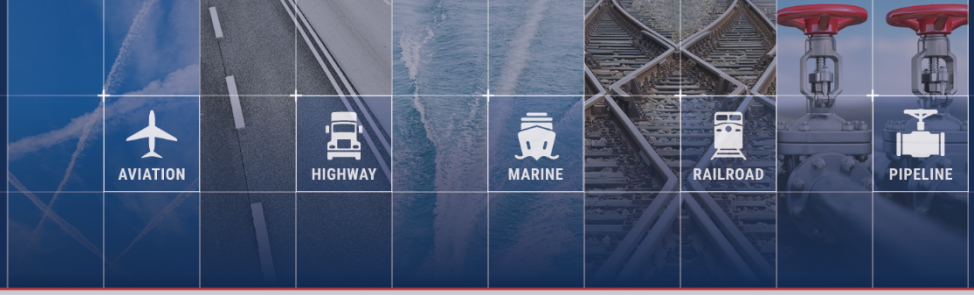

Aviation Investigation Final Report

Location:	ROBERTS, Idaho	**Accident Number:**	SEA95LA154
Date & Time:	July 17, 1995, 08:15 Local	**Registration:**	N4326S
Aircraft:	AIR TRACTOR AT-301	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	1 None
Flight Conducted Under:	Part 91: General aviation - Positioning		

Analysis

THE PILOT REPORTED THAT SHORTLY AFTER TAKEOFF, AT 40 FEET ABOVE GROUND LEVEL, THE ENGINE LOST POWER AND BEGAN BACKFIRING. THE PILOT MADE A FORCED LANDING IN A BARLEY FIELD WITH 3-FOOT-TALL CROPS, AND THE AIRPLANE CARTWHEELED. POSTACCIDENT EXAMINATION OF THE ENGINE REVEALED THAT THE EXHAUST VALVE ROCKER ARM HOUSING ON THE NUMBER 3 CYLINDER SEPARATED, DISABLING THE NUMBER 3 CYLINDER EXHAUST VALVE.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: A LOSS OF ENGINE POWER DUE TO THE SEPARATION OF THE NUMBER 3 CYLINDER EXHAUST VALVE ROCKER ARM SHAFT FROM THE CYLINDER HEAD, WHICH DISABLED MOVEMENT OF THE EXHAUST VALVE. A FACTOR WAS THE LACK OF SUITABLE TERRAIN FOR THE FORCED LANDING.

Findings

Occurrence #1: LOSS OF ENGINE POWER(PARTIAL) - MECH FAILURE/MALF
Phase of Operation: TAKEOFF - INITIAL CLIMB

Findings
1. (C) ENGINE ASSEMBLY,ROCKER ARM/TAPPET - SEPARATION
2. (C) ENGINE ASSEMBLY,VALVE,EXHAUST - DISABLED

Occurrence #2: FORCED LANDING
Phase of Operation: EMERGENCY LANDING AFTER TAKEOFF

Occurrence #3: ON GROUND/WATER ENCOUNTER WITH TERRAIN/WATER
Phase of Operation: EMERGENCY LANDING AFTER TAKEOFF

Findings
3. (F) TERRAIN CONDITION - NONE SUITABLE
4. TERRAIN CONDITION - CROP

Factual Information

On July 17, 1995, at 0815 mountain daylight time, an Air Tractor 301, N4326S, owned by Lewis Flying Service, Inc., a 14 CFR 137 agricultural aircraft operator certificate holder, received substantial damage in a forced landing following a loss of engine power on takeoff from the pilot's private airstrip near Roberts, Idaho. The commercial pilot, a co-owner of the single-seat agricultural aircraft, was not injured. The flight was a 14 CFR 91 positioning flight to Rigby, Idaho. Visual meteorological conditions existed and no flight plan had been filed.

The pilot stated in his report on the accident: "During climb- out at approx[imately] 40 foot altitude engine lost power and [began] backfiring. All terrain (360 deg) was cultivated fields with near mature crops...Established glide into barley field - 3 foot tall crop...attempted soft-field landing. Wheels contacted barley; aircraft immediately pitched over and cartwheeled on left wing...."

