



National Transportation Safety Board Aviation Accident Final Report

Location:	Uvalde, TX	Accident Number:	DFW08LA223
Date & Time:	09/01/2008, 1400 CDT	Registration:	N8472V
Aircraft:	ROCKWELL INTERNATIONAL S-2R	Aircraft Damage:	Substantial
Defining Event:	Loss of engine power (total)	Injuries:	1 None
Flight Conducted Under:	Part 137: Agricultural		

Analysis

The engine of the agricultural airplane lost power while it was maneuvering at low altitude. The airplane impacted thick vegetation and terrain, causing substantial damage to the right wing, nose and tail. A subsequent teardown examination of the engine showed little evidence that the engine was operating at the time of impact, but the ingestion of vegetation into the combustor and the torsional failure of the torsion shaft suggests that there was some rotation of the engine at the time of impact. The engine examination also revealed that several turbine rotors had damage and missing blade material due to short term operation of the engine at an over temperature condition. There was evidence that the rotors had been operating for several hours after the over temperature event that caused the stress rupture of the blades. Further, the examination showed that the first stage turbine rotor and the prop pitch control cam did not conform to Honeywell specifications and were not authorized replacement parts, and a previous weld repair on the engine combustor plenum did not conform to standard practices for weld repairs on aerospace parts.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: A total loss of engine power due to the improper use of unauthorized replacement parts in the engine and repeated operation of the engine in an over-temperature condition.

Findings

Aircraft	Turbine section - Damaged/degraded (Cause) Turbine section - Incorrect service/maintenance (Cause) Engine (turbine/turboprop) - Failure (Cause) Return to service - Incorrect service/maintenance (Cause)
Personnel issues	Unauthorized maint/repair - Not specified (Cause)

Factual Information

On September 1, 2008, approximately 1500 central daylight time (CDT), a Rockwell International S-2R, N8472V, registered to Farm & Ranch Aerial Service Inc., and operated by Rusty's Flying Service as a 14 Code of Federal Regulations Part 137 agricultural flight, crashed while maneuvering at low altitude. Visual meteorological conditions prevailed and flight plan had not been filed. The airplane was substantially damaged by the impact forces. The commercial pilot, who was the only occupant, was not injured. The airplane had departed the Glasscock Field Airport (4TS8) D'Hanis, Texas.

The pilot reported he was half way through his third pass over a 200 acre cotton field and had 80 gallons of chemical and 180 gallons of fuel on board when the engine surged twice and then completely failed. The pilot was able to clear the bigger oak trees on the edge of the field and he stalled the airplane into a thick patch of brush.

The Federal Aviation Administration (FAA) inspector that responded to the accident scene reported that the airplane appeared to have stalled tail first into thick vegetation, impacted terrain and came to rest upright. The right wing, nose and tail were crushed from the impact. One of the three blades on the propeller appeared to be undamaged. A second blade had a single bend and the third blade had a S- type bend.

The wreckage was removed from the accident scene and transported to the facilities of Air Salvage of Dallas (ASOD), near Lancaster, Texas. On September 19, 2008 the Board investigator-in-charge examined the wreckage at ASOD and the engine was removed from the airplane and shipped to the Honeywell Product Integrity Investigation Laboratory in Phoenix, Arizona. On November 18, 2008 a teardown and examination of the engine was conducted at that facility under the oversight of an FAA inspector. The examination shows evidence of over temperature damage and missing material from turbine rotor blades. A metallurgical examination shows that the first stage turbine rotor and the prop pitch control cam do not conform to Honeywell specifications and are not authorized replacement parts. The configuration of the control system components on the engine do not meet the type certificate specifications and a previous weld repair on the engine combustor plenum does not conform to standard practices for weld repairs on aerospace parts.

