



Aviation Short Investigation Final Report

Power-Plant Malfunction

Cirrus SR-22 N325TE

Near Deep Water Cay, Grand Bahama, Bahamas

February 22nd, 2018

AAID Aviation Occurrence Investigation # AO-18-000005

Final Report – April 8, 2019

The Air Accident Investigation Department (AAID)

The Air Accident Investigation Department (AAID) is the independent accident investigation department under the Bahamas Ministry of Tourism and Aviation (MOTA) charged with the responsibility of investigating all aviation accidents and incidents in the Bahamas.

The AAID's function is to promote and improve safety and public confidence in the aviation industry through excellence in:

- Independent investigation of aviation accidents and other safety occurrences
- Safety data recording, analysis and research
- Fostering safety awareness, knowledge and action.

The AAID does not investigate for the purpose of apportioning blame or to provide a means for determining liability. At the same time, an investigation report must include factual material of sufficient weight to support the analysis and findings. At all times the AAID endeavors to balance the use of material that could imply adverse comment with the need to properly explain what happened, and why, in a fair and unbiased manner.

The AAID performs its functions in accordance with the provisions of the Bahamas Civil Aviation Act 2016, Civil Aviation (Investigations of Air Accidents and Incidents) Regulations and Amendment Regulations 2017, International Civil Aviation Organization (ICAO) Annex 13 (Eleventh edition, July 2016 – latest revision) and, where applicable, relevant international agreements.

The Air Accident Investigation Department is mandated by the Ministry of Tourism and Aviation to investigate air transportation accidents and incidents, determine probable causes of accidents and incidents, issue safety recommendations, study transportation safety issues and evaluate the safety effectiveness of agencies and stakeholders involved in air transportation. The objective of a safety investigation is to identify and reduce safety-related risk. AAID investigations determine and communicate the safety factors related to the transport safety matter being investigated.

The AAID makes public its findings and recommendations through accident reports, safety studies, special investigation reports, safety recommendations and safety alerts. Unless otherwise indicated, recommendations in this report are addressed to the regulatory authorities of the State having responsibility for the matters with which the recommendation is concerned. It is for those authorities to decide what action is taken. When the AAID issues a safety recommendation, the person, organization or agency is required to provide a written response without delay. The response shall indicate whether the person, organization or agency accepts the recommendation, any reasons for not accepting part or all of the recommendation(s), and details of any proposed safety action(s) resulting from the recommendation(s) issued.

Official Copies of accident reports can be obtained by contacting:

Air Accident Investigation Department
2nd Floor, Manx Corporate Center
#45 West Bay Street
P. O. Box CB-11702
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Tel: 1 (242) 397-5513 / 5514 / 5509 / 5520 / 5525
Fax: (242) 327-2192

Additional copies of the reports can be viewed on the **AAID's** website at: <http://www.baaid.org> or requested by email: baaid@bahamas.gov.bs.

**AIR ACCIDENT
INVESTIGATION DEPARTMENT**

Registered Owner: SR20 Holdings LTD.

Manufacturer: Cirrus Aircraft

Aircraft Type: SR22

Nationality: United States of America

Registration: N325TE

Place of Accident: Near Deep Water Cay Airport, Grand Bahama

Date and Time: 22nd February 2018; 1:00 pm

Notification: BCAA, NTSB, FAA

Investigating Authority: Air Accident Investigation Department,
Ministry of Tourism and Aviation

Investigator in Charge: Kendall Dorsett Jr.

Accredited Representatives:

Technical Advisors: Kurt Gibson (Continental Motors)
Brannon Mayer (Cirrus Aircraft)

Releasing Authority: Air Accident Investigation Department

**Date of Final
Report Publication:** 8th April, 2019

Power-plant Malfunction – Cirrus SR-22 N325TE

What Happened?

On 22nd February, 2018 at approximately 5:53 pm (LCL), the Air Accident Investigation Department was notified by Bahamas Air Navigation Services Division (Nassau Air Traffic Control), that Cirrus N325TE was involved in an occurrence that led to the pilot in command having to execute an emergency landing on a dirt road near Deep Water Cay Airport, Grand Bahama.



Photo 1: Cirrus SR22 N325TE

The aircraft departed from Pompano Beach, Florida (KPMP) at 12:30 pm and was enroute to Marsh Harbour, (Leonard Thompson International Airport) Abaco (MYAM). While enroute, the pilot-in-command observed an oil sensor indication and noticed that the engine appeared to be malfunctioning. Subsequently he diverted to Deep Water Cay, Airport, East Grand Bahama and landed.

After consulting with his mechanic via telephone and trouble-shooting, the pilot opted to depart Deep Water Cay and continue his flight, taking off from Deep Water Cay at 1:45 pm. However, only minutes into the flight, the oil sensor indication returned and the engine failed. A decision was then made to perform an emergency landing on a dirt road nearby after realizing he would be unable to return to the field.



Photo 2: N325TE Deep Water Cay

He executed the landing and the aircraft received damages as a result. There were no injuries reported related to this occurrence.

Crew Experience

Pilot

The pilot of the aircraft was a 53-year-old male at the time of the accident. He had been issued a United States Airline Transport Pilot License August 22nd, 2006 with airplane multi-engine land privileges. Also, airplane single-engine land, sea and glider ratings were attached to his Commercial pilot certificate. He possessed a First-Class Medical Certificate issued in April 2013 with the restriction 'Must wear corrective lenses.'

