National Transportation Safety Board
Aviation Accident Final Report

Location:	Catskill, NY	**Accident Number:**	ERA13FA225
Date & Time:	05/02/2013, 1629 EDT	**Registration:**	N8AS
Aircraft:	GRUMMAN G-44	**Aircraft Damage:**	Destroyed
Defining Event:	Aerodynamic stall/spin	**Injuries:**	1 Fatal
Flight Conducted Under:	Part 91: General Aviation - Personal		

Analysis

Witnesses reported observing the twin-engine amphibious airplane flying southbound low above a river and hearing the engine running. The airplane then made a 180-degree left turn, which was consistent with the pilot flying a tight traffic pattern before attempting a water landing. The airplane then descended, leveled off above the water, and suddenly banked left. The airplane's nose and left pontoon then struck the water, and the airplane nosed over, caught fire, and sank.

Postrecovery examination of the wreckage revealed that the landing gear was in the "up" position and that the flaps were extended, which indicates that the airplane had been configured for a water landing. No evidence of any preimpact failures or malfunctions of the airplane or engines was found that would have precluded normal operation.

At the time of the accident, a light breeze was blowing, the river was at slack tide, and the water conditions were calm, all of which were conducive to glassy water conditions. It is likely that the glassy water conditions adversely affected the pilot's depth perception and led to his inability to correctly judge the airplane's height above the water. He subsequently flared the airplane too high, which resulted in the airplane exceeding its critical angle-of-attack, entering an aerodynamic stall, and impacting the water in a nose-low attitude.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's misjudgment of the airplane's altitude above the water and early flare for a landing on water with a glassy condition, which led to the airplane exceeding its critical angle-of-attack and experiencing an aerodynamic stall.

Findings

Aircraft	Descent/approach/glide path - Not attained/maintained (Cause) Airspeed - Not attained/maintained (Cause) Angle of attack - Not attained/maintained (Cause)
Personnel issues	Aircraft control - Pilot (Cause)
Environmental issues	Glassy surface - Effect on personnel (Cause)

Factual Information

HISTORY OF FLIGHT

On May 2, 2013, about 1629 eastern daylight time a Grumman, G44 seaplane, N8AS, was substantially damaged when it impacted the waters of the Hudson River during a water landing, near Catskill, New York. The certificated airline transport pilot was fatally injured. Visual meteorological conditions prevailed, and no flight plan had been filed for the local personal flight conducted under Title14 Code of Federal Regulations Part 91, which departed from B Flat Farm Airport (3NK8), Copake, New York about 1600.

Approximately 25 witness interviews were conducted. Descriptions varied between witness statements as to the altitude, direction of flight, and velocity of the airplane; however, the preponderance of witness statements were that the airplane was first observed flying southbound low above the Hudson River and the airplane's engines could heard to be running. The airplane then made a 180 degree left turn until it had reversed direction and was flying in a northerly direction. The airplane descended, leveled off above the surface of the water, then suddenly banked to the left and struck the water with the nose and left pontoon, nosed over, then caught fire, and sank.

PERSONNEL INFORMATION

According to Federal Aviation Administration (FAA) and pilot records, the pilot held an airline transport pilot certificate with multiple ratings including airplane multi-engine land and airplane multi-engine sea, commercial privileges for airplane single engine land and airplane single engine sea, and a type rating for the G-73.

His most recent FAA third-class medical certificate was issued on February 2, 2012, with limitations that required him to wear lenses that correct for distant vision and possess glasses that correct for near vision. He also possessed a statement of demonstrated ability for defective color vision.

He had accrued approximately 5,735 total hours of flight experience of which approximately 411 hours, were in the accident airplane make and model.

AIRCRAFT INFORMATION

The accident aircraft was a twin engine, high wing, tail wheel equipped, amphibious airplane of conventional metal construction. It was powered by two 295 horsepower, horizontally opposed, air cooled, geared, 6-cylinder engines, driving three bladed, constant speed, variable pitch propellers.

According to FAA and maintenance records, the airplane was manufactured in 1943. The airplane's most recent annual inspection was completed on May 25, 2012. At the time of the accident, the airplane had accrued 2,251 total hours of operation.

