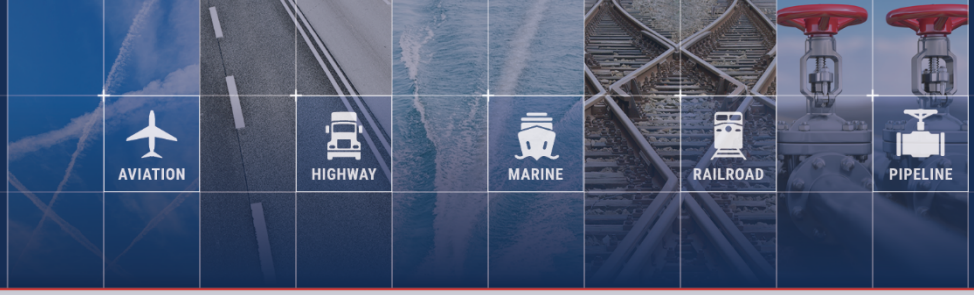

Aviation Investigation Final Report

Location:	Ravendale, California	**Accident Number:**	WPR22LA090
Date & Time:	January 28, 2022, 14:25 Local	**Registration:**	N420WT
Aircraft:	Textron Aviation TTX Inc. T240	**Aircraft Damage:**	Unknown
Defining Event:	Loss of engine power (partial)	**Injuries:**	1 Minor, 2 None
Flight Conducted Under:	Part 91: General aviation - Instructional		

Analysis

The instructor pilot reported that during takeoff about 100 ft above ground level (agl) and near the end of the runway, the engine sustained a sudden loss of engine power. The pilot lowered the nose and extended the flaps for the off-airport forced landing. The airplane impacted the snow-covered terrain.

Postaccident examination of the airplane indicated that the right induction tube connecting the turbocharger compressor outlet to the intercooler inlet had separated from the turbocharger compressor outlet flange. Two inches of the induction tube was installed into the 3-inch-long rubber coupling, leaving only 1 inch remaining to be installed on the turbocharger compressor outlet flange. It is likely that when the engine was at high RPM during the takeoff climb, the improperly installed lower rubber coupling separated from the turbocharger compressor outlet flange, resulting in the loss of engine power.

The engine was installed on an engine test stand and it ran successfully at various RPM settings. The engine test run revealed no evidence of mechanical malfunctions or failures that would have precluded normal operation. Maintenance records indicated that the last 100-hour inspection was performed two days before the accident. During this inspection the induction tubes would have been removed and inspected.

Probable Cause and Findings

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

The inadequate maintenance and inspection of the engine induction system, which resulted in the separation of the right induction tube from the turbocharger compressor outlet and the subsequent loss of engine power during departure.

Findings

Aircraft	Climb capability - Not attained/maintained
Personnel issues	Decision making/judgment - Maintenance personnel
Personnel issues	Scheduled/routine maintenance - Maintenance personnel
Personnel issues	Unauthorized maint/repair - Maintenance personnel
Aircraft	(general) - Inadequate inspection

Factual Information

History of Flight

Takeoff	Loss of engine power (partial) (Defining event)

On January 28, 2022, about 1443 mountain standard time, a Textron Aviation T240 airplane, N420WT, was substantially damaged when it was involved in an accident near Ravendale, California. The two pilots and one passenger onboard were not injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 instructional flight.

The instructor pilot reported that they had flown earlier in the day and the flights were uneventful with no anomalous engine readings. During the accident flight, they conducted a go-around during the approach followed by an uneventful landing. They taxied back for takeoff on runway 17 and had planned to do a short field takeoff. The pilot reported that the wing tanks contained about 20 gallons per side and that he departed with the right tank selected. During takeoff, about 100 ft agl and near the end of the runway, they experienced a sudden loss of engine power. The instructor pilot took control of the airplane, lowered the nose, and extended the flaps for the off airport forced landing. The airplane touched down on snow-covered terrain, impacting brush as it came to rest after about 80 feet of sliding. The pilots and passenger egressed the airplane and the fuselage sustained substantial damage.

The airport elevation at O39 is 5,306 ft above mean sea level (msl) and the density altitude at the time of the accident was calculated to be 5,084 ft msl.

A video recording with sound was provided by the pilot and it showed an over-the-shoulder view of both front seat occupants of the airplane. The video showed the airplane traveling down the runway and then the airplane starting to pitch up. The left-seated instructor pilot stated, “yeah pull it off come on.” As the instructor pilot called for rotation, the primary flight display (PFD) displayed a yellow caution message, and a tone was audible. The PFD annunciated in yellow: STALL WARN COLD PITOT COLD. The yellow caution remained for the rest of the recording until the camera’s view was changed at impact. As the airplane began to climb out there were no anomalies noted on the multi-function display (MFD). The airspeed increased to 80 knots and the airplane continued to climb and accelerate. The PFD showed the pitch attitude was about 14° nose up at an airspeed of 85 knots and an altitude of 5,300 ft msl. Soon after, the manifold pressure, RPM, and exhaust gas temperatures (EGT) for all cylinders began a rapid decrease. At this time, the airspeed was about 87 knots and the airplane’s pitch attitude was about 12.5° nose up. The instructor pilot took control of the airplane and entered a left bank and began flying toward a gravel road. The PFD showed the airplane was about 10° nose up, in about a25° left bank, at an airspeed of 74.5 knots, and at an altitude of 5,370 feet

msl. The pilot brought the airplane to wings level as the airplane approached the gravel road and he flared the aircraft before impacting the terrain.

