Aviation Investigation Final Report

Location:	Bay City, Wisconsin	**Accident Number:**	ERA22FA399
Date & Time:	September 6, 2022, 13:25 Local	**Registration:**	N11HC
Aircraft:	CONWAY PHILIP J Glasair Super II SFT	**Aircraft Damage:**	Substantial
Defining Event:	Collision with terr/obj (non-CFIT)	**Injuries:**	2 Fatal
Flight Conducted Under:	Part 91: General aviation - Instructional		

Analysis

The purpose of the flight was for the commercial pilot in the left seat to build flight time with an instructor so that he could be included on the owner's insurance policy. This was the first flight to satisfy those requirements and the two accident pilots had not flown together previously. The flight instructor had 2 hours of flight experience in the Glasair; the commercial pilot-under-instruction had no flight experience in the airplane. Recorded radar and GPS data revealed that the airplane departed the home airport and airwork was performed for about 45 minutes. The flight then proceeded to another airport for traffic pattern work. The pilots entered the visual pattern and made four approaches without the airplane touching down. On the fifth approach, the airplane turned base-to-final about ½ to 1 mile sooner (tighter) than on the previous patterns.

The accident approach was flown at a higher descent rate, bank angle, and pitch attitude than the previous approaches. The descent rate approached 2,500 fpm, the left bank angle approached 100°, and the pitch attitude was about 15° airplane-nose-down. During the final turn, a positive normal load factor was observed, between 1 and 2 *g* just before the end of the recorded data, and shortly before ground impact, indicating that the airplane did not stall before the crash. The lateral acceleration during the final turn was about 0.3 *g*, which was consistent with a side slip (forward slip) maneuver, commonly used when an airplane is high on approach.

An examination of the airframe and powerplant revealed no evidence of a mechanical malfunction or failure that would have precluded normal operation.

The pilot flying at the time of the accident could not be determined; however, it is apparent that the flight instructor allowed an unstabilized approach to proceed beyond the point where a

safe recovery was not possible. Had the instructor either discontinued the poor approach or directed the commercial pilot-under-instruction to do so, the accident would have been prevented.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:

The continuation of a poorly-flown, unstabilized approach and the flight instructor's failure to direct a discontinuance of that approach, resulting in a collision with terrain during turn to final.

Findings

Aircraft	Descent/approach/glide path - Not attained/maintained
Personnel issues	Aircraft control - Pilot
Personnel issues	Decision making/judgment - Instructor/check pilot

Factual Information

History of Flight

Approach-VFR pattern final	Collision with terr/obj (non-CFIT) (Defining event)

On September 6, 2022, at 1325 central daylight time, an experimental, amateur-built Glasair Super II SFT airplane, N11HC, was substantially damaged when it was involved in an accident near Bay City, Wisconsin. The flight instructor and a commercial pilot-under-instruction were fatally injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 instructional flight.

The flight departed from Rochester Regional Airport (RST), Rochester, Minnesota about 1218. Following some air work, the flight proceeded to Red Wing Airport (RGK), Bay City, Wisconsin and entered left traffic for the visual airport traffic pattern to runway 9. According to automatic dependent surveillance-broadcast (ADS-B) and GPS data, four circuits of the traffic pattern were flown without touching down and a fifth traffic pattern was initiated. The data indicated that the airplane turned onto the base leg of the airport traffic pattern about 0.5 to 1 mile sooner (tighter) than on the previous approaches (figure 1). The airplane impacted the ground about 1/3 nautical mile west-northwest of the approach end of runway 9.

