



# National Transportation Safety Board Aviation Accident Final Report

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|--------------------------------|-------------------------------------------|-------------------------|-------------|
| <b>Location:</b>               | Rifle, CO                                 | <b>Accident Number:</b> | CEN15LA202  |
| <b>Date &amp; Time:</b>        | 04/16/2015, 2245 MDT                      | <b>Registration:</b>    | N2691W      |
| <b>Aircraft:</b>               | FAIRCHILD SA227 AC                        | <b>Aircraft Damage:</b> | Substantial |
| <b>Defining Event:</b>         | Loss of engine power (total)              | <b>Injuries:</b>        | 1 None      |
| <b>Flight Conducted Under:</b> | Part 135: Air Taxi & Commuter - Scheduled |                         |             |

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## Analysis

The commercial pilot departed in the twin-engine airplane for a scheduled, domestic cargo flight. He reported that, during the climb, he heard a "bang," which was followed by a loss of engine power and fire indications from the right engine. The pilot declared an emergency and diverted to another airport for an instrument approach and landed uneventfully.

Postaccident examination of the airplane revealed that the right engine's second-stage turbine rotor had separated. One portion of the rotor exited through the left side of the engine and nacelle structure, penetrated the right side of the fuselage, and came to rest inside the fuselage wall. Other portions of the separated rotor exited through the right side of the engine. The engine and the inside of the nacelle structure exhibited fire damage, but no evidence of a sustained fire was found in that area. The examination of the turbine engine revealed fatigue cracks on the second-stage rotor disk, which indicates that the rotor disk likely failed due to fatigue, and this likely resulted in the uncontained engine failure.

## Probable Cause and Findings

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

The uncontained engine failure due to the fatigue failure of the second-stage turbine rotor disk.

## Findings

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|                 |                                                  |
|-----------------|--------------------------------------------------|
| <b>Aircraft</b> | Turbine section - Fatigue/wear/corrosion (Cause) |
|-----------------|--------------------------------------------------|

## Factual Information

On April 16, 2015, about 2245 mountain daylight time, a Fairchild SA227-AC, twin-engine airplane, N2691W, operating as Key Lime flight 168, was substantially damaged after an uncontained engine failure during climb near Rifle, Colorado. The pilot was not injured. The airplane was registered to CBG LLC, Wilsonville, Oregon, and was operated by Key Lime Air Corporation, Englewood, Colorado. Dark, night, instrument meteorological conditions (IMC) prevailed at the time of the accident and an instrument flight rules (IFR) flight plan had been filed for the Title 14 *Code of Federal Regulations* Part 135 scheduled cargo flight. The airplane departed from Garfield County Regional Airport (RIL), Rifle, Colorado, at 2237 and was destined for Denver International Airport (DEN), Denver, Colorado

The pilot reported that during a climb, when still well below the tops of nearby mountains, he heard a "bang" followed by a complete loss of power and engine fire indications from the right engine. After completing appropriate checklist items, the pilot declared an emergency and diverted to Grand Junction Regional Airport (GJT), Grand Junction, Colorado, for an instrument approach and landing at 2311. The airplane landed without further incident.

A post accident examination of the airplane revealed the second stage turbine rotor from the right engine had separated. One portion of the rotor exited through the left side of the engine and nacelle structure, penetrated the right side of the fuselage, and came to rest inside the fuselage wall. Other portions of the separated rotor exited through the right side of the engine. There was thermal damage to the engine and the inside of the nacelle structure, but no evidence of a sustained fire in that area. The examination of the turbine engine noted fatigue cracks on the 2nd stage rotor disk. The rotor disk had a reported 3,901.4 hrs., and 4,143 cycles

## History of Flight

|                         |                                                                             |
|-------------------------|-----------------------------------------------------------------------------|
| Enroute-climb to cruise | Loss of engine power (total) (Defining event)<br>Part(s) separation from AC |
|-------------------------|-----------------------------------------------------------------------------|

## Pilot Information

|                                  |                                                                                                                                                                                                                                                          |                                          |            |
|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|------------|
| <b>Certificate:</b>              | Commercial                                                                                                                                                                                                                                               | <b>Age:</b>                              | 28         |
| <b>Airplane Rating(s):</b>       | Multi-engine Land; Single-engine Land                                                                                                                                                                                                                    | <b>Seat Occupied:</b>                    | Left       |
| <b>Other Aircraft Rating(s):</b> | None                                                                                                                                                                                                                                                     | <b>Restraint Used:</b>                   |            |
| <b>Instrument Rating(s):</b>     | Airplane                                                                                                                                                                                                                                                 | <b>Second Pilot Present:</b>             | No         |
| <b>Instructor Rating(s):</b>     | None                                                                                                                                                                                                                                                     | <b>Toxicology Performed:</b>             | No         |
| <b>Medical Certification:</b>    | Class 1 With Waivers/Limitations                                                                                                                                                                                                                         | <b>Last FAA Medical Exam:</b>            | 10/27/2014 |
| <b>Occupational Pilot:</b>       | Yes                                                                                                                                                                                                                                                      | <b>Last Flight Review or Equivalent:</b> | 10/08/2014 |
| <b>Flight Time:</b>              | (Estimated) 2920 hours (Total, all aircraft), 1130 hours (Total, this make and model), 2765 hours (Pilot In Command, all aircraft), 117 hours (Last 90 days, all aircraft), 53 hours (Last 30 days, all aircraft), 3 hours (Last 24 hours, all aircraft) |                                          |            |

