



# Aviation Investigation Final Report

<b>Location:</b>	BOCA RATON, Florida	<b>Accident Number:</b>	MIA99LA117
<b>Date &amp; Time:</b>	April 2, 1999, 15:57 Local	<b>Registration:</b>	N820MM
<b>Aircraft:</b>	Waco YMF-5	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>		<b>Injuries:</b>	1 Serious, 1 Minor
<b>Flight Conducted Under:</b>	Part 91: General aviation - Personal		

## Analysis

The pilot reported that during maneuvering flight, at about 500 feet agl, and 1/2 mile offshore, the engine and cowling began to shake, the engine began to sputter, and the windscreens became covered with oil. He made a turn westbound toward land, and declared an emergency, intending to land at the nearest airport. He reported the engine power available would not sustain level flight, and he started a slow descent. Neither the pilot nor his front seat passenger acquired a visual on the airport. The pilot overflew the airport and forced landed in a residential area 2 miles west of the airport. Examination of the engine revealed failure of the 12 cylinder holddown studs of the No. 7 cylinder.

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's failure to select a suitable forced landing site following a partial loss of engine power due to failed cylinder holddown studs, and the subsequent collision with trees. A factor in the accident was the reduced forward visibility from the dual open cockpits due to windshield obscuration by engine oil.

## Findings

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

Findings

1. ENGINE ASSEMBLY, OTHER - FRACTURED
2. REASON FOR OCCURRENCE UNDETERMINED

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Occurrence #2: FORCED LANDING

Phase of Operation: EMERGENCY DESCENT/LANDING

Findings

3. (F) VISUAL LOOKOUT - RESTRICTED - PILOT IN COMMAND

4. (C) UNSUITABLE TERRAIN OR TAKEOFF/LANDING/TAXI AREA - SELECTED - PILOT IN COMMAND

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Occurrence #3: IN FLIGHT COLLISION WITH OBJECT

Phase of Operation: EMERGENCY LANDING

Findings

5. OBJECT - TREE(S)

## Factual Information

On April 2, 1999, about 1557 eastern standard time, a Waco YMF-5, N820MM, registered to MD Aero, Inc., operating as a 14 CFR Part 91 personal flight, crashed in a residential area in Boca Raton, Florida, following an engine failure. Visual meteorological conditions prevailed and no flight plan was filed. The airplane received substantial damage, the private-rated pilot sustained serious injuries, and a passenger sustained minor injuries. The flight originated from Fort Lauderdale's Executive Airport (FXE), about 17 minutes before the accident.

According to the pilot, the flight was maneuvering at 500 feet agl, about 1/2 mile off the coast northeast of Boca Raton when the engine and cowling began to shake, the engine began to sputter, and the windscreens became covered with oil. He stated that the engine power available was not enough to sustain level flight, so he set up a slow rate of descent and an immediate turn westbound. He declared an emergency with FAA Pompano Control Tower, told them he would try to make an emergency landing at Boca Raton Airport, and was given the unicom frequency for Boca Raton. He switched to the Boca frequency and raised a young woman's voice who said she would get help. He stated he could hear other aircraft in the traffic pattern stating they would yield to the emergency, but he made no further calls.

At about 1543, according to FAA Pompano Control Tower personnel, N820MM called that he just departed FXE eastbound and asked for clearance to transit their area along the beach in a south to north direction. At about 1552, he had reached the northern limit of Pompano's airspace and was cleared for a radio frequency change. At about 1554, Pompano tower heard a Mayday call from N820MM, and at about 1555, the pilot said he had an oil leak and would try to land at the Boca Raton Airport.

According to a pilot in the traffic pattern at Boca Raton Airport, when N820MM declared his emergency and stated his engine problem, he obtained a visual on the Waco and watched him proceed westbound from a point about 2 miles east of the airport. It became obvious to the pilot that the Waco pilot and passenger did not or could not see the Boca airport, because they flew "...right over the numbers for runway 23 at Boca, but kept on flying westbound".

According to the Boca Raton Police Services Department, the pilot advised them that the airplane "...developed engine problems and was trying to make Boca Raton Airport and was unable to see the runway and overshot the airport and crashed in the field." The airplane collided with trees in a residential area and came to rest inverted.

According to FAA inspectors, the airplane crashed about 2 miles west of the Boca Raton Airport, within a residential area. Postcrash examination of the Jacobs radial engine by FAA inspectors revealed the power loss was caused by the failure of the No. 7 cylinder holddown studs and the resultant lifting of the cylinder off its seat. Three of a total of 12 holddown

studs, located on the aft side of the cylinder, revealed rust on their fractured surfaces. The remaining studs exhibited overload fractures. Piston wear marks on the walls of No. 7 cylinder reveal tilting of the cylinder away from the studs with rusted fracture sites. The power loss and oil leakage were the result of induction piping and oil line connections being stripped when the cylinder started lifting off its seat. Inspectors reported that the only thing holding No. 7 cylinder on the engine was baffling jammed against the cowl. About 140 engine operating hours before the accident, on March 3, 1998, the engine was reinstalled by General Aviation, Inc. of Lansing, Michigan, after a Jacobs Engine, Inc. factory teardown inspection due to a landing nose over incident.