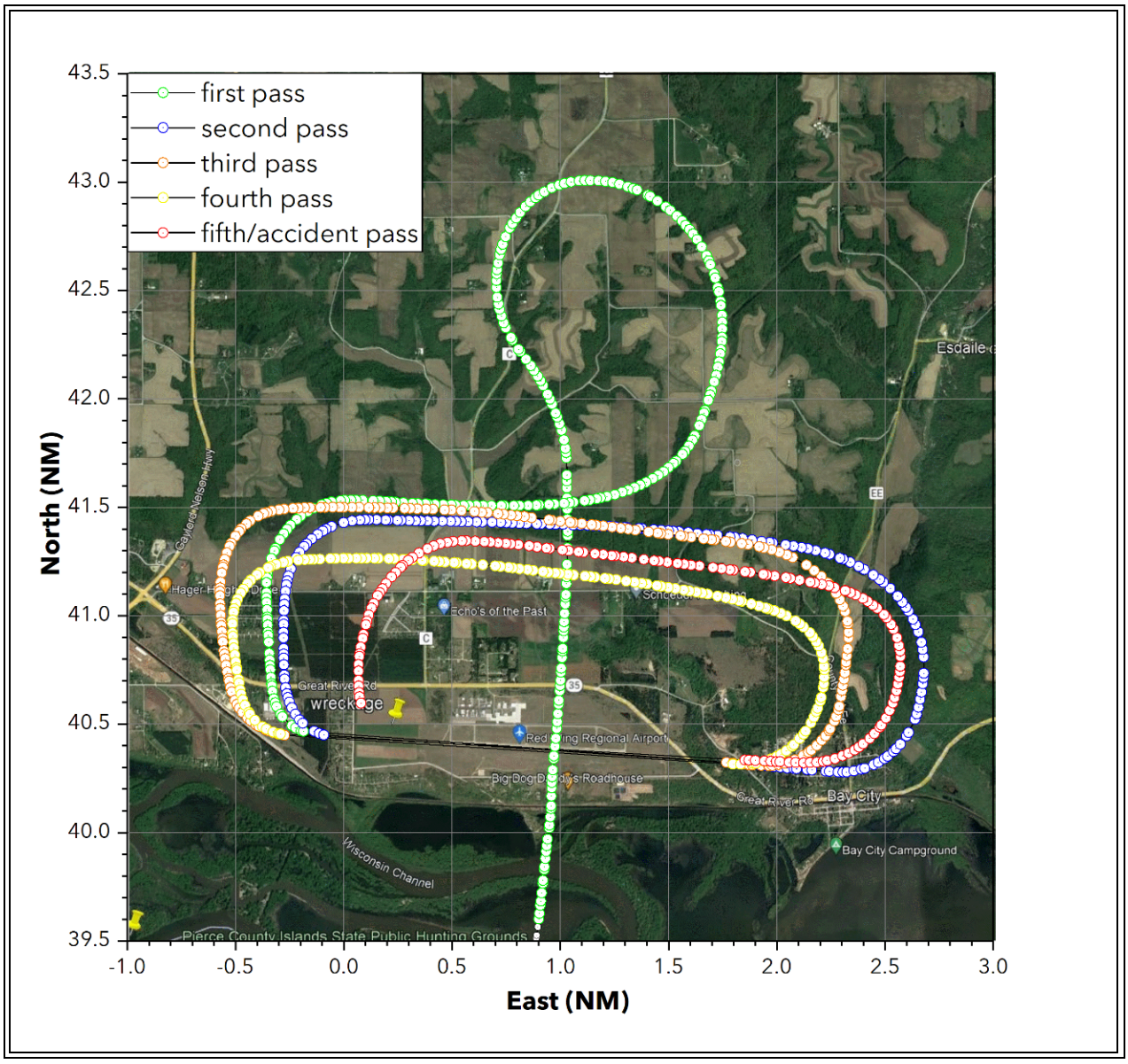

Figure 1: Pattern Work at Red Wing Regional Airport and Wreckage Location

The airplane was equipped with a Garmin G3X integrated flight instrument system. The non-volatile memory cards from the flight displays recorded data from the entire accident flight, including engine and systems performance.

Speed and altitude information from the G3X revealed that the airplane departed RST, climbed to about 10,000 ft mean sea level (msl), and proceeded to the north, where airwork was performed. A series of level, 60° bank, 2 *g* turns were performed, and the airwork continued for about 45 minutes. The airplane then descended at about 4,400 feet per minute (fpm) toward RGK, where the traffic pattern work began.

