Aviation Investigation Final Report

Location:	Winslow, Arizona	**Accident Number:**	WPR21FA175
Date & Time:	April 23, 2021, 15:19 Local	**Registration:**	N59EZ
Aircraft:	Swearingen SA226-T(B)	**Aircraft Damage:**	Destroyed
Defining Event:	Loss of engine power (partial)	**Injuries:**	2 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The pilot was conducting a personal flight and was descending the airplane to the destination airport. Automatic dependent surveillance-broadcast (ADS-B) data showed that the airplane accomplished several turning maneuvers near the airport. These turns occurred from an elevation of 6,000 to 4,950 ft mean sea level, at which time the data ended. The airplane was 80 ft above ground level at the time. Witnesses reported seeing a low-flying airplane perform a turn and then veer toward the ground. The airplane came to rest about 4 miles east of the destination airport and 70 ft from the last data target. A postcrash fire ensued.

Postaccident examination of the airframe and engines found no mechanical anomalies that would have precluded normal operation. Examination of the left engine revealed that the engine was likely producing power. The right engine examination revealed damage consistent with low or no rotation at the time of the accident, including distinct, localized contact marks on the rotating propeller shaft. In addition, no metal spray was found in the turbine section, and no dirt was found within the combustor section. The examination of the right propeller blades showed chordwise scoring with the blades bent aft and twisted toward a low-pitch setting. Examination of the fuel system noted no anomalies.

The airplane was equipped with a single redline (SRL) autostart computer. Examination of the right (R) SRL-OFF annunciator panel light bulb showed signatures of hot filament stretch, which was consistent with illumination of the light at the time of the accident. The SRL light normally extinguishes above an engine speed of 80% rpm. Given the low rotational signatures on the right engine and the illuminated “R SRL-OFF” warning light, it is likely that the right engine lost engine power during the flight for reasons that could not be determined.

Probable Cause and Findings

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

The loss of engine power to the right engine for reasons that could not be determined. Contributing to the accident was the pilot's failure to maintain control of the airplane.

Findings

Not determined	(general) - Unknown/Not determined
Personnel issues	Aircraft control - Pilot

Factual Information

History of Flight

Maneuvering	Loss of engine power (partial) (Defining event)
Uncontrolled descent	Collision with terr/obj (non-CFIT)

History of Flight

On April 24, 2021, about 1519 mountain standard time, a Swearingen SA226-T(B) twin-engine airplane, N59EZ, was destroyed when it was involved in an accident near Winslow-Lindbergh Regional Airport (INW), Winslow, Arizona. The pilot and passenger were fatally injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

The airplane departed from Scottsdale Airport (SDL), Scottsdale, Arizona, about 1409 with an intended destination of INW. No flight plan was filed, and no contact was attempted between the pilot and air traffic control during the flight.

Recorded ADS-B data showed that, after takeoff, the airplane proceeded north with some deviations, climbing to about 12,000 ft above mean sea level (msl) by about 1430. Between about 1430 and 1440, the airplane climbed to an altitude above 17,000 ft msl and performed two 360° turns. About 1452, the airplane began a descent into the Winslow area. The airplane circled over INW for about 15 minutes at altitudes between 6,000 and 9,500 ft msl while the airplane's calibrated airspeed varied between 140 and 220 knots. About 1511, the airplane turned away from INW on a north-northeast heading before turning back toward the airport after about 1514. At 1516:30, the airplane began a right descending turn with a corresponding deceleration in airspeed.

During the final 2 minutes of flight, the airplane descended steadily while slowing from 200 to about 125 knots. The airplane continued to slow while aligning with Interstate 40 (I-40). At 1519:15, the airplane began a turn to the right and away from I-40. The final ADS-B reported altitude for the airplane was 4,950 ft msl (about 80 ft above ground level). Figure 1 shows the airplane's track.

