

From: Raymond Butler [REDACTED]
Sent: Monday, March 09, 2015 7:54 PM
To: Scott Arnold
Cc: Michael.p.garvin [REDACTED]
Subject: N162RB Experimental Helicopter Forced Landing
Importance: High

Hello Scott and Mike:

I have been able to replicate the loss of ignition when the #1 Engine Control Unit is switched into the circuit from either the #1 or #2 wiring harness. The #2 ECU works well on either harness as long as #1 is not switched on. There is an unidentified "fault" that has occurred within the #1 ECU that causes all ignition to be lost. That is all I can be certain of right now.

Sincerely,

Raymond Butler, PE
Butler Consulting
[REDACTED]
Port Lavaca, TX 77979
[REDACTED]

From: Raymond Butler [REDACTED]
Sent: Tuesday, February 17, 2015 7:54 PM
To: Scott Arnold
Cc: Michael.p.garvin [REDACTED]
Subject: N162RB Experimental Helicopter Forced Landing
Importance: High

N162RB AFTER-ACCIDENT FOLLOW-UP

When I got the two original ECU's back from factory check-out, I placed them back in the helicopter, and it started right up. All pre-takeoff checks were completed with no issues at all. I flew the helicopter for about 5 hours on several occasions with no issues at all after that. I assumed that whatever was done to check out the units must have inadvertently fixed the problem with the #1 ECU. Then, on January 31, after several previous uneventful starts and flights, the helicopter engine failed during a local flight with no warning.

I have re-started the helicopter since the accident using the original two ECU's, which were the two in service at the time of the accident and have approximately 120 hours on them. The helicopter started right up on both ECU's. When I first switched the #1 ECU off, the helicopter ran on the #2 ECU with no issues. When I switched the #1 ECU back on, the helicopter engine immediately died.

After that, the only way the engine would restart is with the #1 ECU turned off. Any time I switched the #1 ECU back on, the helicopter would immediately die. When I switched wiring harness locations with the ECU's, the problem followed the #1 ECU, which seemed to negate any issues with the helicopter wiring or #2 ECU. This is the identical scenario I experienced back in the fall, when I had the first problem with the unit. The difference then was that the helicopter was on the ground and would not restart after the engine being turned off for 30 minutes.

There appears to be an intermittent failure within the #1 ECU that impacts the #2 ECU as well, taking all power from both units. After a time of being idle, the #1 ECU issue resolves itself until the next start and pre-takeoff ECU check switch is performed. I also purchased two new, unused ECU units, which the factory programmed for me. I have not yet placed either one in service but plan to do that as a part of my continued troubleshooting.

Sincerely,

Raymond Butler

[REDACTED]

Port Lavaca, TX 77979

[REDACTED]

From: Raymond Butler [REDACTED]
Sent: Monday, February 2, 2015
To: Scott Arnold
Cc: Michael.p.garvin [REDACTED]
Subject: Helicopter Forced Landing
Importance: High

Re: N162RB Incident of January 31, 2015

This will serve as description of an incident involving my homebuilt Rotorway Exec 162F helicopter that occurred on January 31, 2015 at approximately 1445 hours CST. I keep my helicopter stored at my hangar at 1120 South Virginia Street in Port Lavaca, Texas, 77979.

At approximately 1415 hours, I completed a preflight of my helicopter for a local sightseeing trip. Conditions were VFR, with high stratus and light south winds. Temperature was in the low 70's. I always fill the helicopter with fuel after each flight to be sure no moisture condenses in the tanks. Preflight, per Rotorway recommended practice, revealed no issues. I set the helicopter up for single passenger service (ballast weight on right forward skid) and went through the startup sequence, which includes a check of both independent electronically controlled ignition and fuel systems. All checked out fine. I made a brief solo safety flight around the area prior to boarding my passenger, Ms. Victoria Schultz, of [REDACTED] Needville, TX 77461.

I landed at my hangar, re-positioned the ballast weight for passenger flight, boarded my passenger, and did a pre-take off hover around my land. All gauges checked fine. I made an uneventful departure of

my property for a local sightseeing flight of the county.

I had been in the air for about 25 minutes. The helicopter had run flawlessly during that time. I was returning home, flying at about 300 feet altitude, in VFR conditions, when I heard my Low Rotor RPM horn start blaring. I felt the helicopter yaw and realized that I had lost the engine. I immediately entered an autorotation and picked a landing spot on an old roadway in a pasture adjacent to highway 35 just north of the Victoria Barge Canal Bridge.

