Aviation Investigation Final Report

Location:	OPA-LOCKA, Florida	**Accident Number:**	MIA98LA192
Date & Time:	June 5, 1998, 16:15 Local	**Registration:**	N366J
Aircraft:	Cessna 310K	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	1 None
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

During takeoff an explosion inside the left wing resulted in a short duration fire. The flight continued and landed uneventfully. The upper and lower wing skins were displaced and fire damage was noted aft of the battery box. The positive battery cable was chafing against an open adel clamp located near the battery box; the PK screw was not in place. Arching was noted on the battery cable. Testing of the left auxiliary fuel tank revealed seepage from the fuel tank vent line. The fuel tank was not properly secured inside the wing. Damage to the external portion of the auxiliary fuel tank near the vent line was noted. Previous fuel seepage from the left wing auxiliary fuel tank was evident in the form of damage on the ground beneath the left wing area greater than damage to the ground beneath the right wing area. Also, a wax type residue was found on the lower wing skin in the area of the fuel seepage. The service manual indicates to check electrical cables for condition every 100 hours.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The fuel leak due to improper installation of the left auxiliary fuel tank by maintenance personnel. Also, inadequate annual inspection of the airplane by maintenance personnel for failure to identify the missing screw from the adel clamp resulting in chafing of the positive battery cable. Also, operation of the airplane by the owner with known deficiencies in equipment.

Findings

Occurrence #1: EXPLOSION
Phase of Operation: TAKEOFF - INITIAL CLIMB

Findings
1. (C) FUEL SYSTEM,LINE - LEAK
2. (C) MAINTENANCE,INSTALLATION - IMPROPER - OTHER MAINTENANCE PERSONNEL
3. MISCELLANEOUS,BOLT/NUT/FASTENER/CLAMP/SPRING - NOT SECURED
4. (C) MAINTENANCE,ANNUAL INSPECTION - INADEQUATE - OTHER MAINTENANCE PERSONNEL
5. (C) OPERATION WITH KNOWN DEFICIENCIES IN EQUIPMENT - INTENTIONAL - OWNER/BUILDER
6. ELECTRICAL SYSTEM,BATTERY - ARCING

Factual Information

On June 5, 1998, about 1615 eastern daylight time, a Cessna 310K, N366J, registered to the Matsui Aviation Company, experienced an explosion inside the left wing during takeoff from the Opa-Locka Airport, Opa-Locka, Florida. Visual meteorological conditions prevailed at the time and no flight plan was filed for the 14 CFR Part 91 personal flight. The airplane was substantially damaged and the private-rated pilot, the sole occupant, was not injured. The flight was originating at the time of the accident.

The pilot stated that the flight was uneventful and after landing, he departed the area on a commercial flight, but returned the following day. Before departing on the commercial flight, he asked that the airplane be refueled and when he returned, he was advised by the line service personnel that the upper and lower skins of the left wing were displaced.

According to one of the co-owners of the airplane, he discovered the damage to the airplane 2 days after the accident. He also stated that they typically only filled the auxiliary fuel tanks in the summer to a level about 1 inch below the filler neck, but when he examined the fuel level in the left auxiliary fuel tank that day, it was down 1.5 inches. The pilot told him that he did not use fuel from the left auxiliary fuel tank during the flight.

Examination of the airplane revealed that the upper and lower wing skins were displaced upwards and downwards respectively, and a hole was burned through the upper wing skin aft of the battery box access cover. Soot was noted trailing the rivet holes in the upper wing skin where the skin was pulled away from several of the wing ribs. Soot was also noted exiting from the left wing root fairing. The battery was removed and examination of the positive battery cable revealed that it was not secured by a adel clamp, which by design, is secured to rib No. 23. Additionally, the PK sheet metal screw for the adel clamp was not located but the tinnerman nut on the clamp was in place. Examination of the clamp revealed evidence of electrical arching and also evidence of chafing on the insulation of the positive cable against the opened adel clamp. The left auxiliary fuel tank which had been subsequently drained before the NTSB examination, was fueled to the filler neck area. Fuel seeping from the fuel tank vent line outlet was noted. The outlet is located on the outboard upper section of the fuel tank. The fuel was determined to seep into the area aft of the battery box inside the wing then from that area around the sump. The lower skin surface in the sump drain area was found to contain a wax type residue on the skin. The fuel seepage stopped when the fuel level reached a certain point when tested several times. The left auxiliary fuel tank was then examined while in position and it was determined to be held in place by only two of the six hanger loop clips. One of the six hangar clips was not in place and a clamp which secures the fuel vent line to the vent nipple inside the fuel tank was determined to be in place and finger tight. The tank was removed and examination of the outside area near the fuel tank vent nipple revealed blistering of the reinforcing material. Additionally, examination of the ground where the airplane was

