



AVIATION



HIGHWAY



MARINE



RAILROAD



PIPELINE

Aviation Investigation Final Report

Location:	Fort Lauderdale, Florida	Accident Number:	ERA19LA079
Date & Time:	December 24, 2018, 13:44 Local	Registration:	N3015E
Aircraft:	Cessna 172	Aircraft Damage:	Substantial
Defining Event:	Loss of engine power (total)	Injuries:	4 None
Flight Conducted Under:	Part 91: General aviation - Instructional		

Analysis

According to the flight instructor, he and a student pilot were conducting a local, instructional flight. The instructor reported that, while flying about 800 ft above a shoreline, the engine started to vibrate, and it then lost all power. He tried to restart the engine twice to no avail. On the third attempt, the engine started, but it would not produce more than 1,200 rpm. The instructor saw people on the beach and decided to land on the water. When the main landing gear touched down on the water, the airplane immediately flipped over, which resulted in substantial damage to the vertical stabilizer and rudder.

Examination of the engine revealed that the No. 2 exhaust rocker arm stud was fractured. Metallurgical examination of the fracture surfaces on the rocker arm stud revealed that it had fractured due to fatigue. The fatigue fracture of the No. 2 exhaust rocker arm stud likely led to the loss of engine power.

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 due to the fatigue fracture of the No. 2 exhaust rocker arm stud.

Findings

Aircraft	Recip eng cyl section - Fatigue/wear/corrosion
Aircraft	Recip eng cyl section - Failure

Factual Information

History of Flight

Enroute	Powerplant sys/comp malf/fail
Enroute	Loss of engine power (total) (Defining event)
Enroute	Attempted remediation/recovery
Landing	Off-field or emergency landing
Landing	Ditching
Landing	Roll over

On December 24, 2018, about 1344 eastern standard time, a Cessna 172N, N3015E, was substantially damaged during a forced landing near Fort Lauderdale, Florida. The flight instructor, student pilot, and two passengers were not injured. Visual meteorological conditions prevailed, and no flight plan was filed for the local instructional flight. The airplane was owned by Air Con LLC, and operated by Airplanes 4 Rent, under the provisions of Title 14 *Code of Federal Regulations* Part 91. The flight originated from Fort Lauderdale Executive Airport (FXE), Fort Lauderdale, Florida, about 1330.

According to the flight instructor, they were flying along the shoreline at 800 ft above ground level (agl). The engine started to vibrate and then experienced a complete loss of power. The flight instructor tried to restart the engine twice, but the engine did not start. He set up for an emergency landing on the beach. At 200 ft. agl, he noticed a pier and knew he had to fly over the pier to make a safe landing on the other side. He tried to restart the engine for a third time and the engine restarted but did not produce power over 1,200 rpm. Once over the pier, he saw people on the beach and decided to land in the ocean. When the main landing gear touched the water, the airplane immediately flipped over. All four occupants egressed the airplane. During the landing, the vertical stabilizer and rudder were damaged.

Examination of the engine by a NTSB investigator revealed that the No. 2 exhaust rocker arm stud fractured. Engine continuity was established by rotating the propeller by hand and visually verifying that the pistons and push rods moved on all cylinders. No other anomalies were noted.

The rocker arm stud was sent to NTSB Materials Laboratory, Washington, DC, for examination. The examination of the fracture surface revealed characteristics consistent with a fatigue fracture. Review of maintenance records did not reveal if and when the stud was ever replaced or inspected during the major overhaul.

The four-seat, single-engine, high-wing airplane was built in 1978, and equipped with a Lycoming O-320-series engine. The most recent annual inspection was completed on December 19, 2018. At the time of the inspection, the airframe total time was 5,295.0 hours and the engine had 1,568.7 hours since major overhaul. The major overhaul was completed on May 10, 2006.

According to the airplane owner, he purchased the airplane in February 2018 from AIG insurance as a salvage purchase. The airplane was located in Belize City, Belize. The airplane was damaged by a trolley that rolled into it and damaged the left-wing strut, rudder, and elevator. He flew down, repaired the airplane, and flew it back to Fort Lauderdale. He performed an annual inspection in May 2018 and put it into rental service at that time. The airplane flew for 218 hours before the accident.

