



Aviation Investigation Factual Report

Location:	DREW, Mississippi	Accident Number:	MIA99LA203
Date & Time:	July 23, 1999, 15:00 Local	Registration:	N2368R
Aircraft:	Air Tractor 301	Aircraft Damage:	Substantial
Defining Event:		Injuries:	1 None
Flight Conducted Under:	Part 137: Agricultural		

Factual Information

On July 23, 1999, about 1500 central daylight time, an Air Tractor 301, N2368R, registered to Ward Air Service Inc., was substantially damaged during takeoff at Ruleville-Drew Airport, Drew, Mississippi. The commercial-rated pilot reported no injuries. Visual meteorological conditions (VMC) prevailed in the vicinity, and no flight plan had been filed. The local aerial application flight was being conducted in accordance with Title 14 CFR Part 137. The flight was originating at the time.

The flight was departing from a 3,000-foot runway with a full load of fertilizer. The airplane became airborne, and according to the pilot, the engine lost power. The pilot was not able to maintain altitude, and the airplane impacted the ground about 2,500 feet from the departure end of the runway.

According to the FAA, the on-scene investigation revealed that the No. 4 cylinder exhaust rocker box cover was "...fractured and missing. This appeared to be not caused by the post accident phase or impact with the ground."

The No. 4 cylinder was removed from the engine and sent to the NTSB Materials Laboratory in Washington, D.C., for examination. The NTSB Materials Laboratory factual report revealed that the No. 4 cylinder head had failed from fatigue cracking. It was found that the cylinder head was separated through the rocker arm bosses on the exhaust side. The fracture intersected the rocker shaft hole on the boss that had been labeled "1" for identification purposes, and the push rod tube attachment on both bosses "1" and "2". The rocker arm and the mating half of the fracture were not recovered.

The fracture through boss "1" was flat, with evidence of casting porosity on the fracture surface. Cracking arrest positions were faintly recognizable on the surface of the fracture in boss "1". According to the NTSB Materials Laboratory factual report, "...the curvature of these arrest markings and the flow patterns on the surface were consistent with fatigue cracking that originated in the corners between the rocker shaft hole and the surface of the casting." The origin areas revealed "heavy oxidation" which prevented identification of the exact origin locations.

The fracture surface of boss "2" was stepped, containing several plateaus in the surface. Large ratchet marks (Steps in the surface formed when two fatigue cracks, growing independently on two different planes, join together and proceed as one crack front) joined these plateaus, and many smaller ratchet marks were noted within several of the levels. Multiple crack arrest locations were noted on the surface. Scanning electron microscopy of the surface revealed striations throughout the region. The ratchet marks and striation geometry were "consistent with fatigue from multiple origins..." Many of the origins seemed

to originate from two casting discontinuities. These discontinuities did not contain the smooth, nodular surface of the many shrinkage voids that were noted in the material, but appeared relatively flat with a large amount of oxide on the surface. (See the NTSB Materials Laboratory factual report, an attachment to this report.)

The reported temperature in the vicinity about the time of the accident was 96 degrees F, and the winds were from 330 degrees, at 3 knots. The calculated density altitude was 2,559 feet. The field elevation was 137 feet.

Pilot Information

Certificate:	Commercial	Age:	31, Male
Airplane Rating(s):	Single-engine land	Seat Occupied:	Center
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 2 Valid Medical--no waivers/lim.	Last FAA Medical Exam:	March 30, 1999
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	
Flight Time:	4200 hours (Total, all aircraft), 1000 hours (Total, this make and model), 4100 hours (Pilot In Command, all aircraft), 300 hours (Last 90 days, all aircraft), 150 hours (Last 30 days, all aircraft), 8 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Air Tractor	Registration:	N2368R
Model/Series:	301 301	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	
Airworthiness Certificate:		Serial Number:	301-0418
Landing Gear Type:	Tailwheel	Seats:	1
Date/Type of Last Inspection:	March 8, 1999 Annual	Certified Max Gross Wt.:	1500 lbs
Time Since Last Inspection:	300 Hrs	Engines:	1 Reciprocating
Airframe Total Time:	6500 Hrs	Engine Manufacturer:	P&W
ELT:	Not installed	Engine Model/Series:	R-1340
Registered Owner:	WARD AIR SERVICE INC.	Rated Power:	600 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:	GLH ,131 ft msl	Distance from Accident Site:	
Observation Time:	14:50 Local	Direction from Accident Site:	
Lowest Cloud Condition:	Clear	Visibility	7 miles
Lowest Ceiling:	Broken / 5000 ft AGL	Visibility (RVR):	
Wind Speed/Gusts:	3 knots /	Turbulence Type Forecast/Actual:	/
Wind Direction:	330°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	30 inches Hg	Temperature/Dew Point:	36°C / 23°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	(M37)	Type of Flight Plan Filed:	None
Destination:		Type of Clearance:	None
Departure Time:	17:00 Local	Type of Airspace:	

Airport Information

Airport:	RULEVILLE M37	Runway Surface Type:	Asphalt
Airport Elevation:	152 ft msl	Runway Surface Condition:	Dry
Runway Used:	18	IFR Approach:	None
Runway Length/Width:	3000 ft / 80 ft	VFR Approach/Landing:	None

Wreckage and Impact Information

Crew Injuries:	1 None	Aircraft Damage:	Substantial
Passenger Injuries:		Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	1 None	Latitude, Longitude:	33.800975,-90.53096(est)

Administrative Information

Investigator In Charge (IIC):	Yurman, Alan
Additional Participating Persons:	CHARLES WITTINGTON; JACKSON , MS
Report Date:	April 12, 2000
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=46950

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