METEOROLOGICAL INFORMATION

The recorded weather at Albany International Airport (ALB), Albany, New York, located approximately 29 nautical miles north of the accident site, at 1651, included: winds 190 degrees at 3 knots, visibility 10 miles, few clouds at 9,000 feet, temperature 27 degrees C, dew point 03 degrees C, and an altimeter setting of 30.29 inches of mercury.

Review of the National Oceanic and Atmospheric Administration Tide Prediction Chart for the

area of the accident indicated that at the time of the accident the river was at slack tide.

Witnesses described the water conditions at the time as calm.

WRECKAGE AND IMPACT INFORMATION

Accident Site Examination

The airplane came to rest on the bottom of the Hudson River in 20 to 25 feet of water. Examination of the river bottom utilizing side scan sonar revealed that the airplane had broken apart and that the major portions of the airplane were contained within an approximately 250 foot long debris field oriented on a 039 degree magnetic heading.

Wreckage Examination

Examination of the wreckage recovered from the debris field revealed that the airplane break up occurred during the impact sequence and not prior to impact with the water. Further examination revealed that the damage pattern was consistent with witness observations, with the airplane having made contact with the surface of the river with the airplane's nose first, then the left float, in a left wing low, nose down attitude.

Evidence of a postcrash fire was evident primarily in the area of the right main fuel tank where it had been breached by the right engine nacelle structure during the impact sequence. There was no evidence of an inflight fire.

Continuity was established from the ailerons, rudder, and elevator to the breaks in the flight control system which displayed evidence of tensile overload and from the breaks in the flight control system, to the control column and rudder pedals.

The landing gear handle was in the up position and examination of the main landing gear wheels up catches, and tail wheel retracting bell crank assembly, indicated that the landing gear was in the up position during the impact sequence.

Examination of the wing flaps revealed that they were in the extended position during the impact sequence.

All fuel caps were closed. The fuel valve levers for the left and right tank were in the "ON" position and the "TANK CROSS-FLOW" lever was in the "OFF" position.

The left engine and right engine alternator field switches were "ON," and the battery switch was "ON". The left engine, and right engine, magneto switches were each in the "BOTH" position.

Examination of the Left Engine

After recovery from the debris field, examination of the left engine revealed, that the propeller, propeller governor, gearbox assembly, and carburetor, had been separated from the engine during the impact sequence. They were not recovered.

The drive train could not be rotated by hand. However, after the rear mounted accessories, and the No. 2, No. 4, and No. 6 cylinders were removed, continuity of the crankshaft to the rear gears and to the valve train was able to be confirmed visually, and water, rust, and silt, were observed in the removed cylinder barrels.

Oil was observed to be present inside the engine, and the engine driven fuel pump could be rotated by hand.

Both magnetos produced intermittent sparks when rotated by hand and internal examination revealed the presence of water and corrosion.

The spark plugs appeared normal with undamaged electrodes, with the exception of the No.2 cylinder's bottom sparkplug which had been destroyed during the impact sequence. Water and silt were present in the electrode wells of the surviving top and bottom sparkplugs.

The starter, generator, and vacuum pump, remained attached to the engine, and all appeared to be undamaged.

Examination of the Right Engine

After recovery from the debris field, examination of the right engine revealed, that the propeller and gearbox assembly, along with the carburetor, and portions of the induction and exhaust systems had been separated from the engine during the impact sequence.

The propeller governor had remained attached to the gearbox assembly. One propeller blade was twisted in the propeller hub, and bent aft about 90 degrees at approximately the mid-span position. The second propeller blade was twisted in the propeller hub, was curved slightly forward, and exhibited twisting towards the face of the blade. The third propeller blade was bent aft 45 degrees about 12 inches outboard of the hub, and exhibited heavier twisting towards the face of the blade, and curling of the propeller tip.

The drive train could not be rotated by hand. However, after the rear mounted accessories, and the No. 1, No. 3, and No. 5 cylinders were removed, continuity of the crankshaft to the rear gears and to the valve train was able to be confirmed visually, and water, rust, and silt, were observed in the removed cylinder barrels.