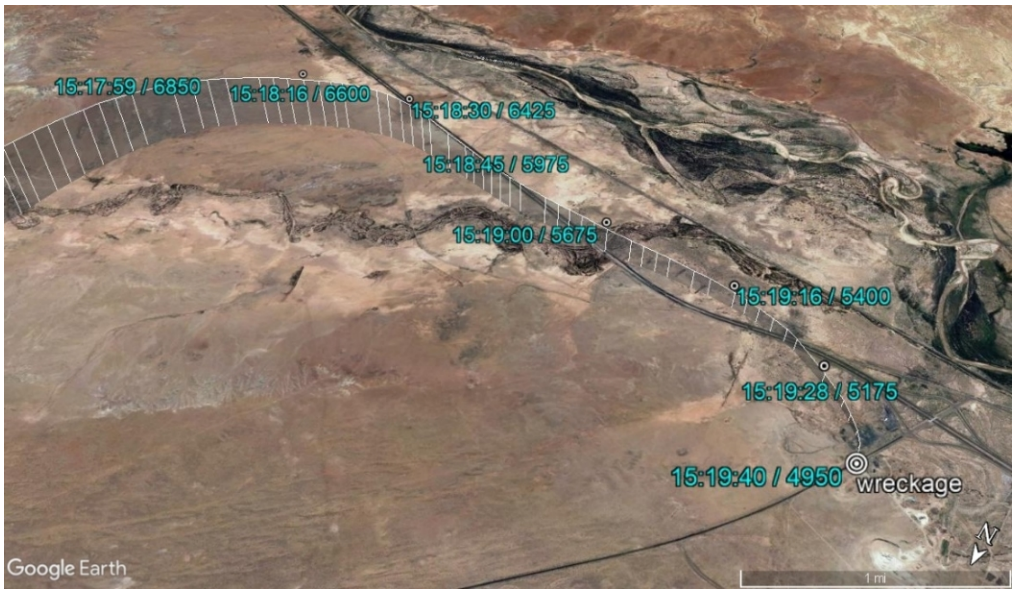

Figure 1. ADS-B track for the accident flight.

Witnesses driving eastbound on I-40 saw a low-flying airplane that appeared to bank “hard” to the north and then veer toward the ground. The witnesses subsequently observed a fireball and black smoke.

The airplane came to rest about 4 miles east of INW. The accident site was about 70 ft from the last ADS-B target.

Aircraft Information

The airplane was equipped with a single-redline (SRL) autostart computer, which controlled three functions: engine speed switching functions, automatic start fuel enrichment, and exhaust gas temperature (EGT) computation. According to the Honeywell *TPE331 Pilot Tips* manual, the SRL system computer

> *automatically switches on at 80% RPM or higher, is used with the Exhaust Gas Temperature (EGT) indicating system and provides a constant temperature indication, which equates to maximum Turbine Inlet Temperature (TIT) under varying atmospheric conditions.*

The manual also stated that the SRL light would normally extinguish above 80% rpm.

Wreckage and Impact Information

The airplane came to rest inverted in a rock quarry and was contained within a flat portion of the quarry. The postcrash fire consumed the wreckage.

The first identified point of impact was a ground mark about 10 ft from a barbed-wire fence. Two metal fence posts, about 12 ft apart from each other, were not damaged or disturbed (see figure 2).

Figure 2. Barbed wire fence and fence posts.

The debris path was oriented on a 028° heading that extended to the main wreckage (see figure 3), which was about 410 ft from the first identified point of impact. All major structural components of the airplane were located within the wreckage debris path. Both wings were separated from the fuselage, and both engines had separated from their respective wings. Both propeller assemblies had separated from their respective engines and were found in the debris field. Flight control continuity was established throughout the airframe.There was no evidence that indicated any pre-existing mechanical malfunction with the airframe.

Figure 3. Main wreckage (Source: Navajo County Sheriff Department).

Fuel System

The right-side fuel system had sustained impact and thermal damage from the collector tank outboard. The fuel outlet lines for both fuel pumps were separated from their associated fittings and sustained thermal damage. The fuel fittings and fuel lines from the fuel pumps to the engine were not located. The right-side fuel vent line sustained impact and thermal damage; when compressed air was applied to the fuel vent line, no air flow was noted. Movement of the fuel line expelled debris consistent with the internal portions of the fuel line. The fuel tank had been breached. The associated check valves remained intact; when compressed air was applied to the system, air flowed freely through it.

The left-side fuel system was intact from the wing root to the fuel shutoff valve, and all fuel lines were secure at their fittings. The outlet fuel lines from the primary and auxiliary fuel pumps were disconnected; when compressed air was applied to the lines, air was expelled from the fuel line that attached to the fuel shutoff valve. The fuel shutoff valve was removed and found to be in the open position. The associated check valves were intact; when compressed air was applied to the system, air flowed freely through it.

The cross-feed tube was intact. It was removed and found to be in the closed position.

Each engine's two fuel boost pumps were removed and examined. No mechanical anomalies were identified that would have precluded all four fuel boost pumps from operating normally before the thermal exposure.

Left (No. 1) Engine

Visual examination of the left engine revealed thermal damage to the accessory gearbox housing and various external fluid lines. The high-speed coupling shaft was fractured, and hand rotation of the low-pressure turbine did not produce a corresponding rotation of the propeller shaft. Evidence indicating that the left engine was operating at the time of impact included circumferential scoring on rotating components, torsional fracture of the coupling shaft, elongation of the propeller shaft locating dowel hole, dirt debris within the combustor section, and metal spray on turbine components. There was no evidence that indicated any pre-existing mechanical malfunction with the left engine.

