



AVIATION



HIGHWAY



MARINE



RAILROAD



PIPELINE

# Aviation Investigation Final Report

<b>Location:</b>	Yuma, Arizona	<b>Accident Number:</b>	WPR18LA250
<b>Date &amp; Time:</b>	August 27, 2018, 10:36 Local	<b>Registration:</b>	N8162H
<b>Aircraft:</b>	Stoddard Hamilton GLASAIR SUPER IIS	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>	Loss of engine power (partial)	<b>Injuries:</b>	1 None
<b>Flight Conducted Under:</b>	Part 91: General aviation - Personal		

## Analysis

The private pilot reported that, about 35 minutes into the personal cross-country flight, the experimental, amateur-built airplane's alternator field toggle switch/circuit breaker tripped. He reset the switch, and all systems appeared normal. About 5 minutes later, the switch tripped again, and the pilot cycled the switch. About 2 minutes later, the pilot noticed that the engine manifold pressure was dropping, along with the airplane's airspeed, consistent with a partial loss of engine power. The engine then experienced a total loss of power when he was maneuvering for an emergency landing to a nearby airport. The airplane subsequently landed short of the runway and sustained substantial damage to the aft fuselage.

The engine had been installed about 91 flight hours and 5 months before the accident flight, and a condition inspection was completed the same month of installation. Maintenance records indicated that during the period between the engine installation and the accident, maintenance was limited to routine oil changes, magneto timing adjustments, the replacement of exhaust gas temperature and cylinder head temperature probes, and the installation of a replacement alternator.

Postaccident examination of the engine revealed that the throttle linkage had detached from the throttle arm of the fuel injection servo. The rod end bearing for the linkage and the throttle arm were intact and undamaged, but the connecting bolt and its associated washers, castellated nut, and cotter pin were missing. The butterfly valve within the throttle body was in the closed position, and the throttle lever in the cabin was in the full forward (open) position. It is likely that the bolt securing the linkage had not been sufficiently tightened and secured with a cotter pin during the installation and that the error was not detected during the subsequent condition inspection.

The investigation determined that the electrical system malfunction was unrelated to the loss of engine power.

# 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 as a result of the detachment of the throttle linkage from the throttle arm of the fuel injector servo due to an insufficiently tightened and secured bolt and the subsequent inadequate maintenance inspection.

## Findings

Aircraft	Fuel control/carburetor - Incorrect service/maintenance
Aircraft	Fuel control/carburetor - Inadequate inspection
Personnel issues	Installation - Maintenance personnel

# Factual Information

## History of Flight

Enroute-cruise	Loss of engine power (partial) (Defining event)
Emergency descent	Loss of engine power (total)
Emergency descent	Off-field or emergency landing
Emergency descent	Collision with terr/obj (non-CFIT)

On August 27, 2018, at 1036 mountain standard time, an experimental amateur-built Stoddard Hamilton Glasair Super IIS RG airplane, N8162H, lost engine power and landed in a parking lot just short of Yuma Marine Corps Air Station/Yuma International Airport (NYL), Yuma, Arizona. The private pilot was not injured, and the airplane sustained substantial damage to the aft fuselage during the forced landing. The airplane was registered to Rich Airplanes LLC., and operated by the pilot under the provisions of Title 14 *Code of Federal Regulations* Part 91 as a personal flight. Visual meteorological conditions prevailed, and no flight plan had been filed. The cross-country flight originated from Montgomery-Gibbs Executive Airport, San Diego, California, at 0942 Pacific daylight time and destined for Marana Regional Airport, Marana, Arizona.

The pilot stated that he completed a preflight inspection prior to departure, and the airplane performed appropriately during the runup. The departure and climb were uneventful, and after reaching 9,500 ft mean sea level, he configured the airplane for cruise. About 35 minutes later the airplane's multifunction display indicated an "electrical problem, check voltage" alert. He noticed that the airplane's main battery was not charging, and that the alternator field toggle switch/circuit breaker had tripped off, but the alternator circuit breaker was still in. He reset the toggle switch, and the battery began to charge again, and all systems appeared normal. About 5 minutes later, the display indicated the same warning, and the toggle switch again tripped. He cycled the switch and the battery started to charge again.