Oil was observed to be present inside the engine, and the engine driven fuel pump could be rotated by hand.

The left magneto would produce spark when rotated by hand. Internal examination revealed the presence of water and corrosion.

The right magneto would not produce spark when rotated however, internal examination of the magneto revealed the water in the magneto point's compartment.

The spark plugs appeared normal with undamaged electrodes, with the exception of the No. 1 cylinder's top and bottom sparkplugs, and the No. 2 Cylinder's bottom sparkplug which displayed impact damage. Water and silt were present in the electrode wells of the surviving top and bottom sparkplugs.

The starter, generator, and vacuum pump, remained attached to the engine, and the vacuum pump produced water when rotated by hand, all appeared to be undamaged.

MEDICAL AND PATHOLOGICAL INFORMATION

An Autopsy was performed on the pilot by St. Peter's Hospital Laboratory Department of Pathology on behalf of the Greene County Coroner.

Cause of death was massive blunt force injuries.

Toxicological testing of the pilot was conducted at the FAA Bioaeronautical Sciences Research Laboratory, Oklahoma City, Oklahoma. The specimens from the pilot were negative for carbon monoxide, cyanide, basic, acidic, and neutral drugs with the exception of:

- Diclofenac; which is a nonsteroidal anti-inflammatory drug with analgesic and antipyretic activity.

- Rosuvastatin; which is a member of the drug class of statins, used to treat high cholesterol and related conditions, and to prevent cardiovascular disease.

- Valsartan; which is an angiotensin receptor blocker indicated for treatment of high blood pressure.

Both Diclofenac and Valsartan had been previously reported to his Aviation Medical Examiner.

TESTS AND RESEARCH

Glassy Water

According to the FAA's Seaplane, Skiplane, and Float Equipped Helicopter Operations Handbook (FAA-H-8083-23), Glassy water conditions are defined as a calm water surface with no distinguishable surface features, with a glassy or mirror like appearance which can deceive a pilot's depth perception.

When landing, the flat, featureless surface makes it far more difficult to gauge altitude accurately, and reflections can create confusing optical illusions. The Handbook advises that when the wind is calm or light, or when the water is like a mirror, or when ripples with the appearance of scales are formed without foam crests, that pilots should check their glassy water technique before water flying under these conditions.

The handbook advised, that flat, calm, glassy water looks inviting and may give a pilot a false sense of safety. By its nature, glassy water indicates no wind, so there are no concerns about which direction to land, no crosswind to consider, no weathervaning, and obviously no rough water. Unfortunately, both the visual and the physical characteristics of glassy water hold potential hazards. Consequently, this surface condition is frequently more dangerous than it appears for a landing seaplane as the visual aspects of glassy water make it difficult to judge the seaplane's height above the water.

The handbook also advised that the lack of surface features can make accurate depth perception very difficult, even for experienced seaplane pilots. Without adequate knowledge of the seaplane's height above the surface, the pilot may flare too high or too low, and that either case could lead to an upset.

If the seaplane flares too high and stalls, it will pitch down, very likely hitting the water with the bows of the floats and flipping over. If the pilot flares too late or not at all, the seaplane may fly into the water at relatively high speed, landing on the float bows, driving them underwater and flipping the seaplane.

Glassy Water Landing Technique

According to FAA-H-8083-23, there are some simple ways to overcome the visual illusions and increase safety during glassy water landings. Perhaps the simplest is to land near the shoreline, using the features along the shore to gauge altitude. The handbook advises though to assure that the water is sufficiently deep and free of obstructions by performing a careful inspection from a safe altitude.

Another technique is to make the final approach over land, crossing the shoreline at the lowest possible safe altitude so that a reliable height reference is maintained to within a few feet of the

water surface.

When adequate visual references are not available, the handbook advised to make glassy water landings by establishing a stable descent in the landing attitude at a rate that will provide a positive, but not excessive, contact with the water.