### Pilot Information

<b>Certificate:</b>	Private	<b>Age:</b>	64, Male
<b>Airplane Rating(s):</b>	Single-engine land	<b>Seat Occupied:</b>	Rear
<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 3 Valid Medical-w/ waivers/lim	<b>Last FAA Medical Exam:</b>	December 3, 1997
<b>Occupational Pilot:</b>	No	<b>Last Flight Review or Equivalent:</b>	
<b>Flight Time:</b>	2228 hours (Total, all aircraft), 547 hours (Total, this make and model), 2088 hours (Pilot In Command, all aircraft), 36 hours (Last 90 days, all aircraft), 15 hours (Last 30 days, all aircraft), 3 hours (Last 24 hours, all aircraft)		

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	Waco	<b>Registration:</b>	N820MM
<b>Model/Series:</b>	YMF-5 YMF-5	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>		<b>Amateur Built:</b>	
<b>Airworthiness Certificate:</b>	Normal	<b>Serial Number:</b>	F5C056
<b>Landing Gear Type:</b>	Tailwheel	<b>Seats:</b>	2
<b>Date/Type of Last Inspection:</b>	April 3, 1998 Annual	<b>Certified Max Gross Wt.:</b>	2950 lbs
<b>Time Since Last Inspection:</b>	156 Hrs	<b>Engines:</b>	1 Reciprocating
<b>Airframe Total Time:</b>	731 Hrs	<b>Engine Manufacturer:</b>	Jacobs
<b>ELT:</b>	Installed	<b>Engine Model/Series:</b>	R755B2M
<b>Registered Owner:</b>	MD AERO, INC.	<b>Rated Power:</b>	275 Horsepower
<b>Operator:</b>		<b>Operating Certificate(s) Held:</b>	None
<b>Operator Does Business As:</b>		<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>	PBI ,17 ft msl	<b>Distance from Accident Site:</b>	21 Nautical Miles
<b>Observation Time:</b>	15:53 Local	<b>Direction from Accident Site:</b>	10°
<b>Lowest Cloud Condition:</b>	Unknown	<b>Visibility</b>	10 miles
<b>Lowest Ceiling:</b>	Broken / 6000 ft AGL	<b>Visibility (RVR):</b>	
<b>Wind Speed/Gusts:</b>	10 knots /	<b>Turbulence Type Forecast/Actual:</b>	/
<b>Wind Direction:</b>	130°	<b>Turbulence Severity Forecast/Actual:</b>	/
<b>Altimeter Setting:</b>	30 inches Hg	<b>Temperature/Dew Point:</b>	28°C / 22°C
<b>Precipitation and Obscuration:</b>	No Obscuration; No Precipitation		
<b>Departure Point:</b>	FT. LAUDERDALE , FL (FXE )	<b>Type of Flight Plan Filed:</b>	None
<b>Destination:</b>		<b>Type of Clearance:</b>	None
<b>Departure Time:</b>	15:40 Local	<b>Type of Airspace:</b>	Class E

## Airport Information

<b>Airport:</b>		<b>Runway Surface Type:</b>	
<b>Airport Elevation:</b>		<b>Runway Surface Condition:</b>	Rough;Soft;Vegetation
<b>Runway Used:</b>	0	<b>IFR Approach:</b>	None
<b>Runway Length/Width:</b>		<b>VFR Approach/Landing:</b>	Forced landing

## Wreckage and Impact Information

<b>Crew Injuries:</b>	1 Serious	<b>Aircraft Damage:</b>	Substantial
<b>Passenger Injuries:</b>	1 Minor	<b>Aircraft Fire:</b>	None
<b>Ground Injuries:</b>	N/A	<b>Aircraft Explosion:</b>	None
<b>Total Injuries:</b>	1 Serious, 1 Minor	<b>Latitude, Longitude:</b>	

## Administrative Information

<b>Investigator In Charge (IIC):</b>	Stone, Alan
<b>Additional Participating Persons:</b>	DAVID HAMMOND; FT. LAUDERDALE , FL
<b>Original Publish Date:</b>	April 19, 2001
<b>Last Revision Date:</b>	
<b>Investigation Class:</b>	<a href="#">Class</a>
<b>Note:</b>	
<b>Investigation Docket:</b>	<a href="https://data.ntsb.gov/Docket?ProjectID=46033">https://data.ntsb.gov/Docket?ProjectID=46033</a>

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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](#).