Aviation Investigation Final Report

Location:	OKLAHOMA CITY, Oklahoma	**Accident Number:**	FTW97LA156
Date & Time:	April 7, 1997, 17:14 Local	**Registration:**	N4861W
Aircraft:	Rockwell 114	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	1 None
Flight Conducted Under:	Part 91: General aviation		

Analysis

The engine lost power and an in flight fire sent smoke into the cabin during initial takeoff climb on a local maintenance flight of a prototype exhaust system. During the forced landing, short of the runway, the airplane touched down in soft soil, crossed a gravel driveway and struck an embankment and a fence before coming to a stop. Subsequently the airplane was consumed by the fire. The airframe was inspected by the FAA inspector and he found an unapproved modification, designed by the pilot, for the cowling and the exhaust system. The exhaust system components were wrapped in a heat protective tape approximately 2 inches wide. After removing the exhaust from the engine and removing the tape, it was found that the right hand exhaust pipe collector was cracked in several areas. The pilot reported that he was working on a STC for drag reduction and the experimental exhaust manifold cracked at the weld after 7 hours of test flights.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The exhaust manifold cracking due to the pilot's inadequate maintenance modification of the exhaust system which resulted in a fire. A factor was the lack of suitable terrain for the forced landing.

Findings

Occurrence #1: AIRFRAME/COMPONENT/SYSTEM FAILURE/MALFUNCTION
Phase of Operation: TAKEOFF - INITIAL CLIMB

Findings
1. (C) EXHAUST SYSTEM,MANIFOLD/PIPE - CRACKED
2. (C) MAINTENANCE,MODIFICATION - INADEQUATE - PILOT IN COMMAND

Occurrence #2: FIRE
Phase of Operation: APPROACH - VFR PATTERN - DOWNWIND

Occurrence #3: FORCED LANDING
Phase of Operation: EMERGENCY DESCENT/LANDING

Occurrence #4: ON GROUND/WATER ENCOUNTER WITH TERRAIN/WATER
Phase of Operation: LANDING - ROLL

Findings
3. (F) TERRAIN CONDITION - NONE SUITABLE
4. TERRAIN CONDITION - BERM
5. TERRAIN CONDITION - SOFT
6. OBJECT - FENCE
7. OBJECT - FENCE POST

Factual Information

On April 7, 1997, at 1714 central standard time, a Rockwell International 114, N4861W, owned by Montana Engine Rebuilders, Inc., at Billings, Montana, and operated by a private individual under Title 14 CFR Part 91, was destroyed following an in flight fire and forced landing near Oklahoma City, Oklahoma. The private pilot egressed prior to the destruction of the airplane and he was not injured. Visual meteorological conditions prevailed for the local maintenance test flight and a flight plan was not filed. The flight was originating at the time of the emergency.

During an interview, conducted by the investigator-in-charge (IIC), and on the Pilot/Operator Report, the pilot reported that during initial takeoff climb from runway 17 at the Sundance Airpark he noticed a "hot" smell due to the thermal wrapping material around the exhaust pipes. As the smell was growing stronger, the pilot made a downwind entry for the runway. Smoke entered the cabin and during the downwind to base entry for the landing there was a partial loss of engine power. By the time the airplane was turned onto base, a total loss of engine power occurred and a forced landing was made short of the runway with the initial touchdown point about 1/2 mile north and 900 feet west of the runway. The airplane touched down in soft soil and during the landing roll the airplane crossed a gravel driveway, and struck an embankment and a fence before coming to a stop. After exiting the airplane, the pilot noted flames coming from the bottom of the firewall and engine compartment. Subsequently the airplane was consumed by the fire.

The pilot reported that he was working on a Supplemental Type Certificate (STC) for drag reduction in the make and model of aircraft. The exhaust system and cowling were a prototype with about 7 hours of test flights completed. He reported on the Pilot/Operator Report that the experimental part of the exhaust manifold cracked at the weld.

During an interview, the owner reported to the IIC that his aircraft was flown from Montana to Oklahoma about 3 years ago. The pilot, who was a design engineer, was utilizing the airplane for testing a speed modification design.

A former employee of the pilot reported that the aircraft had been "extensively and illegally modified." The list included " unapproved engine cowling, cowling barrier material, and the muffler system."

On April 30, 1997, the airframe was inspected by the FAA inspector who found an unapproved modification of the cowling and the exhaust system. The exhaust system components were wrapped in a heat protective tape approximately 2 inches wide. After removing the exhaust from the engine and removing the tape, it was found that the right hand exhaust pipe collector was cracked in several areas. For additional details see the enclosed FAA inspector

statement.

Pilot Information

Certificate:	Private	**Age:**	46,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 3 Expired	**Last FAA Medical Exam:**	September 11, 1989
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	295 hours (Total, all aircraft), 182 hours (Total, this make and model), 261 hours (Pilot In Command, all aircraft), 6 hours (Last 90 days, all aircraft), 2 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Rockwell	**Registration:**	N4861W
Model/Series:	114 114	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	14191
Landing Gear Type:	Retractable - Tricycle	**Seats:**	4
Date/Type of Last Inspection:	May 22, 1996 Annual	**Certified Max Gross Wt.:**	3250 lbs
Time Since Last Inspection:	14 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	2000 Hrs	**Engine Manufacturer:**	Lycoming
ELT:	Installed, not activated	**Engine Model/Series:**	IO-540
Registered Owner:	MONTANA ENGINE REBUILDERS, INC	**Rated Power:**	260 Horsepower
Operator:	ROBERT K. CORDRAY	**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:		**Distance from Accident Site:**	
Observation Time:		**Direction from Accident Site:**	
Lowest Cloud Condition:	Scattered / 5000 ft AGL	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	18 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	190°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:		**Temperature/Dew Point:**	14°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	(HSD)	**Type of Flight Plan Filed:**	None
Destination:		**Type of Clearance:**	
Departure Time:	17:14 Local	**Type of Airspace:**	Class E

Airport Information

Airport:	SUNDANCE AIRPARK HSD	**Runway Surface Type:**	
Airport Elevation:	1193 ft msl	**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:**	Destroyed
Passenger Injuries:		**Aircraft Fire:**	In-flight
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 None	**Latitude, Longitude:**	35.479846,-97.650596(est)

Administrative Information

Investigator In Charge (IIC):	Smith, Joyce
Additional Participating Persons:	RANDY FOSTER; OKLAHOMA CITY , OK
Original Publish Date:	February 2, 1998
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=20196