



# Aviation Investigation Final Report

|                                |                              |                         |             |
|--------------------------------|------------------------------|-------------------------|-------------|
| <b>Location:</b>               | KATY, Texas                  | <b>Accident Number:</b> | FTW99LA228  |
| <b>Date &amp; Time:</b>        | August 14, 1999, 18:30 Local | <b>Registration:</b>    | N540DM      |
| <b>Aircraft:</b>               | Aviat S1-11B                 | <b>Aircraft Damage:</b> | Substantial |
| <b>Defining Event:</b>         |                              | <b>Injuries:</b>        | 1 None      |
| <b>Flight Conducted Under:</b> | Part 91: General aviation    |                         |             |

## Analysis

The pilot was unable to maintain directional control of the aerobatic biplane during the landing roll due to failure of the brake master cylinder for the left brake. He reported that he had been operating in the designated aerobatic box above the airport for approximately 15 minutes, and while recovering from a hammer head stall, the propeller and engine oversped, and suspecting engine damage, he elected to execute a precautionary landing on runway 27. The airplane touched down about mid-field on the 4,300 foot grass/sod runway. The pilot applied brakes to exit the runway; however, the left brake failed, and the airplane 'made a violent turn to the right.' The tailwheel-equipped airplane nosed over and came to rest in the inverted position. The FAA inspector verified that the master cylinder for the left brake had failed, and braking was not possible. The 1998 model airplane had accumulated a total of 160 hours since new.

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's inability to maintain directional control of the tailwheel equipped biplane following the failure of the left brake master cylinder.

## Findings

Occurrence #1: AIRFRAME/COMPONENT/SYSTEM FAILURE/MALFUNCTION  
Phase of Operation: LANDING - ROLL

Findings

1. (C) LANDING GEAR,NORMAL BRAKE SYSTEM - FAILURE
2. BRAKES(NORMAL) - NOT ATTAINED - PILOT IN COMMAND
3. (C) DIRECTIONAL CONTROL - NOT POSSIBLE - PILOT IN COMMAND

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Occurrence #2: LOSS OF CONTROL - ON GROUND/WATER  
Phase of Operation: LANDING - ROLL

## Factual Information

On August 14, 1999, at 1830 central daylight time, an Aviat-Pitts S1-11B biplane, N540DM, was substantially damaged following a loss of control during the landing roll at the Sack-O-Grande Airport near Katy, Texas. The instrument rated commercial pilot, sole occupant of the airplane, was not injured. The airplane was owned and operated by the pilot. Visual meteorological conditions prevailed for the Title 14 CFR Part 91 personal flight for which a flight plan was not filed. The local flight originated approximately 15 minutes prior to the accident.

The 1,400-hour pilot reported to the FAA inspector, who traveled to the accident site, that he had been operating in the designated aerobatic box above the airport for approximately 15 minutes. He added that "while recovering from a hammer head stall, the propeller and engine over sped," and suspecting engine damage, he elected to execute a precautionary landing on runway 27.

The pilot stated that the airplane touched down about mid-field on the 4,300 foot grass/sod runway. The airplane was decelerating through 40 knots when he applied brakes to exit the runway; however, the left brake failed, and the airplane "made a violent turn to the right." The left wing tip impacted the ground, and the tailwheel-equipped airplane nosed over and came to rest in the inverted position. The pilot was able to exit the biplane without assistance.

Examination of the wreckage by the FAA inspector revealed that the rudder and vertical stabilizer were crushed, the fuselage was wrinkled, and the left main landing gear was folded under the fuselage. The inspector verified that the master cylinder for the left brake had failed, and braking was not possible. He added that the 1998 airplane had accumulated a total of 160 hours since new.

The pilot reported that an examination of the engine revealed signs that an engine overspeed had occurred, necessitating the replacement of the engine.

## Pilot Information

|                                  |  |  |                |
|----------------------------------|--|--|----------------|
| <b>Certificate:</b>              | Commercial   | <b>Age:</b>                              | 36, Male       |
| <b>Airplane Rating(s):</b>       | Single-engine land; Multi-engine land  | <b>Seat Occupied:</b>                    | Center         |
| <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 2 Valid Medical--no waivers/lim.   | <b>Last FAA Medical Exam:</b>            | March 25, 1999 |
| <b>Occupational Pilot:</b>       | No   | <b>Last Flight Review or Equivalent:</b> |                |
| <b>Flight Time:</b>              | 1400 hours (Total, all aircraft), 410 hours (Total, this make and model), 1200 hours (Pilot In Command, all aircraft), 60 hours (Last 90 days, all aircraft), 20 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft) |  |                |

