



AVIATION



HIGHWAY



MARINE



RAILROAD



PIPELINE

# Aviation Investigation Final Report

<b>Location:</b>	Casa Grande, Arizona	<b>Accident Number:</b>	WPR23LA199
<b>Date &amp; Time:</b>	May 24, 2023, 09:00 Local	<b>Registration:</b>	N60372
<b>Aircraft:</b>	Cessna 172S	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>	Powerplant sys/comp malf/fail	<b>Injuries:</b>	2 None
<b>Flight Conducted Under:</b>	Part 91: General aviation - Personal		

## Analysis

The pilot and safety pilot departed to practice simulated instrument approaches at a local airport. As they approached the airport, they observed that the throttle was in the full open position but the tachometer indicated 1,900 rpm. The safety pilot, a certificated flight instructor, took control of the airplane and attempted to cycle the throttle but was unsuccessful in his attempt to restore engine power. The engine speed remained at 1,900 rpm for the remainder of the flight regardless of the throttle position. During the emergency landing at the airport, the airplane touched down at a high rate of speed. The safety pilot reduced the mixture control to idle/cutoff and landed in a field at the end of the runway. The airplane impacted a tree, which resulted in substantial damage to the left wing.

Postaccident examination of the airplane revealed that the throttle linkage had separated from the throttle arm. The threads on both the linkage and threaded section of the arm were intact and both jamnuts were loosely threaded to the linkage. The absence of any damage to the throttle assembly suggests that the linkage likely unthreaded itself from the throttle arm during the accident flight, which resulted in a loss of throttle control.

The separation likely developed over the course of the airplane's 680 flight hours since the throttle linkage was installed and should have been discovered during one of the subsequent required 50-hour inspection intervals or the airplane's most recent 100-hour inspection. However, none of these inspections were accomplished in the 680 hours of operation.

## Probable Cause and Findings

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

An in-flight separation of the throttle linkage, which resulted in a loss of throttle control.

Contributing to the accident was maintenance personnel's failure to follow the maintenance manual inspection procedure for the throttle cable assembly.

## Findings

<b>Personnel issues</b>	Scheduled/routine inspection - Maintenance personnel
<b>Aircraft</b>	Power lever - Malfunction

# Factual Information

## History of Flight

Approach	Powerplant sys/comp malf/fail (Defining event)
----------	--

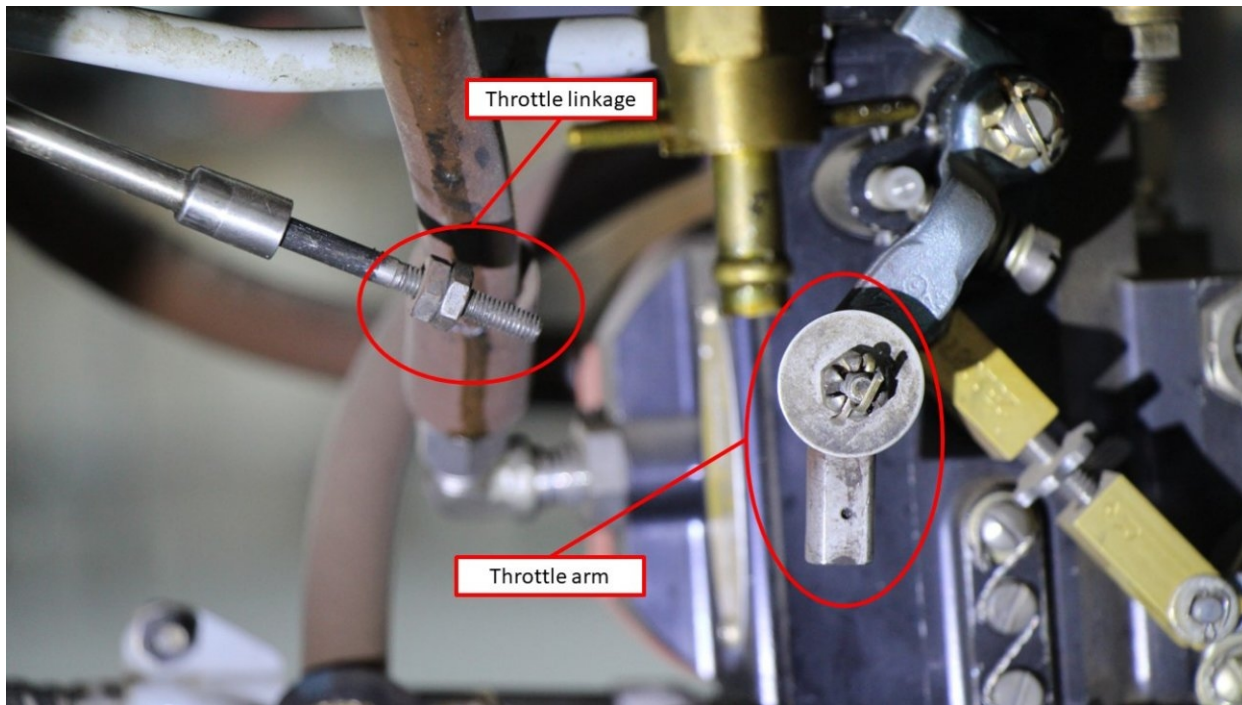
On May 24, 2023, about 0900 mountain standard time, a Cessna 172S, N60372, was substantially damaged when it was involved in an accident near Casa Grande, Arizona. The pilot and pilot-rated passenger were not injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

