Aviation Investigation Final Report

Location:	ST. IGNACE, Michigan	**Accident Number:**	CHI94FA262
Date & Time:	August 2, 1994, 13:40 Local	**Registration:**	N7025N
Aircraft:	GRUMMAN HU-16	**Aircraft Damage:**	Minor
Defining Event:		**Injuries:**	1 Fatal, 3 Minor, 9 None
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

THE PILOT AND BOAT OPERATOR HAD PREARRANGED TO MEET IN A COVE OFF A DESERTED ISLAND. THE PILOT STATED THAT THE WINDS WERE OUT OF THE ENE AT 10-15 KTS, AND HE LANDED ON AN EASTERLY HEADING. HE STATED '...WE TOUCHED DOWN AND WERE GOING TOWARDS SHORE WHEN I WENT INTO REVERSE AND OFF THE STEP. THE AIRPLANE TURNED RIGHT FURTHER TOWARDS SHORE AND AWAY FROM THE WIND....' THIS WOULD OCCUR IF THE LEFT PROPELLER DID NOT GO INTO REVERSE. THE PILOT THEN TURNED AROUND AND TAXIED DOWNWIND ON THE WATER TOWARDS THE MOORED BOAT. AS THE AIRPLANE NEARED THE BOAT, THE PILOT APPLIED REVERSE THRUST, BUT THE LEFT PROPELLER DID NOT GO INTO REVERSE PITCH. WHEN IT BECAME APPARENT THAT THE PILOT WAS HAVING DIFFICULTY SLOWING DOWN, THE BOAT OPERATOR, HIS WIFE, AND 4-YEAR-OLD SON JUMPED INTO THE WATER. THE 6-YEAR-OLD SON DID NOT GET OFF THE BOAT AND WAS KILLED WHEN THE AIRPLANE STRUCK THE BOAT. INVESTIGATION REVEALED THE LEFT PROPELLER LOW PITCH STOP ASSEMBLY WAS NOT OPERATING NORMALLY DUE TO A DISPLACED STOP RING AND STOP WEDGE. THE PROPELLER ASSEMBLY HAD OPERATED ABOUT 70 HOURS SINCE IT WAS REBUILT.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: THE PILOT'S FAILURE TO FOLLOW GOOD SEAPLANE OPERATING PRACTICES BY TAXIING WITH POWER AT FORWARD THRUST, WITH A TAILWIND, AT A SPEED THAT NECESSITATED USING REVERSE THRUST TO ARREST THE EXCESSIVE SPEED, AND THE PILOT'S MISJUDGMENT OF HIS DISTANCE FROM THE BOAT. THE FAILURE OF THE LEFT PROPELLER REVERSING SYSTEM WAS A FACTOR IN THE ACCIDENT.

Findings

Occurrence #1: ON GROUND/WATER COLLISION WITH OBJECT
Phase of Operation: TAXI

Findings
1. (F) WEATHER CONDITION - TAILWIND
2. (C) PROCEDURES/DIRECTIVES - NOT FOLLOWED - PILOT IN COMMAND
3. (C) DISTANCE/SPEED - MISJUDGED - PILOT IN COMMAND
4. (F) PROPELLER SYSTEM/ACCESSORIES,REVERSING SYSTEM - FAILURE,TOTAL

Factual Information

HISTORY OF FLIGHT

On August 2, 1994, about 1340 eastern daylight time, a Grumman HU-16 seaplane, N7025N, operated by the Airline Transport Pilot (ATP) rated pilot/registered owner, collided with a moored boat during water taxi operation in the north cove of St. Helena's Island, near St. Ignace, Michigan. The airplane received minor damage, and the pilot, co-pilot, and seven airplane passengers reported no injuries. Two adults and a 4 year old child received minor injuries when they abandoned the boat immediately prior to the collision. One child, age 6, remained aboard the boat and received fatal injuries. The boat was damaged beyond economical repair. Visual meteorological conditions prevailed for the flight, no flight plan was filed. The flight operated under 14 CFR Part 91, and originated from the Mackinaw County Airport, St. Ignace, Michigan, approximately 1325.

The occupants of the airplane and the boat involved in this accident were friends who had prearranged to meet in the north cove of St. Helena's Island. They operator of the boat had a handheld radio tuned to a preselected frequency, and was already moored in the cove when the airplane arrived. The pilot and the boat operator were in radio communication as the airplane approached the island and landed.

The pilot stated the winds were out of the east-northeast at 10 to 15 knots, with light chop on the water. The airplane overflew the cove from east to west, then turned around and landed on an easterly heading. The pilot stated "...We touched down and were going towards shore when I went into reverse and off the step. The airplane turned right further towards shore and away from the wind....I taxied the aircraft upwind while doing the landing checklist....I then turned to the right to go downwind towards the mooring and the boat and the shoreline. At this point we were taxiing downwind at idle power. As we were approaching the boat and the mooring - they were about 100 yards apart along the shore - I started to drift towards the boat. At this point I started to use reverse thrust on both engines. As we neared the boat I added more reverse thrust to arrest my closure rate. This seemed to not only make us drift closer but also faster. I pushed the throttles to idle forward as part of shutting the engines down with the magnetos. The aircraft struck the boat first with its nose at midship. Then the right propeller struck the boat cabin at the right front windshield and continued through to the back of the cabin."