During the postaccident examination of the wreckage, the right induction tube, which connects the turbocharger compressor outlet to the intercooler inlet, was found separated from the turbocharger compressor outlet flange. The examination revealed that two inches of the induction tube was installed into the 3-inch-long rubber coupling, leaving only 1 inch remaining to be installed on the turbocharger compressor outlet flange. The lower rubber coupling, and band clamps remained attached to the induction tube. A required heat shield was not attached to the lower clamps.

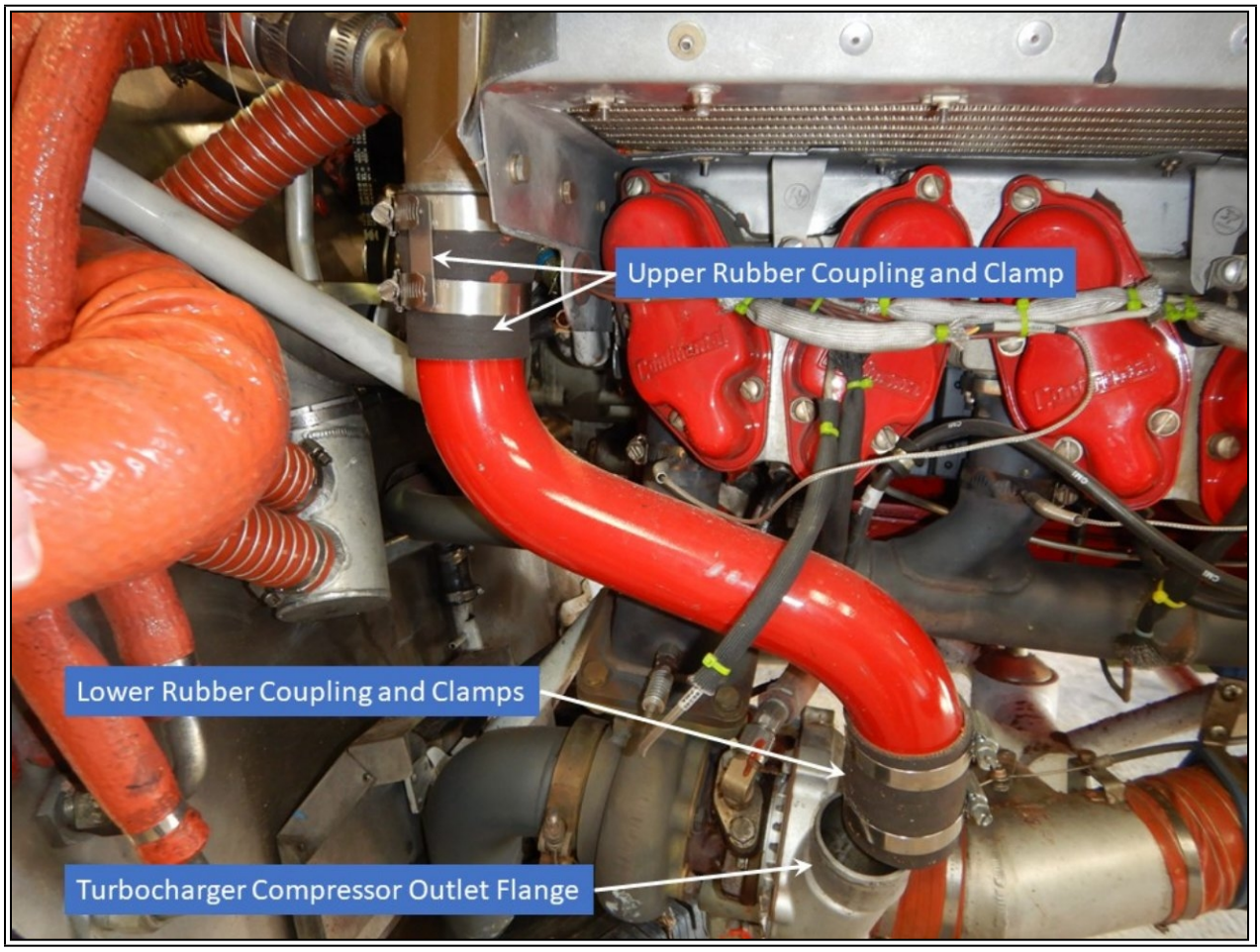

Figure 1.Right side induction tube and rubber coupling.