The flight instructor held a commercial pilot certificate, with a rating for airplane single-engine land, and instrument airplane. His most recent Federal Aviation Administration first-class medical certificate was issued on October 26, 2017. He reported 1,580.5 total hours of flight experience at the time of the accident.

Flight instructor Information

Certificate:	Commercial; Flight instructor	Age:	25, Male
Airplane Rating(s):	Single-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 single-engine; Instrument airplane	Toxicology Performed:	No
Medical Certification:	Class 1 Without waivers/limitations	Last FAA Medical Exam:	October 26, 2017
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	November 13, 2017
Flight Time:	1580.5 hours (Total, all aircraft), 1500 hours (Total, this make and model), 1567.4 hours (Pilot In Command, all aircraft)		

Student pilot Information

Certificate:	Student	Age:	27, Male
Airplane Rating(s):	None	Seat Occupied:	Left
Other Aircraft Rating(s):	None	Restraint Used:	3-point
Instrument Rating(s):	None	Second Pilot Present:	Yes
Instructor Rating(s):	None	Toxicology Performed:	No
Medical Certification:	Class 1 Without waivers/limitations	Last FAA Medical Exam:	July 26, 2018
Occupational Pilot:	No	Last Flight Review or Equivalent:	
Flight Time:			

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	Registration:	N3015E
Model/Series:	172 N	Aircraft Category:	Airplane
Year of Manufacture:	1978	Amateur Built:	
Airworthiness Certificate:	Normal	Serial Number:	17271404
Landing Gear Type:	Tricycle	Seats:	4
Date/Type of Last Inspection:	December 19, 2018 100 hour	Certified Max Gross Wt.:	2299 lbs
Time Since Last Inspection:	20 Hrs	Engines:	1 Reciprocating
Airframe Total Time:	5295 Hrs as of last inspection	Engine Manufacturer:	Lycoming
ELT:	Installed	Engine Model/Series:	O-320 SERIES
Registered Owner:		Rated Power:	160 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:	KOPF, 10 ft msl	Distance from Accident Site:	9 Nautical Miles
Observation Time:	18:53 Local	Direction from Accident Site:	269°
Lowest Cloud Condition:	Few / 4200 ft AGL	Visibility	10 miles
Lowest Ceiling:		Visibility (RVR):	
Wind Speed/Gusts:	8 knots /	Turbulence Type Forecast/Actual:	None / None
Wind Direction:	50°	Turbulence Severity Forecast/Actual:	N/A / N/A
Altimeter Setting:	30.1 inches Hg	Temperature/Dew Point:	22°C / 14°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Fort Lauderdale, FL (FXE)	Type of Flight Plan Filed:	None
Destination:	Fort Lauderdale, FL (FXE)	Type of Clearance:	None
Departure Time:	13:30 Local	Type of Airspace:	

Wreckage and Impact Information

Crew Injuries:	2 None	Aircraft Damage:	Substantial
Passenger Injuries:	2 None	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	4 None	Latitude, Longitude:	25.909444,-80.120552(est)

Administrative Information

Investigator In Charge (IIC):	Boggs, Daniel
Additional Participating Persons:	Brian Hahn; FAA; Miami, FL
Original Publish Date:	April 13, 2020
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.nts.gov/Docket?ProjectID=98856

The National Transportation Safety Board (NTSB), established in 1967, is an independent federal agency mandated by Congress through the Independent Safety Board Act of 1974 to investigate transportation accidents, determine the probable causes of the accidents, issue safety recommendations, study transportation safety issues, and evaluate the safety effectiveness of government agencies involved in transportation. The NTSB makes public its actions and decisions through accident reports, safety studies, special investigation reports, safety recommendations, and statistical reviews.

The Independent Safety Board Act, as codified at 49 U.S.C. Section 1154(b), precludes the admission into evidence or use of any part of an NTSB report related to an incident or accident in a civil action for damages resulting from a matter mentioned in the report. A factual report that may be admissible under 49 U.S.C. § 1154(b) is available [here](#).