About 2 minutes later he noticed that the engine manifold pressure was beginning to drop along with the airplane's airspeed. He stated that the fuel flow, fuel pressure, and oil pressure appeared normal, and he could not discern an appreciable reduction in cylinder head or exhaust gas temperatures (CHT, EGT). He selected an alternate fuel tank, turned on the auxiliary electrical fuel pump, and adjusted the throttle, with no change, and by now the multifunction displayed indicated the engine was producing 30% of its rated power.

The pilot declared an emergency with Yuma Radar Approach Control and was provided a local control frequency for NYL. He stated that the engine was still producing partial power when the local tower controller cleared him for an emergency landing on runway 17, and then changed the clearance to runway 21L, which was longer. The pilot stated that he was too high to land, so performed a 360° turn at the north end of the runway, but during the turn the engine lost all power, and the airplane landed short.

The airplane's multifunction display system was a Dynon SkyView Touch, which was configured to record an array of airframe and engine parameters, including main bus voltage. Examination of the

recorded data revealed a voltage drop from 14.3 to 12.9 volts at 1017 and 1021, consistent with the pilot's recollection. The drops lasted 20 and 30 seconds respectively, after which normal voltage and current draw was restored. All other engine parameters remained unchanged during the excursions.

Forty seconds after the last voltage drop was restored, the manifold pressure decreased from 21 to 10 inches of mercury and the fuel flow from 10 to 4 gallons per hour (gph). A few seconds later the EGT and CHT's began to decrease. The manifold pressure and fuel flow remained steady for the next 9 minutes, following which they dropped to 7 inches of mercury and 0.7 gph respectively. The data ended about 3 minutes later.

The airplane was equipped with a fuel-injected XP series IO-361-J1HD2 engine, manufactured by Superior Air Parts. The engine was installed new on April 1, 2018, and a condition inspection was completed on April 24, 2018 before the first flight with the engine. At the time of the accident, the engine had accumulated about 91 hours of flight time since installation. Maintenance records indicated that during the period between the engine installation and accident, maintenance events were limited to routine oil changes, magneto timing adjustments, replacement of EGT and CHT probes, and the installation of a replacement alternator.

Postaccident examination of the engine revealed that the throttle linkage had detached from the throttle arm of the fuel injection servo. The rod end bearing (Heim joint) for the linkage, and the throttle arm were intact and undamaged, but the connecting bolt and its associated washers, castellated nut and cotter pin were not present (Photo 1). The butterfly valve within the throttle body was in the closed position, and the throttle lever in the cabin was in the full forward, "open" position.



Photo 1 – Throttle Linkage

## Pilot Information

<b>Certificate:</b>	Private	<b>Age:</b>	63, Male
<b>Airplane Rating(s):</b>	Single-engine land	<b>Seat Occupied:</b>	Left
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	4-point
<b>Instrument Rating(s):</b>	None	<b>Second Pilot Present:</b>	No
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	No
<b>Medical Certification:</b>	Class 3 With waivers/limitations	<b>Last FAA Medical Exam:</b>	June 5, 2017
<b>Occupational Pilot:</b>	No	<b>Last Flight Review or Equivalent:</b>	October 2, 2017
<b>Flight Time:</b>	1598.4 hours (Total, all aircraft), 298.3 hours (Total, this make and model), 1598.4 hours (Pilot In Command, all aircraft), 74.4 hours (Last 90 days, all aircraft), 13.5 hours (Last 30 days, all aircraft), 0 hours (Last 24 hours, all aircraft)		

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	Stoddard Hamilton	<b>Registration:</b>	N8162H
<b>Model/Series:</b>	GLASAIR SUPER IIS RG	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>	1995	<b>Amateur Built:</b>	Yes
<b>Airworthiness Certificate:</b>	Experimental (Special)	<b>Serial Number:</b>	2224
<b>Landing Gear Type:</b>	Retractable - Tricycle	<b>Seats:</b>	4
<b>Date/Type of Last Inspection:</b>	April 24, 2018 Condition	<b>Certified Max Gross Wt.:</b>	2200 lbs
<b>Time Since Last Inspection:</b>	91 Hrs	<b>Engines:</b>	1 Reciprocating
<b>Airframe Total Time:</b>	2020.5 Hrs as of last inspection	<b>Engine Manufacturer:</b>	Superior Air Parts
<b>ELT:</b>	C126 installed, not activated	<b>Engine Model/Series:</b>	IO-361-J1HD2
<b>Registered Owner:</b>		<b>Rated Power:</b>	200 Horsepower
<b>Operator:</b>	On file	<b>Operating Certificate(s) Held:</b>	None