Airplane maintenance logbooks could not be located and were not available for inspection. The Hobbs meter reading at the accident site was 874.4. A few selected pages of maintenance records for the engine were located that covered the period from June 20, 2004 at 3369.5 engine time since overhaul (TSOH) until the last entry at 4763.4 TSOH on June 24, 2008. A maintenance record entry by a certified repair station on June 24, 2008, shows that a hot section inspection was performed; the engine was returned to service and reinstalled on N8472V at a Hobbs meter reading of 442.0.

History of Flight

Prior to flight	Aircraft maintenance event
Maneuvering-low-alt flying	Loss of engine power (total) (Defining event)
Uncontrolled descent	Collision with terr/obj (non-CFIT)

Pilot Information

Certificate:	Commercial	Age:	28, Male
Airplane Rating(s):	Single-engine Land	Seat Occupied:	Single
Other Aircraft Rating(s):	None	Restraint Used:	Seatbelt, Shoulder harness
Instrument Rating(s):	None	Second Pilot Present:	No
Instructor Rating(s):	None	Toxicology Performed:	No
Medical Certification:	Class 2 Without Waivers/Limitations	Last Medical Exam:	03/10/2008
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	12/18/2006
Flight Time:	2300 hours (Total, all aircraft), 400 hours (Total, this make and model), 2220 hours (Pilot In Command, all aircraft), 400 hours (Last 90 days, all aircraft), 150 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Manufacturer:	ROCKWELL INTERNATIONAL	Registration:	N8472V
Model/Series:	S-2R	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	No
Airworthiness Certificate:	Restricted	Serial Number:	2232R
Landing Gear Type:	Tailwheel	Seats:	1
Date/Type of Last Inspection:	04/14/2008, Annual	Certified Max Gross Wt.:	6900 lbs
Time Since Last Inspection:	432 Hours	Engines:	1 Turbo Prop
Airframe Total Time:	7935 Hours	Engine Manufacturer:	Honeywell Garrett
ELT:	Not installed	Engine Model/Series:	TPE 331-1-151
Registered Owner:	FARM & RANCH AERIAL SERVICE INC	Rated Power:	665 hp
Operator:	LINDEMAN, RUSTY	Air Carrier Operating Certificate:	None
Operator Does Business As:	Rusty's Flying Service	Operator Designator Code:	UXRG

Meteorological Information and Flight Plan

Observation Facility, Elevation:	KUVA, 942 ft msl	Observation Time:	1328 CDT
Distance from Accident Site:	10 Nautical Miles	Condition of Light:	Day
Direction from Accident Site:	196°	Conditions at Accident Site:	Visual Conditions
Lowest Cloud Condition:	Clear	Temperature/Dew Point:	34° C / 19° C
Lowest Ceiling:	None	Visibility	10 Miles
Wind Speed/Gusts, Direction:	Calm	Visibility (RVR):	
Altimeter Setting:	29.8 inches Hg	Visibility (RVV):	
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	D'Hanis, TX (4TS8)	Type of Flight Plan Filed:	None
Destination:	D'Hanis, TX (4TS8)	Type of Clearance:	None
Departure Time:	CDT	Type of Airspace:	

Wreckage and Impact Information

Crew Injuries:	1 None	Aircraft Damage:	Substantial
Passenger Injuries:	N/A	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	1 None		

Administrative Information

Investigator In Charge (IIC):	Thomas Latson	Adopted Date:	05/06/2010
Additional Participating Persons:	Victor H Lopez; FAA San Antonio FSDO; San Antonio, TX John A Eller; FAA Scottsdale FSDO; Scottsdale, AZ Dana Metz; Honeywell Aerospace; Phoenix, AZ		
Publish Date:	05/06/2010		
Investigation Docket:	NTSB accident and incident dockets serve as permanent archival information for the NTSB's investigations. Dockets released prior to June 1, 2009 are publicly available from the NTSB's Record Management Division at pubinq@ntsb.gov , or at 800-877-6799. Dockets released after this date are available at http://dms.nts.gov/pubdms/ .		

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