Because of my low altitude, I had very little time to react. I arrested my rate of descent but still had too much forward speed to set down. I altered course to some heavy grass, and lost main rotor rpm about 8 feet above the ground, but still moving forward faster than I would have liked.

The helicopter settled hard, destroying the landing gear. My passenger and I immediately surveyed ourselves and determined that we were unhurt. There was no apparent fuel leak or danger of fire. I shut off the ELT, which had gone off, and turned off the main power switch.

We exited the helicopter right away and surveyed the surrounding area and condition of the helicopter. All appeared to be stable, with no danger of fire. I immediately called a friend, Edgar Cruz, who told me the emergency services vehicles appeared to be heading my way. I assumed that a passing motorist must have called in the incident.

The DPS, Calhoun County Sheriff's Dept, and local EMS services responded within 15 to 20 minutes. All information was given to the various responding agencies. Jeremiah Collins, the DPS officer who responded, told me that the FAA would be in touch. Shortly after, I spoke with Mike Garvin [REDACTED] of the FAA and Brian (?) of Houston Center [REDACTED], relaying brief details of the incident. I later spoke with Josh Lindberg, of the NTSB [REDACTED].

After receiving permission to depart from the DPS officer and determining that the FAA would be in touch on securing of the helicopter, we left with my friend Edgar Cruz.

I later spoke with Josh Lindberg of the NTSB and briefed him on the circumstances of the incident. I also spoke with Boyd Kempf, of the FAA, whom I had known from earlier years of flying in Calhoun County. I relayed details of the incident to Boyd, who told me that I would be hearing from Mike Garvin shortly. Later that evening, I again spoke with Mike Garvin who gave me permission to retrieve the helicopter.

Edgar Cruz and I went out to the site with a tractor and trailer and retrieved the helicopter, bringing it back to my hangar in Port Lavaca. It is stored in my hangar at this time.

Background

I am a fixed-wing, rotorcraft, instrument-rated private pilot with over 3000 fixed wing hours and 350 rotorcraft hours. I purchased the helicopter in 2006 as a complete kit from Rotorway Helicopters, Inc., of Chandler, Arizona. During the later stages of construction, I received training for my Rotorcraft endorsement on my fixed wing, instrument-rated private pilot license and received my endorsement in late 2007. Over a 5-year period, I constructed the kit and received specific flight instruction from a highly-experienced Rotorway helicopter pilot and CFI. I began flying N162RB regularly in February of 2009.

I received an FAA Repairman's Certificate, which allows me to do all maintenance on N162RB specifically. I am a registered engineer in the State of Texas (mechanical) and have always enjoyed building and operating all forms of mechanical equipment. I built N162RB with the objective of making it safe beyond all current knowledge of the machine. I belong to Rotorway Owners' Group, which is an online forum for builders. Many safety and improvement initiatives originate within this group, and I incorporated all that I thought were helpful. Some have been adopted by the factory as standard equipment.

I completed the 100 Hour Inspection in September, 2014. During that inspection, I complied with all Rotorway 100 inspection requirements in addition to renewing all critical control system bearings. N162RB has a highly modified, safer, more reliable engine than the standard Rotorway designed power plant. It also has an after-market ignition system that was engineered specifically for the engine modification. The modified engine was installed in 2010 and now has a total of approximately 140 hours in service.

I recently had an incident where the helicopter failed to start after a brief flight. The engine has two separate (and supposedly) redundant FADEC ignition systems. I determined that it appeared to have a faulty Engine Control Module (ECM) on the number one system, so I sent both number one and number two ECM units back to the manufacturer (Vertical Performance Systems, now out of business) for checkout. The manufacturer is actually no longer in the business of modifying Rotorway engines, but he did send the ECM's back to his original supplier for checkout. No problems were identified with either of the two units.

I received the units back from the manufacturer after checkout and re-installed both ECM units back in the helicopter along with a new battery in early January. I made at least 4 uneventful, problem free flights and put about 3 hours on the helicopter with no issues whatsoever.

Although I have not yet conducted an analysis of the exact cause of engine failure, I suspect that it was an intermittent fault in the number one ECM that incapacitated the entire ignition system, just as before. I intend to remove the damaged parts from the ship and place it in a condition where I can attempt to run the engine. This will allow me to determine more accurately what the problem may have been.

At this point, I am not inclined to rebuild N162RB, since repair costs and time required are beyond what I am able to commit.

Raymond Butler, PE

Pilot Certificate [REDACTED]

[REDACTED]

Port Lavaca, TX 77979

[REDACTED]