocking the turbocharger inlet tube that had become entangled with the turbocharger compressor wheel. The towel likely blocked the inlet air from reaching the cylinders, which resulted in a loss of engine power. The pilot stated that during the last oil change, about 34 flight hours before the accident, he removed the airbox and placed a towel in the inlet scat tubing (not disconnected) in an effort to protect the turbocharger from foreign object damage.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:

A total loss of engine power as a result of the pilot's failure to remove a towel from the engine's air induction following maintenance.

Findings

Aircraft	Turbocharger - Damaged/degraded
Aircraft	(general) - Incorrect service/maintenance
Personnel issues	(general) - Pilot

Factual Information

History of Flight

Initial climb	Loss of engine power (total) (Defining event)

On October 27, 2018, about 1045 Pacific daylight time, a Cessna T210G, N6834R, was substantially damaged when it was involved in an accident near Fillmore, California. The private pilot and pilot-rated passenger received minor injuries. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

The pilot stated that the airplane idled on the ground for about 15 minutes before departure while he performed a run-up and waited for traffic to vacate the runway. After making a normal departure, he continued east and climbed to about 4,000 ft mean sea level (msl). While in cruise flight with the airspeed about 105 kts, the engine suddenly lost total power. Despite his attempts to troubleshoot the failure, he could not restart the engine and performed a forced landing in a dry riverbed. After touchdown, the airplane rolled several hundred feet in the dry sand. The nose landing gear impacted a rock and collapsed, and the airplane nosed over and came to rest inverted.

An external examination of the engine revealed that the crankcase was intact with no evidence of pre-mishap catastrophic mechanical malfunction or fire. The crankshaft was rotated by turning the propeller blades that remained affixed to the crankshaft flange. Thumb compression was established in all cylinders. Valve train continuity was observed, with equal lift action at each rocker assembly; oil was found in the rocker box areas on all cylinders. Upon rotation of the engine, the magnetos and their respective ignition harnesses produced spark in the proper firing order; the magneto impulse couplings were heard to release.

The upper sparkplugs were removed and examined. All sparkplugs were dark in color, but the engine manufacturer's representative stated that they were consistent with normal wear. A lighted borescope was used to perform an internal examination of each cylinders' combustion chamber, all of which displayed light combustion deposits.

Disassembly of the fuel manifold revealed a liquid that was brown in color and had an odor and appearance similar with a mixture of engine oil and aviation fuel. The engine-driven fuel pump dry-bay outlet pipe was removed, and a trace amount of oily film was present. Removal of the fuel injectors revealed that they were saturated with a brown liquid consistent in smell and appearance to engine oil.

The turbocharger compressor outlet pipe/hoses (discharge duct) were disassembled, and oil was present in the conduit. The rubber connector nearest the turbo compressor inlet was removed and a lighted electronic borescope was used to inspect the inlet tube. A yellow terry cloth towel (rag) was discovered blocking the turbo inlet tube and the towel had become entangled with the turbo charger compressor wheel. (see Figure 1.)