## Aircraft and Owner/Operator Information

|                                      |                                |                                       |                 |
|--------------------------------------|--------------------------------|---------------------------------------|-----------------|
| <b>Aircraft Make:</b>                | Aviat                          | <b>Registration:</b>                  | N540DM          |
| <b>Model/Series:</b>                 | S1-11B S1-11B                  | <b>Aircraft Category:</b>             | Airplane        |
| <b>Year of Manufacture:</b>          |                                | <b>Amateur Built:</b>                 |                 |
| <b>Airworthiness Certificate:</b>    | Aerobatic                      | <b>Serial Number:</b>                 | 4003            |
| <b>Landing Gear Type:</b>            | Tailwheel                      | <b>Seats:</b>                         | 1               |
| <b>Date/Type of Last Inspection:</b> | January 28, 1999 Annual        | <b>Certified Max Gross Wt.:</b>       | 1600 lbs        |
| <b>Time Since Last Inspection:</b>   | 35 Hrs                         | <b>Engines:</b>                       | 1 Reciprocating |
| <b>Airframe Total Time:</b>          | 160 Hrs                        | <b>Engine Manufacturer:</b>           | Lycoming        |
| <b>ELT:</b>                          | Not installed                  | <b>Engine Model/Series:</b>           | AEIO-540        |
| <b>Registered Owner:</b>             | DAVID Z. MAFRIGE               | <b>Rated Power:</b>                   | 260 Horsepower  |
| <b>Operator:</b>                     |                                | <b>Operating Certificate(s) Held:</b> | None            |
| <b>Operator Does Business As:</b>    | DAVID Z. MAFRIGE AIRSHOWS, INC | <b>Operator Designator Code:</b>      |                 |

## Meteorological Information and Flight Plan

|   |                                  |   |          |
|---|----------------------------------|---|----------|
| <b>Conditions at Accident Site:</b>     | Visual (VMC)                     | <b>Condition of Light:</b>                  | Day      |
| <b>Observation Facility, Elevation:</b> |                                  | <b>Distance from Accident Site:</b>         |          |
| <b>Observation Time:</b>                |                                  | <b>Direction from Accident Site:</b>        |          |
| <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>                | 4 knots /                        | <b>Turbulence Type Forecast/Actual:</b>     | /        |
| <b>Wind Direction:</b>                  | 270°                             | <b>Turbulence Severity Forecast/Actual:</b> | /        |
| <b>Altimeter Setting:</b>               |                                  | <b>Temperature/Dew Point:</b>               |          |
| <b>Precipitation and Obscuration:</b>   | No Obscuration; No Precipitation |   |          |
| <b>Departure Point:</b>                 | (9X59)                           | <b>Type of Flight Plan Filed:</b>           | None     |
| <b>Destination:</b>                     |                                  | <b>Type of Clearance:</b>                   | None     |
| <b>Departure Time:</b>                  | 18:15 Local                      | <b>Type of Airspace:</b>                    | Class G  |

## Airport Information

|                             |                    |                                  |                                 |
|-----------------------------|--------------------|----------------------------------|---------------------------------|
| <b>Airport:</b>             | SACK-O-GRANDE 9X59 | <b>Runway Surface Type:</b>      | Grass/turf                      |
| <b>Airport Elevation:</b>   | 175 ft msl         | <b>Runway Surface Condition:</b> | Dry                             |
| <b>Runway Used:</b>         | 27                 | <b>IFR Approach:</b>             |                                 |
| <b>Runway Length/Width:</b> | 4300 ft / 80 ft    | <b>VFR Approach/Landing:</b>     | Full stop;Precautionary landing |

## Wreckage and Impact Information

|                            |        |                             |                          |
|----------------------------|--------|-----------------------------|--------------------------|
| <b>Crew Injuries:</b>      | 1 None | <b>Aircraft Damage:</b>     | Substantial              |
| <b>Passenger Injuries:</b> |        | <b>Aircraft Fire:</b>       | None                     |
| <b>Ground Injuries:</b>    | N/A    | <b>Aircraft Explosion:</b>  | None                     |
| <b>Total Injuries:</b>     | 1 None | <b>Latitude, Longitude:</b> | 29.75035,-95.740905(est) |

## Administrative Information

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|--|---|
| <b>Investigator In Charge (IIC):</b>     | Casanova, Hector  |
| <b>Additional Participating Persons:</b> | GALE R HUEY; HOUSTON , TX   |
| <b>Original Publish Date:</b>            | September 12, 2000  |
| <b>Last Revision Date:</b>               |   |
| <b>Investigation Class:</b>              | <a href="#">Class</a>   |
| <b>Note:</b>                             |   |
| <b>Investigation Docket:</b>             | <a href="https://data.nts.gov/Docket?ProjectID=47092">https://data.nts.gov/Docket?ProjectID=47092</a> |

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](#).