The boat operator reported as the airplane approached the moored boat, it became apparent the pilot was having difficulty slowing down. The boat operator, his wife and four year old son jumped from the boat into the water just prior to the collision. The six year old son did not get off the boat and was struck by the right propeller during the impact.

TESTS AND RESEARCH

Postaccident investigation revealed the left propeller assembly did not transition into reverse pitch when selected. Troubleshooting indicated the problem existed within the left propeller dome assembly. A functional test and teardown of the dome assembly was conducted. The functional test revealed the dome assembly would rotate propeller blades from a blade angle of 88.2 degrees (feathered position) to a low pitch position of 17.7 degrees. The specified reverse pitch value is -12 degrees.

The teardown report stated "...When reverse pitch is selected by the pilot, an internal servo piston valve provides for increased hydraulic pressure and unseats a stop wedge in an outboard direction on the piston shaft. Movement of the stop wedge allows stop levers to retract and the blades can rotate past their low pitch setting into a negative (reverse) pitch angle....The stop wedge is prevented from moving inboard beyond the stop levers by a stop ring that is seated in a groove around the piston shaft. The stop ring normally engages circumferentially on a machined lip of the stop wedge. Removal and disassembly of the dome's low pitch stop assembly revealed that the stop ring had been displaced inboard, out of its machined groove on the piston shaft. The stop wedge also moved inboard and jammed the stop levers, preventing their retraction and movement of the blades beyond low pitch and into reverse pitch."

Examination of maintenance records revealed the rebuilt propeller assembly had operated about 70 hours since it was installed on the accident airplane. The accident airplane was inspected and recertificated on June 22, 1994, and had flown about 20 hours since that date. The pilot stated the left propeller had failed to go into reverse on one other occasion, during the landing roll on a runway, about a month before the accident. He stated he had not noticed any anomalies with the propeller system since that time. The pilot reported he used reverse thrust upon arrival at Mackinaw County Airport the night before the accident, and the system appeared to operate normally.

Pilot Information

Certificate:	Airline transport; Flight instructor	**Age:**	40,Male
Airplane Rating(s):	Single-engine land; Single-engine sea; Multi-engine land; Multi-engine sea	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	Airplane single-engine; Instrument airplane	**Toxicology Performed:**	No
Medical Certification:	Class 1 Valid Medical--w/ waivers/lim	**Last FAA Medical Exam:**	April 15, 1994
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	
Flight Time:	14128 hours (Total, all aircraft), 69 hours (Total, this make and model), 7438 hours (Pilot In Command, all aircraft), 51 hours (Last 90 days, all aircraft), 13 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	GRUMMAN	**Registration:**	N7025N
Model/Series:	HU-16 HU-16	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Restricted (Special)	**Serial Number:**	409
Landing Gear Type:	Amphibian	**Seats:**	12
Date/Type of Last Inspection:	June 24, 1994 Annual	**Certified Max Gross Wt.:**	33500 lbs
Time Since Last Inspection:	20 Hrs	**Engines:**	2 Reciprocating
Airframe Total Time:	3936 Hrs	**Engine Manufacturer:**	WRIGHT
ELT:	Installed, not activated	**Engine Model/Series:**	R-1820-76D
Registered Owner:	DA SILVA, URBANO M.	**Rated Power:**	1425 Horsepower
Operator:	DASILVA, URBANO M.	**Operating Certificate(s) Held:**	None
Operator Does Business As:		**Operator Designator Code:**	

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:		**Distance from Accident Site:**	
Observation Time:		**Direction from Accident Site:**	
Lowest Cloud Condition:	Scattered / 10000 ft AGL	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	10 knots / 15 knots	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	60°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30 inches Hg	**Temperature/Dew Point:**	18°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:		**Type of Flight Plan Filed:**	None
Destination:		**Type of Clearance:**	None
Departure Time:	12:45 Local	**Type of Airspace:**	Class G

Airport Information

Airport:		**Runway Surface Type:**	
Airport Elevation:		**Runway Surface Condition:**	
Runway Used:	0	**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	Full stop

Wreckage and Impact Information

Crew Injuries:	2 None	**Aircraft Damage:**	Minor
Passenger Injuries:	7 None	**Aircraft Fire:**	None
Ground Injuries:	1 Fatal, 3 Minor	**Aircraft Explosion:**	None
Total Injuries:	1 Fatal, 3 Minor, 9 None	**Latitude, Longitude:**	45.860076,-84.719215(est)

Administrative Information

Investigator In Charge (IIC):	Reeves, Jodi
Additional Participating Persons:	JUAN THOMPSON; BELLEVILLE , MI DANIEL E CARIS; GRAND RAPIDS , MI BRUCE BOWERMAN; GRAND RAPIDS , MI
Original Publish Date:	October 31, 1995
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=9386