The airplane crashed on the fifth approach in the traffic pattern. The accident approach was flown at a higher descent rate, bank angle, and pitch attitude than the previous approaches. The descent rate approached 2,500 fpm, the left bank angle approached 100°, and the pitch attitude was about 15° airplane-nose-down. During the final turn, a positive normal load factor was observed, between 1 and 2 *g* just before the end of the recorded data, shortly before ground impact. The lateral acceleration during the final turn was about 0.3 *g*, which was consistent with a side slip (forward slip) maneuver.

Engine data recorded by the G3X was consistent with engine operation at a reduced throttle setting at the time the data ended. The last data, at 13:24:53, revealed fuel pressure at 26.1 psi, engine speed at 1,590 rpm, and oil pressure at 61 psi.

Flight instructor Information

Certificate:	Commercial	**Age:**	28,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	None	**Restraint Used:**	3-point
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	Airplane single-engine; Instrument airplane	**Toxicology Performed:**	Yes
Medical Certification:	Class 1 With waivers/limitations	**Last FAA Medical Exam:**	September 6, 2022
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	August 17, 2021
Flight Time:	829 hours (Total, all aircraft), 2 hours (Total, this make and model)		

Student pilot Information

Certificate:	Commercial	**Age:**	20,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	3-point
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 1 With waivers/limitations	**Last FAA Medical Exam:**	November 3, 2020
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	600 hours (Total, all aircraft), 0 hours (Total, this make and model)		

The owner, who was the airplane builder, reported that the purpose of the flight was to build time requirements for insurance purposes so that he could include the commercial pilot, who was a family friend, on his policy. This was the first flight to satisfy those requirements and the

two accident pilots had not flown together previously. The flight instructor flew with the owner on September 1, 2022, and the owner stated that the flight instructor performed all tasks satisfactorily, including air work, stalls, patterns, and landings. Other than the 2-hour flight on September 1, the flight instructor had no previous experience in the Glasair. The commercial pilot had flown with the owner as a passenger; however, he had no logged time in the Glasair.

Aircraft and Owner/Operator Information

Aircraft Make:	CONWAY PHILIP J	**Registration:**	N11HC
Model/Series:	Glasair Super II SFT	**Aircraft Category:**	Airplane
Year of Manufacture:	2012	**Amateur Built:**	Yes
Airworthiness Certificate:	Experimental (Special)	**Serial Number:**	2329
Landing Gear Type:	Tricycle	**Seats:**	2
Date/Type of Last Inspection:	September 14, 2021 Condition	**Certified Max Gross Wt.:**	2200 lbs
Time Since Last Inspection:	131 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	1045 Hrs at time of accident	**Engine Manufacturer:**	Lycoming
ELT:	C91A installed, activated, did not aid in locating accident	**Engine Model/Series:**	IO-360-B1E
Registered Owner:	On file	**Rated Power:**	180 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KRGK,780 ft msl	**Distance from Accident Site:**	1 Nautical Miles
Observation Time:	13:35 Local	**Direction from Accident Site:**	101°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	5 knots /	**Turbulence Type Forecast/Actual:**	None / None
Wind Direction:	140°	**Turbulence Severity Forecast/Actual:**	N/A / N/A
Altimeter Setting:	30.11 inches Hg	**Temperature/Dew Point:**	26°C / 17°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Rochester, MN (RST)	**Type of Flight Plan Filed:**	
Destination:	Rochester, MN (RST)	**Type of Clearance:**	None
Departure Time:	12:07 Local	**Type of Airspace:**	Class G

Airport Information

Airport:	RED WING RGNL RGK	**Runway Surface Type:**	Asphalt
Airport Elevation:	777 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	9	**IFR Approach:**	None
Runway Length/Width:	5010 ft / 100 ft	**VFR Approach/Landing:**	Traffic pattern

Wreckage and Impact Information

Crew Injuries:	2 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:	N/A	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Fatal	**Latitude, Longitude:**	44.59111,-92.50083(est)

An examination of the accident site revealed that the airplane impacted terrain on a heading of about 045° and the main wreckage came to rest, upright, about 80 ft from the point of initial impact. There was no fire. All structural components of the airplane were located within the confines of the wreckage path.