According to the pilot, he was flying under simulated instrument flight rules using a view limiting device with a safety pilot (pilot-rated passenger) onboard. The safety pilot, who was also a certified flight instructor, stated that after one approach into Casa Grande airport (CGZ) they entered a hold at 5,500 ft mean sea level (msl). According to the safety pilot, they were operating in an area of uncontrolled airspace that was popular for instrument training, and each aircraft used the Common Traffic Advisory Frequency (CTAF) at CGZ to report when they were established in the hold, when they were descending in the hold, and when they left the hold to begin an approach. During the accident flight, the pilot descended to 5,000 ft msl after the other aircraft had announced their movements over the CTAF. After the airplane leveled out, the safety pilot observed a decrease in airspeed and noted that the throttle was in the full open position, but the engine speed was only 1,900 rpm. The pilot then advanced the mixture to the full rich position, engaged the fuel boost pump, and cycled the throttle, but did not observe any changes in engine power. At this time, the safety pilot announced over CTAF that they had experienced an engine anomaly and were heading direct inbound to CGZ to land the airplane. They reached the airport at 3,000 ft msl, at which point they started a circling descent.

The safety pilot reported that the engine speed was still about 1,900 rpm when they turned to the final approach leg of the airport traffic pattern. The pilot also attempted to reduce throttle but was unsuccessful. They deployed flaps to slow the airplane while the safety pilot (who was now the pilot flying) started to assess landing options as they were unable to decelerate. After he decided to land in a field at the end of runway 5, he reduced the mixture to idle/cutoff and the engine stopped running. The airplane touched down normally in the field, but during the landing roll it impacted a fence, and the left wing subsequently impacted a tree, which resulted in

substantial damage to the left wing and fuselage.

Postaccident examination of the engine revealed that the throttle linkage had separated from the throttle arm at the fuel servo.



*Figure 1: Throttle linkage and throttle arm*

The throttle system can be advanced and retarded for power adjustments. Throttle action is achieved through a cable that connects the throttle lever to the throttle arm of the fuel servo mounted at a plenum below the oil sump. The throttle linkage is threaded into the rod end attached to the throttle arm. (See figures 1 and 2).