A post-accident inspection of the Pratt & Whitney R-1340-AN1 radial engine revealed that the boss securing the exhaust valve rocker arm shaft to the number 3 cylinder head had separated from the cylinder head, allowing the entire rocker arm to move freely rather than pivot. This failure prevented the number 3 cylinder's exhaust valve from opening during engine operation. No other evidence of engine damage or malfunction was noted.

According to the accident report and copies of the aircraft and engine logs submitted by the airplane's owner, the engine had been operated 201.3 hours since the airplane's last inspection (an annual inspection conducted on April 7, 1995), and 233.8 hours since its last overhaul. The engine was installed on the airplane at zero time since overhaul on August 7, 1994 according to the engine log.

The FAA publication, "General Aviation Airworthiness Alerts" (AC 43-16), December 1995 issue, which the FAA distributes to FAA- certificated Inspection Authorization (IA) airframe and powerplant mechanics, contained an advisory for cylinder cracks on Pratt & Whitney model R-1340 engines. The advisory reported: "After receiving reports from three engine overhaul shops concerning cracks in the cylinder exhaust rocker shaft housing area, an investigation and interviews suggest this may be a systematic problem. Two repair stations stated they reject approximately 3 percent of the cylinders passing through their shops for this type defect. The defects in the exhaust rocker shaft housings range from slight cracking to complete separation of the housing above the rocker shaft....The Service Difficulty Reporting (SDR) data base revealed 42 similar reports, and 7 others which may have been related to this topic....the exact cause for cracking in this area has not been determined...Since the rocker shaft uses an 'O-ring' seal under each of the nuts, it is possible that when oil seepage is found, the nuts are tightened beyond the torque limits established by the manufacturer's maintenance manual....It is also possible that thermal expansion and contraction...may result in this type defect....It

would be wise to pay close attention to this area during scheduled inspections."

Pilot Information

Certificate:	Commercial	**Age:**	50,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):	Airplane single-engine	**Toxicology Performed:**	No
Medical Certification:	Class 2 Valid Medical--w/ waivers/lim	**Last FAA Medical Exam:**	April 28, 1995
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	
Flight Time:	8554 hours (Total, all aircraft), 3301 hours (Total, this make and model), 8433 hours (Pilot In Command, all aircraft), 220 hours (Last 90 days, all aircraft), 100 hours (Last 30 days, all aircraft), 8 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	AIR TRACTOR	**Registration:**	N4326S
Model/Series:	AT-301 AT-301	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Restricted (Special)	**Serial Number:**	301-0006
Landing Gear Type:	Tailwheel	**Seats:**	1
Date/Type of Last Inspection:	April 7, 1995 Annual	**Certified Max Gross Wt.:**	5000 lbs
Time Since Last Inspection:	202 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	7174 Hrs	**Engine Manufacturer:**	P&W
ELT:	Not installed	**Engine Model/Series:**	R-1340-AN1
Registered Owner:	LEWIS, ORLIN & JULIA	**Rated Power:**	600 Horsepower
Operator:		**Operating Certificate(s) Held:**	
Operator Does Business As:	LEWIS FLYING SERVICE	**Operator Designator Code:**	HNBG

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	IDA ,4740 ft msl	**Distance from Accident Site:**	12 Nautical Miles
Observation Time:	07:45 Local	**Direction from Accident Site:**	160°
Lowest Cloud Condition:	Clear	**Visibility**	60 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	5 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	350°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30 inches Hg	**Temperature/Dew Point:**	14°C / 9°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:		**Type of Flight Plan Filed:**	None
Destination:	RIGBY , ID (U56)	**Type of Clearance:**	None
Departure Time:	00:00 Local	**Type of Airspace:**	Class G

Airport Information

Airport:		**Runway Surface Type:**	
Airport Elevation:		**Runway Surface Condition:**	
Runway Used:	0	**IFR Approach:**	
Runway Length/Width:		**VFR Approach/Landing:**	Forced landing

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:**	43.730209,-112.260932(est)

Administrative Information

Investigator In Charge (IIC):	Nesemeier, Gregg
Additional Participating Persons:	GEORGE D CAWTHRA; SALT LAKE CITY , UT
Original Publish Date:	February 8, 1996
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=42196