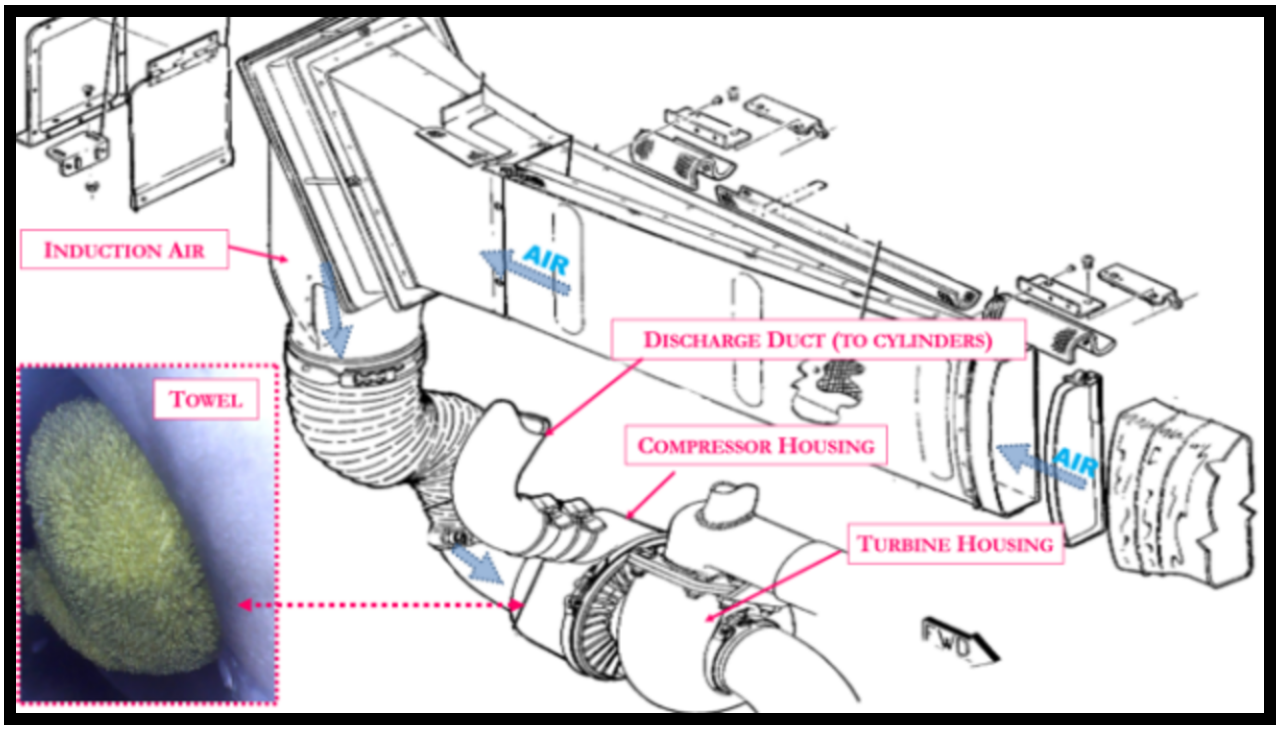

Figure 1: Turbocharger System (showing towel blocking inlet)

The compressor wheel was damaged, and several blades were distorted. After the towel was removed, the compressor wheel was free to rotate. When the turbocharger was unable to rotate normally, the ring seals which are used to seal the turbocharger shaft (between the compressor and turbine wheel) will allow oil to escape the shaft bearing area and enter the compressor section. If the airplane is inverted, the oil could migrate through the discharge duct to the upper deck pressure plumbing to the fuel injectors. From injectors the oil could build in the cylinders and, when inverted, drain into the fuel manifold. Additionally, with the induction tube blocked, no ram air would enter the cylinders. (see Figure 2.)