Right (No. 2) Engine

Visual examination of the right engine revealed no signs of an uncontained failure or fire damage. Engine continuity was confirmed using hand rotation of the low-pressure turbine, which produced a corresponding rotation of the propeller. Localized contact marks were observed along the outer diameter of the propeller shaft; these marks were consistent with contact marks observed on the sun gear inner diameter. The compressor section remained intact and had no impact or mechanical damage. No metal spray was observed on the turbine blades or nozzle airfoils. The local contact marks, intact compressor section, and lack of metal spray on the turbine blades and nozzle airfoils were consistent with the No. 2 engine having low or no rotation at the time of the accident.

A functional test and teardown of the fuel control unit and propeller governor were performed. Both units operated within the manufacturer's specifications. The fuel control unit was disassembled; no significant damage was observed to any of the internal components that would have precluded normal operation.

Propeller Assemblies

Both the left and right propeller assemblies separated from their respective engines during the accident sequence. The left propeller blades were bent forward in the thrust direction, with twisting toward high pitch, face-side chordwise scoring, bending opposite the direction of rotation tip fractures and leading-edge gouging. There was no evidence of any preexisting mechanical malfunction with the airframe, No 1 (left) engine and propeller.The manufacturer determined the impact signatures on the left propeller were consistent with a high-power setting.

The right propeller blades were bent aft and twisted toward low pitch with some rotation scoring found predominately on the camber side without tip fractures. The manufacturer determined the impact signatures on the right propeller were consistent with a low-to-zero power setting.

Annunciator Panel The annunciator panel was submitted to the National Transportation Safety Board's Materials Laboratory in Washington, DC, for examination. The panel contained 48 individual annunciators, and each annunciator contained two bulbs. One annunciator light, R-SRL OFF (right single redline off), displayed hot filament stretch in both bulbs.

Information

Certificate:	**Age:**
Airplane Rating(s):	**Seat Occupied:**
Other Aircraft Rating(s):	**Restraint Used:**
Instrument Rating(s):	**Second Pilot Present:**
Instructor Rating(s):	**Toxicology Performed:**
Medical Certification:	**Last FAA Medical Exam:**
Occupational Pilot:	**Last Flight Review or Equivalent:**
Flight Time:	

Aircraft and Owner/Operator Information

Aircraft Make:	Swearingen	**Registration:**	N59EZ
Model/Series:	SA226-T(B)	**Aircraft Category:**	Airplane
Year of Manufacture:	1981	**Amateur Built:**	
Airworthiness Certificate:	Unknown	**Serial Number:**	394
Landing Gear Type:	Retractable - Tricycle	**Seats:**	11
Date/Type of Last Inspection:	September 20, 2017 Annual	**Certified Max Gross Wt.:**	
Time Since Last Inspection:		**Engines:**	2 Turbo prop
Airframe Total Time:	5959.5 Hrs as of last inspection	**Engine Manufacturer:**	Honeywell
ELT:	Installed, not activated	**Engine Model/Series:**	TPE331-10U-512G
Registered Owner:	On file	**Rated Power:**	900 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:	KINW,4886 ft msl	**Distance from Accident Site:**	4 Nautical Miles
Observation Time:	14:56 Local	**Direction from Accident Site:**	280°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	24 knots / 30 knots	**Turbulence Type Forecast/Actual:**	None / None
Wind Direction:	220°	**Turbulence Severity Forecast/Actual:**	N/A / N/A
Altimeter Setting:	29.93 inches Hg	**Temperature/Dew Point:**	26°C / -6°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Scottsdale, AZ (SDL)	**Type of Flight Plan Filed:**	None
Destination:	Winslow, AZ	**Type of Clearance:**	None
Departure Time:	14:09 Local	**Type of Airspace:**	Class G

Airport Information

Airport:	WINSLOW-LINDBERGH RGNL INW	**Runway Surface Type:**	
Airport Elevation:	4941 ft msl	**Runway Surface Condition:**	
Runway Used:		**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:	1 Fatal	**Aircraft Fire:**	On-ground
Ground Injuries:		**Aircraft Explosion:**	None
Total Injuries:	2 Fatal	**Latitude, Longitude:**	35.015706,-110.63785

Administrative Information

Investigator In Charge (IIC):	Cornejo, Tealeye		
Additional Participating Persons:	Thomas Dickerson; Federal Aviation Administration; Scottsdale, AZ David Studtmann; Honeywell Aerospace; Phoenix, AZ Les Doud; Hartzell Propeller/Hartzell Engine Technologies; Piqua, OH		
Original Publish Date:	September 27, 2023	**Investigation Class:**	3
Note:			
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=102972		