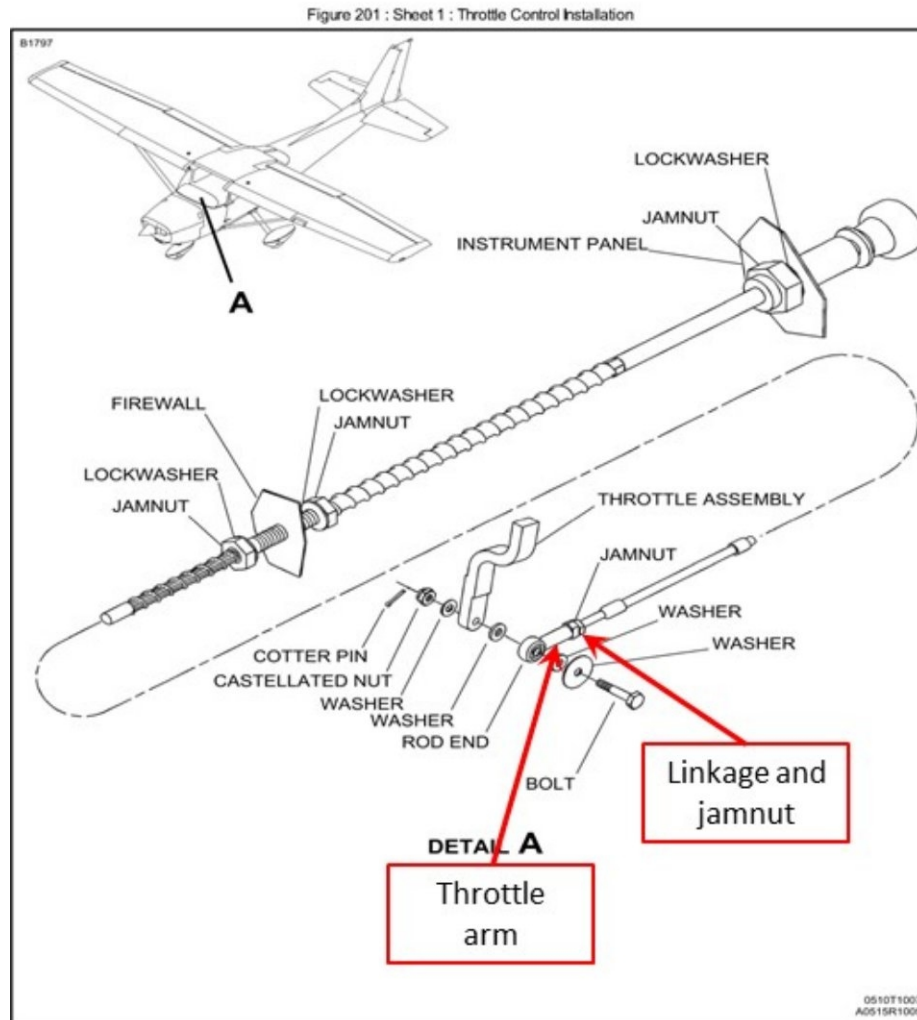


Figure 2: Throttle linkage installation from maintenance manual

The airplane maintenance manual includes inspection criteria for the throttle control. According to the manual, the engine throttle assembly should be inspected every 50 hours.

*“Engine Controls and Linkage – Examine the general condition and freedom of movement through the full range. Complete a check for the proper travel, security of attachment, and for evidence of wear. Complete a check of the friction lock and vernier adjustment for proper operation. Complete a check to make sure the throttle, fuel mixture, and propeller governor arms operate through their full arc of travel. The maximum linear freeplay is 0.050 inch.”*

According to the engine logbook, the engine’s most recent major overhaul was completed 8 months before the accident, which was likely the last time the linkage would have been installed. The airplane’s last annual inspection predated the engine installation. A review of the maintenance records showed that the throttle linkage assembly inspection was not inspected in the timeline prescribed by the manufacturer. Further, the mechanic who had performed all of

the subsequent maintenance after the engine overhaul and installation reported that he was not aware of the inspection interval for the throttle linkage.

After reconnecting the throttle linkage to the arm, the engine operation was smooth and continuous when tested at run-up power and no mechanical anomalies were noted.

### Pilot Information

<b>Certificate:</b>	Private	<b>Age:</b>	59, Male
<b>Airplane Rating(s):</b>	Single-engine land	<b>Seat Occupied:</b>	Left
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	3-point
<b>Instrument Rating(s):</b>	None	<b>Second Pilot Present:</b>	
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	
<b>Medical Certification:</b>	Class 3 With waivers/limitations	<b>Last FAA Medical Exam:</b>	June 27, 2022
<b>Occupational Pilot:</b>	Yes	<b>Last Flight Review or Equivalent:</b>	March 24, 2023
<b>Flight Time:</b>	250.7 hours (Total, all aircraft), 65.8 hours (Total, this make and model), 170.1 hours (Pilot In Command, all aircraft), 22.1 hours (Last 90 days, all aircraft), 10.7 hours (Last 30 days, all aircraft)		

### Pilot Information

<b>Certificate:</b>	Commercial; Flight instructor	<b>Age:</b>	22, Male
<b>Airplane Rating(s):</b>	Single-engine land; Multi-engine land	<b>Seat Occupied:</b>	Right
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	3-point
<b>Instrument Rating(s):</b>	Helicopter	<b>Second Pilot Present:</b>	
<b>Instructor Rating(s):</b>	Airplane single-engine; Instrument airplane	<b>Toxicology Performed:</b>	
<b>Medical Certification:</b>	Class 1 Without waivers/limitations	<b>Last FAA Medical Exam:</b>	January 20, 2021
<b>Occupational Pilot:</b>	No	<b>Last Flight Review or Equivalent:</b>	October 15, 2020
<b>Flight Time:</b>	1233 hours (Total, all aircraft), 50 hours (Total, this make and model), 1129 hours (Pilot In Command, all aircraft), 142 hours (Last 90 days, all aircraft), 60 hours (Last 30 days, all aircraft)		