The Aircraft

The Cirrus SR22 is a four-place, low wing, single-engine monoplane with fixed landing gear. The aircraft is constructed of primarily composite materials.

This airplane is certificated in the normal category. In the normal category all aerobatic maneuvers are prohibited. The aircraft is approved for day and night VFR/IFR when equipped in accordance with US Code of Federal Aviation Regulations (F.A.R.) Part 91 or F.A.R. Part 135.

The engine is a Continental Model IO-550-N and is rated at 310 hp at 2700 RPM. It is a six cylinder direct drive, normally aspirated, air-cooled, horizontally opposed, fuel injected engine.

A 92-gallon usable wet-wing fuel storage system provides fuel for engine operation. The system consists of vented integral fuel tanks and a fuel collector/sump in each wing, a three-position selector valve, an electric boost pump, and an engine-driven fuel pump. Fuel is gravity fed from each tank to the associated collector sumps where the engine-driven fuel pump draws fuel through a filter and selector valve to pressure feed the engine fuel injection system. The electric boost pump is provided for engine priming and vapor suppression.

The airplane is equipped with a two-alternator, two-battery, 28-volt direct current electrical system designed to reduce the risk of electrical system faults. Alternator 1 is a gear-driven, internally rectified, 60-amp alternator mounted on the right front of the engine and is regulated to 28 volts. Alternator 2 is a gear-driven, internally rectified, 20-amp alternator mounted on the accessory drive at the rear of the engine and is regulated to 28.75 volts. The output from Alternator 1 is connected to the Main Distribution Bus. The output from Alternator 2 is connected to the Essential Distribution Bus. Both alternators are self-exciting (not self-starting), and require battery voltage for field excitation in order to start up.

Weather

Weather was not deemed to be a factor in this accident.

Investigation Findings

- There were no signs of impact damage to the aircraft's engine.
- The #3, #4, #5, and #6 connecting rods, bearings and journals displayed lubrication distress and damage.
- The #5 connecting rod had released from the crankshaft and the #5 piston was destroyed.

Engine Analysis

The aircraft engine was removed and sent for tear down and engine analysis under the supervision of the AAID with representatives of the airframe (Cirrus Aircraft) and engine manufacturers (Continental Motors), between 29th - 30th May 2018.

All engine accessory components were intact and not related to probable cause. The report summary revealed, after examination of the recorded data from the last flight, oil pressure went from its minimum of 1 psi to a max pressure of 22 psi during full power. The oil pressure then returned to less than 5 psi in 27 seconds after reaching its max. Approximately 2 minutes and 6 seconds after full power, #5 EGT (Exhaust Gas Temperature) dropped off significantly and the engine RPM dropped as well. Approximately 12 secs after that, the #1 EGT followed. It was also noted that the oil temperature continued to rise after the application of full power to a max temperature of approximately 198.5 degrees. The oil temperature did not begin to fall until 33 seconds before the end of the recording.

The #3, #4, #5 and #6 connecting rods, bearings, and journals displayed lubrication distress and damage; the #3 main journal displayed lubrication distress signatures, and the #2, #3, and the #4 main bearings displayed varying amounts of damage consistent with lubrication distress. The #5 connecting rod had release from the crankshaft and the #5 piston was destroyed.



Photo 3: #4 Connecting Rod & Bearings



Photo 4: #5 Connecting Rod & Bearings

Conclusion

The Air Accident Investigation Department has determined the probable cause of this accident to be engine malfunction related to the lack of oil pressure to the bearings of the connecting rods and the crankshaft journals, thus increasing operating temperatures. The initial causal factor of the oil starvation was not determined.

Safety Action

Whether or not the AAID identifies safety issues in the course of an investigation, relevant organizations may proactively initiate safety action in order to reduce their safety risk.

Safety Message

Every investigation undertaken by the AAID is intended to have the effect of advancing the safety of aviation in some way, shape, or form. Usually, this would be accomplished via the issuance of safety recommendations that were developed in the aftermath or during the process of an accident/incident investigation. However, the dynamic nature of aviation makes each accident scenario unique, and as such, each occurrence must be evaluated on its own merit and a determination made as to the method by which safety can be promoted.

During this investigation, the analysis process brought to light what transpired relative to the oil starvation of the engine. However, the initial causal factor was unable to be determined.

In review of this accident, the AAID identified the role that Aeronautical Decision Making (ADM) ¹ could have played in mitigating against this occurrence. Therefore, it is the responsibility of this agency to reiterate and reinforce how critical it is for airman to adhere to the tenants outlined in the Federal Aviation Administration’s guidance on Aeronautical Decision Making (ADM). As such, there would be a lesser chance of falling victim to hazardous behavior patterns such as ‘Get-There-Itis’².

About this report

Decisions regarding whether to investigate, and the scope of an investigation, are based on many factors, including the level of safety benefit likely to be obtained from an investigation. For this occurrence, a limited-scope, fact-gathering investigation was conducted in order to produce a summary report and allow for greater industry awareness of potential safety issues and possible safety actions.

By the Air Accident Investigation Department



Delvin R. Major
Chief Investigator of Air Accidents

¹ Aeronautical Decision Making (ADM) – a systematic approach to the mental process used by aircraft pilots to consistently determine the best course of action in response to a given set of circumstances. (FAA Advisory Circular AC 60-22)

² Get-There-Itis – tendency common among pilots, clouds the vision and impairs judgement by causing a fixation on the original goal or destination combined with a total disregard for any alternate course of action.