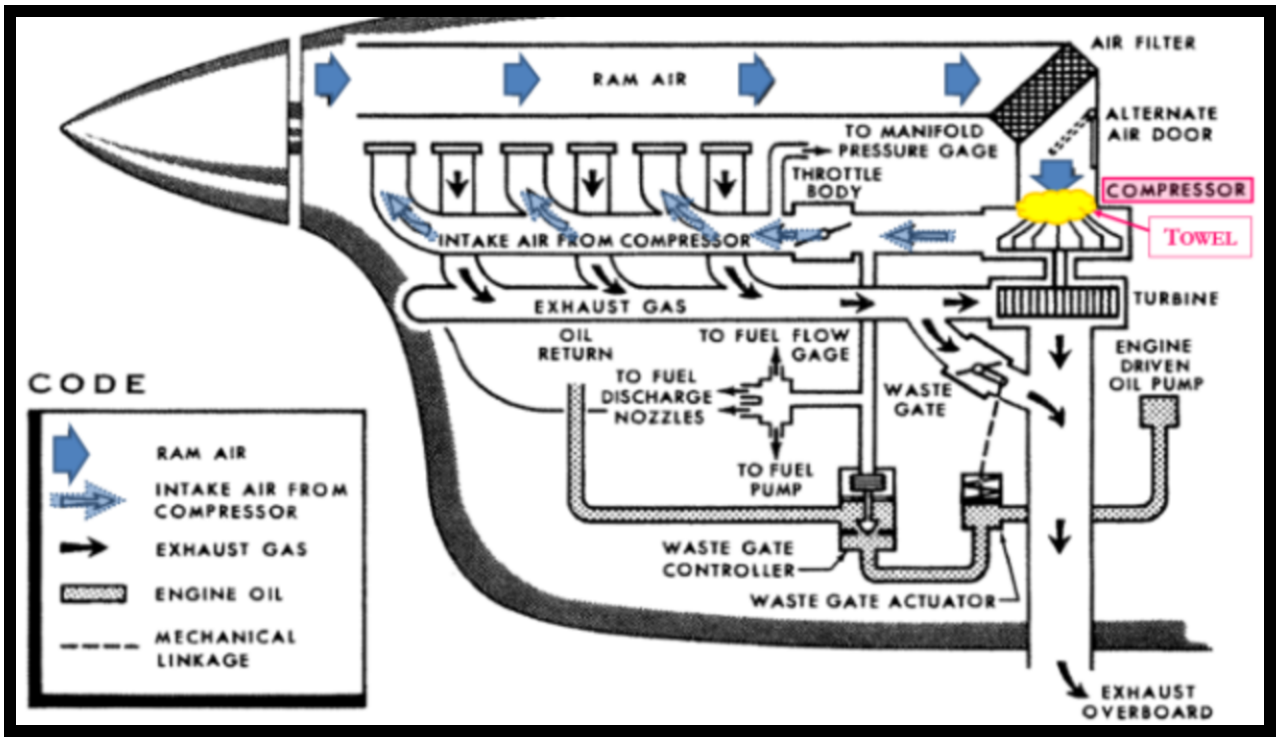

Figure 2: Turbocharger System (showing towel blocking inlet)

The oil filter displayed a date of June 8, 2018. The pilot stated that the airplane had accrued about 34 hours since the oil change. He stated that to access the oil filter, he removed the airbox and placed a towel in the scat tubing (not disconnected) in an effort to protect the turbocharger from foreign object damage.

Pilot Information

Certificate:	Private	**Age:**	70,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	3-point
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	BasicMed With waivers/limitations	**Last FAA Medical Exam:**	
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	December 15, 2017
Flight Time:	(Estimated) 5300 hours (Total, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	**Registration:**	N6834R
Model/Series:	T210 G	**Aircraft Category:**	Airplane
Year of Manufacture:	1966	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	T210-0234
Landing Gear Type:	Retractable - Tricycle	**Seats:**	4
Date/Type of Last Inspection:	March 27, 2018 Annual	**Certified Max Gross Wt.:**	3400 lbs
Time Since Last Inspection:	84.3 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	8745 Hrs as of last inspection	**Engine Manufacturer:**	Continental
ELT:	C126 installed, activated, did not aid in locating accident	**Engine Model/Series:**	TSIO-520-C(2B)
Registered Owner:		**Rated Power:**	285 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KSZP,259 ft msl	**Distance from Accident Site:**	6 Nautical Miles
Observation Time:	17:55 Local	**Direction from Accident Site:**	256°
Lowest Cloud Condition:	Clear	**Visibility**	9 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	7 knots /	**Turbulence Type Forecast/Actual:**	None / None
Wind Direction:	230°	**Turbulence Severity Forecast/Actual:**	N/A / N/A
Altimeter Setting:	30.01 inches Hg	**Temperature/Dew Point:**	23°C / 13°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Santa Paula, CA (SZP)	**Type of Flight Plan Filed:**	None
Destination:	Bakersfield, CA (L45)	**Type of Clearance:**	None
Departure Time:	10:40 Local	**Type of Airspace:**	

Airport Information

Airport:	Santa Paula SZP	**Runway Surface Type:**	
Airport Elevation:	248 ft msl	**Runway Surface Condition:**	Soft
Runway Used:		**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	Forced landing

Wreckage and Impact Information

Crew Injuries:	1 Minor	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 Minor	**Aircraft Fire:**	None
Ground Injuries:		**Aircraft Explosion:**	None
Total Injuries:	2 Minor	**Latitude, Longitude:**	34.374168,-118.96194(est)

Administrative Information

Investigator In Charge (IIC):	Keliher, Zoe		
Additional Participating Persons:	Frank Motter; Federal Aviation Administration; Van Nuys, CA Kurt Gibson; Teledyne Continental Motors; Mobile, AL Henry; Soderlund; Wichita , KS		
Original Publish Date:	March 23, 2022	**Investigation Class:**	3
Note:	The NTSB did not travel to the scene of this accident.		
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=98562		