The wreckage was recovered to a salvage facility where additional examination was performed.

The fuselage exhibited structural damage and fiberglass skin separation in several areas. The fuselage-mounted header fuel tank was breached and no fuel remained inside the tank. The cockpit fuel tank selector was found in the “HEADER” tank position.

The Garmin G3X components separated from the instrument panel during the accident sequence. Both SD memory cards were undamaged and found at the scene.

Both wings sustained structural damage. The airplane was equipped with extended-length wing tips. Both wing fuel tanks were breached during the impact sequence, and no fuel remained inside the tanks. The owner reported that he filled the tanks to their 50-gallon capacity before the flight. Aileron continuity was confirmed from the control surfaces to the cockpit controls. The electrically-operated wing flaps were visibly extended. The G3X data revealed that the flaps were in transit toward the extended positions when the data ended. The last position recorded on the G3X was 36° (full extension was 40°).

The fiberglass dorsal transition from the vertical stabilizer to the upper fuselage was cracked and partially separated from impact forces. The vertical stabilizer skin separated and was buckled and folded down to the right. The rudder was partially separated from the vertical stabilizer. Rudder cable continuity was confirmed from the rudder attachment points to the rudder pedals.

The left and right elevators remained attached to the horizontal stabilizers and aft fuselage. Elevator continuity was confirmed via the push-pull tube from the elevator attachment point to the cockpit area.

The engine remained attached to the aircraft firewall. The propeller remained attached to the crankshaft flange, but the crankshaft flange had separated from the crankshaft during the impact. Oil was observed leaking from the bottom of the engine. Extensive impact damage was observed on the bottom of the engine. The oil sump was mostly missing, except for a piece towards the rear that was displaced aft.

The engine was cut free from the engine mounts and hoisted for the examination. The cylinders were undamaged. The crankshaft was rotated manually via the vacuum pump drive. Thumb compression and suction were established and camshaft to crankshaft continuity was confirmed throughout the engine. Valvetrain movement was correct on all cylinders.

An examination of the engine fuel system revealed normal signatures and residual fuel inside the lines and components. No obstructions or fuel contamination was found.

Both magnetos remained attached to the accessory housing of the engine with minor impact damage to the harness caps. The units were removed and both units produced spark at all 4 leads when rotated.

The spark plugs remained installed in their respective cylinder heads. The No. 2 bottom and No. 1 bottom plugs had impact damage to the harness end of the plugs. The plugs were removed for further examination and found to have normal coloration and wear when compared to a Champion Check-a-Plug chart. The static soaking of the Nos. 1 and 3 spark plugs was attributed to the resting position of the engine post recovery.

Nothing was found during the course of the engine examination that would have precluded the powerplant from making power before the impact sequence.

The propeller remained attached to the crankshaft flange. The flange of the crankshaft had separated from the remainder of the crankshaft during the impact sequence. One was bent aft approximately 15 degrees and showed polishing on the leading edge and the other blade displayed polishing and rotational scoring on the leading edge.

Medical and Pathological Information

According to autopsy report from the Office of the Medical Examiner, Pierce County, Wisconsin, the cause of death of the commercial-rated flight instructor (right seat occupant) was multiple traumatic injuries due to the airplane crash. Toxicology testing on this pilot was not performed by the Federal Aviation Administration (FAA) Forensic Sciences Laboratory; however, testing was performed locally as part of the autopsy protocol. No evidence of drugs or ethanol were found.

The cause of death of the commercial-rated pilot-under-instruction (left seat occupant) was multiple traumatic injuries due to the airplane crash. Toxicology testing was performed by the FAA Forensic Sciences Laboratory; no evidence of drugs or ethanol were found.

Administrative Information

Investigator In Charge (IIC):	Hicks, Ralph
Additional Participating Persons:	Mark R. Lee; FAA/FSDO; Minneapolis, MN Ryan Enders; Lycoming Engines; Williamsport, PA
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Last Revision Date:	
Investigation Class:	Class 3
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=105876