## Meteorological Information and Flight Plan

<b>Conditions at Accident Site:</b>	Visual (VMC)	<b>Condition of Light:</b>	Day
<b>Observation Facility, Elevation:</b>	KNYL, 213 ft msl	<b>Distance from Accident Site:</b>	2 Nautical Miles
<b>Observation Time:</b>	17:57 Local	<b>Direction from Accident Site:</b>	225°
<b>Lowest Cloud Condition:</b>	Scattered / 20000 ft AGL	<b>Visibility</b>	7 miles
<b>Lowest Ceiling:</b>	None	<b>Visibility (RVR):</b>	
<b>Wind Speed/Gusts:</b>	4 knots /	<b>Turbulence Type Forecast/Actual:</b>	/
<b>Wind Direction:</b>		<b>Turbulence Severity Forecast/Actual:</b>	/
<b>Altimeter Setting:</b>	29.8 inches Hg	<b>Temperature/Dew Point:</b>	36°C / 14°C
<b>Precipitation and Obscuration:</b>	No Obscuration; No Precipitation		
<b>Departure Point:</b>	San Diego, CA (MYF )	<b>Type of Flight Plan Filed:</b>	None
<b>Destination:</b>	Marana, AZ (AVQ )	<b>Type of Clearance:</b>	VFR flight following
<b>Departure Time:</b>	09:42 Local	<b>Type of Airspace:</b>	Class D

## Airport Information

<b>Airport:</b>	YUMA MCAS/YUMA INTL NYL	<b>Runway Surface Type:</b>	Asphalt;Concrete
<b>Airport Elevation:</b>	213 ft msl	<b>Runway Surface Condition:</b>	Dry
<b>Runway Used:</b>	21L	<b>IFR Approach:</b>	None
<b>Runway Length/Width:</b>	9240 ft / 150 ft	<b>VFR Approach/Landing:</b>	Forced landing

## Wreckage and Impact Information

<b>Crew Injuries:</b>	1 None	<b>Aircraft Damage:</b>	Substantial
<b>Passenger Injuries:</b>		<b>Aircraft Fire:</b>	None
<b>Ground Injuries:</b>	N/A	<b>Aircraft Explosion:</b>	None
<b>Total Injuries:</b>	1 None	<b>Latitude, Longitude:</b>	32.669998,-114.59333

## Administrative Information

<b>Investigator In Charge (IIC):</b>	Simpson, Elliott
<b>Additional Participating Persons:</b>	Scott G Boek; Federal Aviation Administration FSDO; Scottsdale, AZ Bill Ross; Superior Air Parts; Coppell, TX
<b>Original Publish Date:</b>	November 19, 2019
<b>Note:</b>	The NTSB did not travel to the scene of this accident.
<b>Investigation Docket:</b>	<a href="https://data.nts.gov/Docket?ProjectID=98220">https://data.nts.gov/Docket?ProjectID=98220</a>

The National Transportation Safety Board (NTSB), established in 1967, is an independent federal agency mandated by Congress through the Independent Safety Board Act of 1974 to investigate transportation accidents, determine the probable causes of the accidents, issue safety recommendations, study transportation safety issues, and evaluate the safety effectiveness of government agencies involved in transportation. The NTSB makes public its actions and decisions through accident reports, safety studies, special investigation reports, safety recommendations, and statistical reviews.

The Independent Safety Board Act, as codified at 49 U.S.C. Section 1154(b), precludes the admission into evidence or use of any part of an NTSB report related to an incident or accident in a civil action for damages resulting from a matter mentioned in the report. A factual report that may be admissible under 49 U.S.C. § 1154(b) is available [here](#).