The handbook also advised to recognize the need for this type of landing in ample time to set up the proper final approach, to always perform glassy water landings with power, and to perform a normal approach, but prepare as though intending to land at an altitude well above the surface. For example, in a situation where a current altimeter setting is not available and there are few visual cues, this altitude might be 200 feet above the surface. Landing preparation should include completion of the landing checklist and extension of flaps as recommended by the manufacturer.

The objective is to have the seaplane ready to contact the water soon after it reaches the target altitude, so at approximately 200 feet above the surface, the pilot should raise the nose to the attitude normally used for touchdown, and to adjust the power to provide a constant descent rate of no more than 150 feet per minute at an airspeed approximately 10 knots above stall speed. The pilot should maintain this attitude, airspeed, and rate of descent until the seaplane contacts the water. Once the landing attitude and power setting are established, the airspeed and descent rate should remain the same without further adjustment, and the pilot should closely monitor the instruments to maintain this stable glide. Power should only be changed if the airspeed or rate of descent, deviate from the desired values. The pilot should not flare, but let the seaplane fly onto the water in the landing attitude.

History of Flight

Landing	Aerodynamic stall/spin (Defining event)
Uncontrolled descent	Collision with terr/obj (non-CFIT)
Other	Dragged wing/rotor/float/other Nose over/nose down
Post-impact	Fire/smoke (post-impact)

Pilot Information

Certificate:	Airline Transport; Commercial	**Age:**	72
Airplane Rating(s):	Multi-engine Land; Multi-engine Sea; Single-engine Land; Single-engine Sea	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 3 With Waivers/Limitations	**Last FAA Medical Exam:**	02/06/2012
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	08/14/2012
Flight Time:	(Estimated) 5735 hours (Total, all aircraft), 411 hours (Total, this make and model)		

Aircraft and Owner/Operator Information

Aircraft Make:	GRUMMAN	**Registration:**	N8AS
Model/Series:	G-44	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	No
Airworthiness Certificate:	Normal	**Serial Number:**	1315
Landing Gear Type:	Hull; Tailwheel	**Seats:**	5
Date/Type of Last Inspection:	05/25/2012, Annual	**Certified Max Gross Wt.:**	4700 lbs
Time Since Last Inspection:		**Engines:**	2 Reciprocating
Airframe Total Time:	2251 Hours at time of accident	**Engine Manufacturer:**	LYCOMING
ELT:	Installed, not activated	**Engine Model/Series:**	GO-480-B1D
Registered Owner:	On file	**Rated Power:**	295 hp
Operator:	On file	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	**Condition of Light:**	Day
Observation Facility, Elevation:	ALB, 285 ft msl	**Distance from Accident Site:**	29 Nautical Miles
Observation Time:	1651 EDT	**Direction from Accident Site:**	360°
Lowest Cloud Condition:	Few / 9000 ft agl	**Visibility**	10 Miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	3 knots /	**Turbulence Type Forecast/Actual:**	/ None
Wind Direction:	190°	**Turbulence Severity Forecast/Actual:**	/ N/A
Altimeter Setting:	30.29 inches Hg	**Temperature/Dew Point:**	27°C / 3°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Copake, NY (3NK8)	**Type of Flight Plan Filed:**	None
Destination:	Copake, NY (3NK8)	**Type of Clearance:**	None
Departure Time:	1600 EDT	**Type of Airspace:**	Class G

Airport Information

Airport:	Hudson River (None)	**Runway Surface Type:**	Water
Airport Elevation:	0 ft	**Runway Surface Condition:**	Water--calm; Water--glassy
Runway Used:	N/A	**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	Traffic Pattern

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:	N/A	**Aircraft Fire:**	On-Ground
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Fatal	**Latitude, Longitude:**	42.136667, -73.904444 (est)

Administrative Information

Investigator In Charge (IIC):	Todd G Gunther	**Report Date:**	04/07/2015
Additional Participating Persons:	Timothy B Shaver; FAA/FSDO; Albany, NY Mike Childers; Textron Lycoming; Lockport, PA		
Publish Date:	04/07/2015		
Note:	The NTSB traveled to the scene of this accident.		
Investigation Docket:	http://dms.ntsb.gov/pubdms/search/dockList.cfm?mKey=86795		