The left side induction tube connecting the turbocharger compressor outlet to the intercooler inlet remained attached to both. The required heat shield was attached to the lower clamps.

The engine was installed on a test stand and it ran successfully at various RPM settings. The engine test run revealed no evidence of mechanical malfunctions or failures that would have precluded normal operation.

Maintenance records indicated that the last 100-hour inspection was performed on January 26, 2022. During this inspection the induction tubes would have been removed and inspected. Continental Motors Service Bulletin SB94-3A states the following, “WARNING…Loss of induction system coupling will result in a loss of turbo boost and subsequent loss of engine power.”

According to Title 14 Part 43 Appendix D, during an annual inspection, lines, hoses, and clamps should be checked “for leaks, improper condition and looseness” and all systems should be checked for “improper installation, poor general condition, defects, and insecure attachment.”

Pilot Information

Certificate:	Commercial; Flight instructor	**Age:**	52,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	None	**Restraint Used:**	3-point
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	Airplane multi-engine; Airplane single-engine	**Toxicology Performed:**	
Medical Certification:	Class 2 With waivers/limitations	**Last FAA Medical Exam:**	June 11, 2020
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	February 4, 2021
Flight Time:	4000 hours (Total, all aircraft), 1800 hours (Total, this make and model), 3700 hours (Pilot In Command, all aircraft), 317 hours (Last 90 days, all aircraft), 114 hours (Last 30 days, all aircraft), 7.8 hours (Last 24 hours, all aircraft)		

Pilot Information

Certificate:	Commercial; Flight instructor	**Age:**	34,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):	Airplane multi-engine; Instrument airplane	**Toxicology Performed:**	
Medical Certification:	Class 1 Unknown	**Last FAA Medical Exam:**	August 18, 2020
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	
Flight Time:	661 hours (Total, all aircraft), 7 hours (Total, this make and model), 599 hours (Pilot In Command, all aircraft), 99 hours (Last 90 days, all aircraft), 41 hours (Last 30 days, all aircraft)		

Passenger Information

Certificate:		**Age:**	Male
Airplane Rating(s):		**Seat Occupied:**	Rear
Other Aircraft Rating(s):		**Restraint Used:**	3-point
Instrument Rating(s):		**Second Pilot Present:**	Yes
Instructor Rating(s):		**Toxicology Performed:**	
Medical Certification:		**Last FAA Medical Exam:**	
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:			

Aircraft and Owner/Operator Information

Aircraft Make:	Textron Aviation	**Registration:**	N420WT
Model/Series:	TTX Inc. T240	**Aircraft Category:**	Airplane
Year of Manufacture:	2016	**Amateur Built:**	
Airworthiness Certificate:	Unknown	**Serial Number:**	T24002124
Landing Gear Type:	Retractable - Tricycle	**Seats:**	4
Date/Type of Last Inspection:	January 26, 2022 100 hour	**Certified Max Gross Wt.:**	
Time Since Last Inspection:	11.3 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	2112 Hrs at time of accident	**Engine Manufacturer:**	Continental
ELT:	C126 installed, activated, did not aid in locating accident	**Engine Model/Series:**	TSIO-550-C
Registered Owner:	BERNOULLI BROS LLC	**Rated Power:**	310 Horsepower
Operator:	SarkAir Inc.	**Operating Certificate(s) Held:**	None
Operator Does Business As:	Learn to Fly Air, LLC	**Operator Designator Code:**	

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KAAT,4378 ft msl	**Distance from Accident Site:**	42 Nautical Miles
Observation Time:	13:00 Local	**Direction from Accident Site:**	334°
Lowest Cloud Condition:	Clear	**Visibility**	50 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	15 knots /	**Turbulence Type Forecast/Actual:**	Unknown / Unknown
Wind Direction:	31°	**Turbulence Severity Forecast/Actual:**	Unknown / Unknown
Altimeter Setting:	3035 inches Hg	**Temperature/Dew Point:**	-11.7°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Ravendale, CA	**Type of Flight Plan Filed:**	None
Destination:	Susanville, CA (1Q2)	**Type of Clearance:**	None
Departure Time:		**Type of Airspace:**	Class G

Airport Information

Airport:	RAVENDALE O39	**Runway Surface Type:**	Asphalt
Airport Elevation:	5306 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	17	**IFR Approach:**	None
Runway Length/Width:	2607 ft / 30 ft	**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	2 None	**Aircraft Damage:**	Unknown
Passenger Injuries:	1 Minor	**Aircraft Fire:**	None
Ground Injuries:		**Aircraft Explosion:**	None
Total Injuries:	1 Minor, 2 None	**Latitude, Longitude:**	40.809411,-120.36549

Administrative Information

Investigator In Charge (IIC):	Swick, Andrew
Additional Participating Persons:	Ronald R. Green; FAA-FSDO; Reno, NV Henry Soderlund; Textron Aviation; Wichita, KS
Original Publish Date:	January 31, 2024
Last Revision Date:	
Investigation Class:	Class 3
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=104575