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	Cessna	<b>Registration:</b>	N60372
<b>Model/Series:</b>	172S	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>	2006	<b>Amateur Built:</b>	
<b>Airworthiness Certificate:</b>	Normal	<b>Serial Number:</b>	172S10216
<b>Landing Gear Type:</b>	Tricycle	<b>Seats:</b>	4
<b>Date/Type of Last Inspection:</b>	June 9, 2022 Annual	<b>Certified Max Gross Wt.:</b>	
<b>Time Since Last Inspection:</b>	749 Hrs	<b>Engines:</b>	1 Reciprocating
<b>Airframe Total Time:</b>	12905 Hrs as of last inspection	<b>Engine Manufacturer:</b>	LYCOMING
<b>ELT:</b>	Installed, activated, did not aid in locating accident	<b>Engine Model/Series:</b>	IO-360-L2A
<b>Registered Owner:</b>	On file	<b>Rated Power:</b>	180 Horsepower
<b>Operator:</b>	On file	<b>Operating Certificate(s) Held:</b>	None

## Meteorological Information and Flight Plan

<b>Conditions at Accident Site:</b>	Visual (VMC)	<b>Condition of Light:</b>	Day
<b>Observation Facility, Elevation:</b>	KCGZ, 1462 ft msl	<b>Distance from Accident Site:</b>	1 Nautical Miles
<b>Observation Time:</b>	08:56 Local	<b>Direction from Accident Site:</b>	229°
<b>Lowest Cloud Condition:</b>	Clear	<b>Visibility</b>	10 miles
<b>Lowest Ceiling:</b>	None	<b>Visibility (RVR):</b>	
<b>Wind Speed/Gusts:</b>	3 knots /	<b>Turbulence Type Forecast/Actual:</b>	None / None
<b>Wind Direction:</b>	150°	<b>Turbulence Severity Forecast/Actual:</b>	N/A / N/A
<b>Altimeter Setting:</b>	29.91 inches Hg	<b>Temperature/Dew Point:</b>	28°C / 3°C
<b>Precipitation and Obscuration:</b>	No Obscuration; No Precipitation		
<b>Departure Point:</b>	Chandler, AZ (CHD)	<b>Type of Flight Plan Filed:</b>	VFR
<b>Destination:</b>	Casa Grande, AZ	<b>Type of Clearance:</b>	VFR
<b>Departure Time:</b>	08:24 Local	<b>Type of Airspace:</b>	Class E

## Airport Information

<b>Airport:</b>	CASA GRANDE MUNI CGZ	<b>Runway Surface Type:</b>	
<b>Airport Elevation:</b>	1464 ft msl	<b>Runway Surface Condition:</b>	Dry
<b>Runway Used:</b>	05	<b>IFR Approach:</b>	None
<b>Runway Length/Width:</b>	5200 ft / 100 ft	<b>VFR Approach/Landing:</b>	Forced landing

## Wreckage and Impact Information

<b>Crew Injuries:</b>	2 None	<b>Aircraft Damage:</b>	Substantial
<b>Passenger Injuries:</b>		<b>Aircraft Fire:</b>	None
<b>Ground Injuries:</b>		<b>Aircraft Explosion:</b>	None
<b>Total Injuries:</b>	2 None	<b>Latitude, Longitude:</b>	32.957188,-111.75706(est)



## Administrative Information

**Investigator In Charge (IIC):** Stein, Stephen

**Additional Participating Persons:** Brian Mehrstens; Federal Aviation Administration; Scottsdale, AZ

**Original Publish Date:** June 20, 2024

**Last Revision Date:**

**Investigation Class:** [Class 3](#)

**Note:** The NTSB did not travel to the scene of this accident.

**Investigation Docket:** <https://data.nts.gov/Docket?ProjectID=192231>

The National Transportation Safety Board (NTSB) is an independent federal agency charged by Congress with investigating every civil aviation accident in the United States and significant events in other modes of transportation—railroad, transit, highway, marine, pipeline, and commercial space. We determine the probable causes of the accidents and events we investigate, and issue safety recommendations aimed at preventing future occurrences. In addition, we conduct transportation safety research studies and offer information and other assistance to family members and survivors for each accident or event we investigate. We also serve as the appellate authority for enforcement actions involving aviation and mariner certificates issued by the Federal Aviation Administration (FAA) and US Coast Guard, and we adjudicate appeals of civil penalty actions taken by the FAA.

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](#).