



# **ENGINE EXAMINATION**

**NATIONAL TRANSPORTATION SAFETY BOARD**

**Office of Aviation Safety**

**Western Pacific Region**

**April 18, 2019**

**WPR17LA048**

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**Napa, California**  
**January 4, 2017**  
**1430 PST**  
**Cozy MK IV– N4518S**

**EXAMINATION PARTICIPANTS**

**Stephen Stein**  
**Air Safety Investigator (IIC)**  
**National Transportation Safety Board**  
**Federal Way, Washington**

**John Schosanski**  
**Airplane Owner and Builder**  
**Napa, California**

**HISTORY OF FLIGHT**

On January 4, 2017, about 1430 Pacific standard time(PST), an experimental amateur-built Schosanski, Cozy MK IV R, N4518S, following a loss of engine power, made a forced landing and ran off the end of the runway at Napa County Airport (APC), Napa, California. The airplane was registered and operated by the owner-pilot under the provisions of 14 *Code of Federal Regulations* (CFR) Part 91. The commercial pilot was not injured. The airplane sustained substantial damage to the left wing during the accident sequence. The local personal flight departed Napa, California, about 1400 PST. Visual meteorological conditions prevailed and no flight plan had been filed.

The pilot reported that he was in closed traffic using runway 24, doing touch and go landings. On the accident approach the pilot noted he would be landing farther down the runway than he desired and initiated a go around. As he advanced the throttle the engine started to respond

normally and then rolled back to idle. The pilot attempted to land on the runway but the airplane over ran the end of the runway and came to rest in a marsh area at the end of the runway.

## PERSONNEL INFORMATION

The pilot, age 72, held a commercial pilot certificate with ratings for single-engine land and instrument airplane. The pilot's most recent third-class medical certificate was issued on January 3, 2017, which included the limitation, "must available glasses for near vision." According to the pilot, his flight time included 814 hours of total flight time in all airplane, of which 331 hours had been accumulated in the airplane make and model.

Although the pilot did not hold an airframe and powerplant mechanic certificate, his occupational history was in electronics for 27 years.

## AIRCRAFT INFORMATION

According to FAA records, the airplane was manufactured in 1991. The airplane was powered by an automotive Mazda 13B rotary engine that was modified by the owner for use in the aircraft. The pilot removed the turbo system, which derated the engine to 150 hp. Maintenance records showed that the airplane's most recent annual inspection was completed on July 29, 2016 at 205 flight hours by the pilot, who also held a repairman's certificate for this airplane. At the time of the accident, the engine had accumulated a total of 223 hours total time in service and 17 hours since the airplane's most recent inspection.

## WRECKAGE AND IMPACT INFORMATION

The airplane came to rest in salt water. Electronics were corroded.

In the day that followed, a witness reported fuel staining in the sand below the fuel tank cap.

## ADDITIONAL INFORMATION

### Fuel System

Two inboard fuel tanks that each hold 26 gallons. Each tank is equipped with a high pressure fuel tank. Pilot selects the fuel pump they want to run from. Fuel line runs inboard along the longitudinal axis of airplane direct to the engine. The R and L fuel lines T off and run to a fuel filter which runs to a primary fuel rail and a secondary fuel rail, which returns fuel back to gascolator to the fuel tank that you select. If you overfill a tank you excess will go out of the vent lines. Select fuel tanks by activating the fuel pump from the fuel tank you want to select. Fuel goes from fuel rails directly into fuel injectors directly into engine. Saturated fuel injectors are electronic valves and were original from engine that are pulse activated. The computer can be programmed to increase/decrease the pulse which determines how long the injectors will stay open and deliver fuel to the engine. EFI/Ignition controller manages the fuel injector settings based on rpm simultaneously with the three butterfly valves.

## FAA Exam

With FAA present, tested both high pressure fuel pumps by pilot and both work normally. Checked fuel filter, operated normally. Tested injectors through diagnostic mode in ECU that simulates an engine run at 3,000 rpm. Butterfly valves inspected during teardown and they worked normally. Spark plugs were partially corroded from salt water. Checked resistance of coils/igniters and ignition harness according to Haynes manual and they functioned according to specification.

Took the plugs out and ran the ECU in diagnostic mode and each plug fired, which confirms continuity from the ECU to the spark plugs through the igniters.

## ECU

ECUs mounted in a silver box on aft firewall, they take information from crank angle sensor and manifold pressure and air temperature sensor from throttle body (only for primary ECU) and sends impulse to coils and signal to fuel injectors to moderate fuel flow and ignition power supplied to spark plugs. Unable to test ECUs; engine will not run. The pilot verified the crank angle sensor was properly aligned and in normal condition.

Vacuum lines run from ECU to the induction tubes using manifold pressure supplied from the engine.

## Engine Monitoring Unit

Pilot was able to display engine data on the unit, which appeared in hexadecimal format. He was unable to download the data onto a thumb drive.

## Air Filter

Spectre induction air filter was not obstructed.

## Apex Seal

Two park apex seals are normally installed in each of the three corners of each rotor. The top seal from one of the rotor sides was never found after the accident. If an apex seal broke in flight, the engine would have lost compression, but not failed (see youtube videos).

## Testing

### Overhauled engine

Atkins rotary makes a kit with seals and O rings. There are oil seals and O rings seals for water jacket and at either end of the engine to prevent leaks from eccentric shaft. Replaced all seals, but did not replace rotors or rotor housing. Rotors were not damaged and neither was the

eccentric shaft. Verified timing using the manual to ensure the crank angle sensor is aligned with the timing marks of the engine.

## Oil System

Checked oil pressure – good

Two separate oil systems. A wet sump connected to an oil filter and pickup tube that returns oil to the rotary system and the PSRU through the oil cooler. A two stroke sump directs oil to the apex seals.

## Compression

Removed exhaust and rotated engine through. Could hear good intake and exhaust compression. No abnormal deformation signatures on rotary cylinder walls. Apex seals looked in normal condition.

When he tries to run the engine, it will turn, but there is no indication that it is trying to fire.

## PSRU

Planetary system built by Tracy Crook.