## Aircraft and Owner/Operator Information

|                                      |                                      |                                       |                          |
|--------------------------------------|--------------------------------------|---------------------------------------|--------------------------|
| <b>Aircraft Make:</b>                | FAIRCHILD                            | <b>Registration:</b>                  | N2691W                   |
| <b>Model/Series:</b>                 | SA227 AC                             | <b>Aircraft Category:</b>             | Airplane                 |
| <b>Year of Manufacture:</b>          | 1986                                 | <b>Amateur Built:</b>                 | No                       |
| <b>Airworthiness Certificate:</b>    | Commuter; Normal                     | <b>Serial Number:</b>                 | AC-655B                  |
| <b>Landing Gear Type:</b>            | Retractable - Tricycle               | <b>Seats:</b>                         | 3                        |
| <b>Date/Type of Last Inspection:</b> | 02/24/2015, Continuous Airworthiness | <b>Certified Max Gross Wt.:</b>       | 16000 lbs                |
| <b>Time Since Last Inspection:</b>   |                                      | <b>Engines:</b>                       | 2 Turbo Prop             |
| <b>Airframe Total Time:</b>          | 26855 Hours at time of accident      | <b>Engine Manufacturer:</b>           | AIRESEARCH               |
| <b>ELT:</b>                          | C91A installed, not activated        | <b>Engine Model/Series:</b>           | TPE331 SERIES            |
| <b>Registered Owner:</b>             | CBG LLC                              | <b>Rated Power:</b>                   | 1100 hp                  |
| <b>Operator:</b>                     | KEY LIME AIR CORPORATION             | <b>Operating Certificate(s) Held:</b> | On-demand Air Taxi (135) |
| <b>Operator Does Business As:</b>    | DENVER AIR CONNECTION                | <b>Operator Designator Code:</b>      | KY7A                     |

## Meteorological Information and Flight Plan

|                                  |                        |                                         |                  |
|----------------------------------|------------------------|-----------------------------------------|------------------|
| Conditions at Accident Site:     | Instrument Conditions  | Condition of Light:                     | Night/Dark       |
| Observation Facility, Elevation: | KRIL, 5522 ft msl      | Distance from Accident Site:            | 0 Nautical Miles |
| Observation Time:                | 2253 MDT               | Direction from Accident Site:           | 71°              |
| Lowest Cloud Condition:          | / 2000 ft agl          | Visibility                              | 10 Miles         |
| Lowest Ceiling:                  | Overcast / 2000 ft agl | Visibility (RVR):                       |                  |
| Wind Speed/Gusts:                | 4 knots /              | Turbulence Type<br>Forecast/Actual:     | /                |
| Wind Direction:                  | 130°                   | Turbulence Severity<br>Forecast/Actual: | /                |
| Altimeter Setting:               | 30.04 inches Hg        | Temperature/Dew Point:                  | 3°C / 2°C        |
| Precipitation and Obscuration:   | Light - Rain           |                                         |                  |
| Departure Point:                 | Rifle, CO (RIL)        | Type of Flight Plan Filed:              | IFR              |
| Destination:                     | DENVER, CO (DEN)       | Type of Clearance:                      | IFR              |
| Departure Time:                  | 2237 MDT               | Type of Airspace:                       | Class E          |

## Airport Information

|                      |                            |                           |         |
|----------------------|----------------------------|---------------------------|---------|
| Airport:             | GARFIELD COUNTY RGNL (RIL) | Runway Surface Type:      | Asphalt |
| Airport Elevation:   | 5537 ft                    | Runway Surface Condition: | Wet     |
| Runway Used:         | 26                         | IFR Approach:             | None    |
| Runway Length/Width: | 7000 ft / 100 ft           | VFR Approach/Landing:     | None    |

## Wreckage and Impact Information

|                     |        |                      |                              |
|---------------------|--------|----------------------|------------------------------|
| Crew Injuries:      | 1 None | Aircraft Damage:     | Substantial                  |
| Passenger Injuries: | N/A    | Aircraft Fire:       | None                         |
| Ground Injuries:    | N/A    | Aircraft Explosion:  | None                         |
| Total Injuries:     | 1 None | Latitude, Longitude: | 39.525833, -107.728056 (est) |

## Administrative Information

|                                   |                                                                                                                                 |              |            |
|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------|--------------|------------|
| Investigator In Charge (IIC):     | Thomas Latson                                                                                                                   | Report Date: | 04/20/2020 |
| Additional Participating Persons: | Mark M Rushton; FAA Salt Lake City FSDO; Salt Lake City, UT<br>David Studtmann; Honeywell Aerospace; Phoenix, AZ                |              |            |
| Publish Date:                     | 04/20/2020                                                                                                                      |              |            |
| Note:                             | The NTSB did not travel to the scene of this accident.                                                                          |              |            |
| Investigation Docket:             | <a href="http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=91049">http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=91049</a> |              |            |

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](#).