routinely kept revealed damage to the asphalt beneath several areas near the left wing auxiliary fuel tank, including the area beneath the sump drain area. The damage beneath the left wing was greater than the damage beneath the right wing.

Review of the maintenance records revealed that the left and right auxiliary fuel tanks were replaced on December 16, 1990. Markings on the external portion of the left auxiliary fuel tank revealed that the tank was manufactured in April 1989. Additionally, the airplane was last inspected in accordance with an annual inspection that was signed off on July 10, 1997. The airplane had accumulated about 31 hours since then when the damage to the left wing was noted. Review of the checklist prepared and used by the mechanic who performed the inspection revealed in part, that the fuel tanks and plumbing are required to be checked. The mechanic stated that he could not recall removing the battery during the inspection and he did not drain or remove the left auxiliary fuel tank. He did verify that the fuel vent line was clear.

According to a representative of the tank manufacturer, it was manufactured under a Parts Manufacturer Approval (PMA) Letter, issued by the Federal Aviation Administration. Hanger clips are not typically included with the fuel cell when shipped to a customer and the tank was proper for the airplane application.

Review of the service manual for the airplane revealed there is a requirement to check the battery cables for condition, corrosion and security every 100 hours. The checklist lists only three types of inspections, a 50-hour, 100-hour, and as required.

Pilot Information

Certificate:	Private	**Age:**	32,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 3 Valid Medical--w/ waivers/lim	**Last FAA Medical Exam:**	May 12, 1997
Occupational Pilot:	UNK	**Last Flight Review or Equivalent:**	
Flight Time:	1043 hours (Total, all aircraft), 361 hours (Total, this make and model), 11 hours (Last 90 days, all aircraft), 8 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	**Registration:**	N366J
Model/Series:	310K 310K	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	310K0086
Landing Gear Type:	Retractable - Tricycle	**Seats:**	5
Date/Type of Last Inspection:	July 10, 1997 Annual	**Certified Max Gross Wt.:**	5200 lbs
Time Since Last Inspection:	31 Hrs	**Engines:**	2 Reciprocating
Airframe Total Time:	3437 Hrs	**Engine Manufacturer:**	Continental
ELT:	Installed, not activated	**Engine Model/Series:**	IO-520-E2B
Registered Owner:	MATSUI AVIATION CORPORATION	**Rated Power:**	300 Horsepower
Operator:		**Operating Certificate(s) Held:**	None
Operator Does Business As:		**Operator Designator Code:**	

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	OPF ,9 ft msl	**Distance from Accident Site:**	
Observation Time:	15:53 Local	**Direction from Accident Site:**	
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	10 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	150°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29 inches Hg	**Temperature/Dew Point:**	34°C / 23°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	(OPF)	**Type of Flight Plan Filed:**	None
Destination:	TAMPA , FL (X16)	**Type of Clearance:**	None
Departure Time:	16:10 Local	**Type of Airspace:**	Class D

Airport Information

Airport:	OPA-LOCKA OPF	**Runway Surface Type:**	
Airport Elevation:	9 ft msl	**Runway Surface Condition:**	
Runway Used:	0	**IFR Approach:**	
Runway Length/Width:		**VFR Approach/Landing:**	

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	In-flight
Ground Injuries:	N/A	**Aircraft Explosion:**	In-flight
Total Injuries:	1 None	**Latitude, Longitude:**	25.909088,-80.269248(est)

Administrative Information

Investigator In Charge (IIC):	Monville, Timothy
Additional Participating Persons:	BOB BLAKE; TAMPA , FL WILLIAM B WELCH; WICHITA , KS
Original Publish Date:	February 16, 2001
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=38542