Aviation Investigation Final Report

Location:	Roseburg, Oregon	**Accident Number:**	SEA07LA095
Date & Time:	April 8, 2007, 14:00 Local	**Registration:**	N173ST
Aircraft:	Diemert/Rotorway Exec 162 F	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	1 None
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

Shortly after departure, the amateur-built experimental-category helicopter experienced a loss of engine power and the pilot initiated an autorotation to a nearby field. During the auto rotational landing, the helicopter impacted terrain and subsequently slid into a fence. The pilot stated that as the engine lost power, he noticed the number one Fully Automated Digital Electronic Control (FADEC) light went off and that the secondary FADEC did not function. Examination of the FADEC Electronic Control Units (ECU) revealed that there was a discontinuity of the "L3" ferrite inductor on both the number one and two ECU circuit boards. The reason for both failures was undetermined.

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 failure of the primary and secondary electronic control units (ECU's) within the engine's Fully Automated Digital Electronic Control.

Findings

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

Findings
1. (C) IGNITION SYSTEM - FAILURE,TOTAL

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

Findings
2. AUTOROTATION - PERFORMED - PILOT IN COMMAND

Occurrence #3: ON GROUND/WATER COLLISION WITH OBJECT
Phase of Operation: EMERGENCY LANDING

Findings
3. OBJECT - FENCE

Factual Information

On April 8, 2007, about 1400 Pacific daylight time, an amateur-built experimental-category Diemert/Rotorway International Exec 162 F helicopter, N173ST, sustained substantial damage during a forced landing subsequent to an in-flight loss of engine power approximately 5 miles south of the Roseburg Regional Airport, Roseburg, Oregon. The pilot/owner of the helicopter was not injured. The helicopter was operated under the provisions of Title 14 CFR Part 91, when the accident occurred. The pilot's planned destination was the Roseburg Airport. No flight plan was filed for the local flight.

In a written statement, the pilot reported that after takeoff, he climbed to an altitude of 30 - 40 feet above ground level (agl). As he advanced the cyclic forward to gain airspeed, the engine lost power and he immediately initiated an autorotation. Subsequently, the helicopter impacted the ground and slid into a fence resulting in substantial damage.

The pilot stated that as the engine lost power, he noticed the number one Fully Automated Digital Electronic Control (FADEC) light went off and that the secondary FADEC did not function. The pilot added that the loss of engine power was the fifth occurrence of the same nature.

Examination of the FADEC Engine Control Units (ECU) at the facilities of Electro-Sim of Tempe, Arizona under supervision of a Federal Aviation Administration inspector revealed that there was a discontinuity of the "L3" ferrite inductor on both the number one and two ECU circuit boards. The Electro-Sim representative stated that both ferrite inductors are digital grounds and a simultaneous failure of the inductors would cause the engine to shut down immediately; and should only one of the "L3" ferrite inductors fail, "the engine would continue to operate, but the sensor/annunciator panel would become inoperative." The reason for the failure was undetermined.

Pilot Information

Certificate:	Private; Student	**Age:**	55,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):		**Restraint Used:**	
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	April 1, 2006
Occupational Pilot:	UNK	**Last Flight Review or Equivalent:**	April 1, 2006
Flight Time:	897 hours (Total, all aircraft), 78 hours (Total, this make and model), 913 hours (Pilot In Command, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Diemert/Rotorway	**Registration:**	N173ST
Model/Series:	Exec 162 F	**Aircraft Category:**	Helicopter
Year of Manufacture:		**Amateur Built:**	Yes
Airworthiness Certificate:	Experimental (Special)	**Serial Number:**	6721
Landing Gear Type:	Skid	**Seats:**	2
Date/Type of Last Inspection:	March 1, 2007 Continuous airworthiness	**Certified Max Gross Wt.:**	1500 lbs
Time Since Last Inspection:	7.3 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	98 Hrs at time of accident	**Engine Manufacturer:**	Rotorway
ELT:	Not installed	**Engine Model/Series:**	R1-162F
Registered Owner:	James G. Diemert	**Rated Power:**	150 Horsepower
Operator:		**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KRGB,529 ft msl	**Distance from Accident Site:**	5 Nautical Miles
Observation Time:	13:53 Local	**Direction from Accident Site:**	360°
Lowest Cloud Condition:	Scattered / 8000 ft AGL	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	/	**Turbulence Type Forecast/Actual:**	/
Wind Direction:		**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.8 inches Hg	**Temperature/Dew Point:**	19°C / 6°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Roseburg, OR	**Type of Flight Plan Filed:**	None
Destination:	Roseburg, OR (KRGB)	**Type of Clearance:**	None
Departure Time:	14:04 Local	**Type of Airspace:**	

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:**	43.238609,-123.355834

Administrative Information

Investigator In Charge (IIC):	Hogenson, Dennis
Additional Participating Persons:	Richard Davis; Federal Aviation Administration; Portland, OR John Eller ; FAA FSDO; Scottsdale, AZ
Original Publish Date:	February 28, 2008
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=65544