



National Transportation Safety Board Aviation Accident Final Report

Location:	WEST CHICAGO, IL	Accident Number:	CHI95FA182
Date & Time:	06/13/1995, 1955 CDT	Registration:	N121H
Aircraft:	Grumman G-21E	Aircraft Damage:	Destroyed
Defining Event:		Injuries:	2 Fatal

Flight Conducted Under: Part 91: General Aviation -

Analysis

THIS WAS THE FIRST FLIGHT OF THE GRUMMAN G-21 IN TWO YEARS. ALSO, THE PILOT HAD NOT FLOWN THE G-21 FOR TWO YEARS. BEFORE TAKING OFF, THE PILOT REPORTED THAT THREE TAKEOFFS AND LANDINGS WOULD BE NEEDED FOR PURPOSES OF BECOMING CURRENT. AFTER TAKEOFF, HE FLEW THE AIRPLANE APPROXIMATELY ONE HOUR AND MADE TWO FULL STOP LANDINGS. DURING THE THIRD TAKEOFF, THE AIRPLANE WAS DESCRIBED AS LIFTING OFF IN A SHORT DISTANCE AND GOING INTO A NOSE HIGH ATTITUDE BELOW AN ALTITUDE OF 100 FEET. THE AIRPLANE THEN ROLLED LEFT, STRUCK THE GROUND IN A STEEP DESCENT, AND BURNED. WITNESSES REPORTED THAT THE ENGINES WERE PROVIDING POWER UNTIL IMPACT; THE ENGINES AND PROPELLERS HAD EVIDENCE OF ROTATIONAL DAMAGE. THE FLAP ACTUATORS WERE FOUND EXTENDED TO A POSITION THAT EQUATED WITH 30 DEGREES OF FLAPS (HALF FLAPS). FOUR G-21 PILOTS WERE INTERVIEWED. ACCORDING TO THEM, FLAPS WERE NOT NORMALLY USED FOR TAKEOFF IN THIS AIRPLANE. THEY REPORTED THAT THE TURBOPROP ENGINES HAD SUBSTANTIAL POWER FOR THE WEIGHT OF THE AIRPLANE, ESPECIALLY WHEN THE PLANE WAS NOT LOADED, AND THAT THE G-21 WOULD TEND TO BECOME AIRBORNE QUICKLY WITH FLAPS EXTENDED. NO PREIMPACT MECHANICAL PROBLEM WAS NOTED DURING THE INVESTIGATION.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: THE PILOT ALLOWED EXCESSIVE NOSE-UP ROTATION OF THE AIRPLANE DURING LIFT-OFF, AND FAILED TO OBTAIN AND/OR MAINTAIN ADEQUATE AIRSPEED, WHICH RESULTED IN AN INADVERTENT STALL AND COLLISION WITH THE TERRAIN. FACTORS RELATING TO THE ACCIDENT WERE: THE PILOT'S LACK OF RECENT EXPERIENCE IN THE MAKE AND MODEL OF AIRPLANE, AND THE USE OF FLAPS DURING A LIGHT WEIGHT TAKEOFF.

Findings

Occurrence #1: LOSS OF CONTROL - IN FLIGHT
Phase of Operation: TAKEOFF - INITIAL CLIMB

Findings

1. (F) LOWERING OF FLAPS - PERFORMED - PILOT IN COMMAND
2. (C) ROTATION - EXCESSIVE - PILOT IN COMMAND
3. (C) AIRSPEED - NOT OBTAINED/MAINTAINED - PILOT IN COMMAND
4. (C) STALL - INADVERTENT - PILOT IN COMMAND
5. (F) LACK OF RECENT EXPERIENCE IN TYPE OF AIRCRAFT - PILOT IN COMMAND

Occurrence #2: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: TAKEOFF

Factual Information

History of Flight

On June 13, 1995, at 1955 Central Daylight Time (CDT), N121H, a Grumman G-21E amphibian aircraft, registered to Stallion Aircraft, Inc., struck the ground in uncontrolled flight at DuPage Airport, West Chicago, Illinois. The aircraft was observed taking off on runway 28 and entered a high nose up pitch, rolled to the left, and struck the ground in a steep nose down attitude. The private pilot and passenger were fatally injured. There was a post crash fire which consumed the aircraft.

The 14 CFR Part 91 flight was operating in visual meteorological conditions and winds were calm. The aircraft was not on a flight plan. This was the third takeoff of the evening for the aircraft; however, it was the first flight in approximately two years.

The flight contacted the FAA DuPage Air Traffic Control Tower at 1821:11 for a radio check. The ground controller responded the aircraft was loud and clear. At 1836:32, the flight reported they were at J.A. Air Center and requested to taxi to the west side of the airport and back.

At 1840:20, Ground Control asked them what their destination was. N121H responded, "Just go down, turn around in front of the building there."

At 1844:22, N121H was told, "taxi to J.A., traffic is in position runway three three."

At 1846:08, N121H, called tower stating "If we go out on three three we would be able to come in and land on one left."

At 1846:14, Ground Control responded, "affirmative" and asked if two one hotel wanted to taxi to three three for the departure.

At 1846:32, N121H responded they would be going out VFR and because the plane had extensive work done, "we wanna go out and play with it a little bit then come back in and we'll give you notice."

At 1850:10, N121H was in position and holding.

At 1850:27, N121H advised Local Control, "understand this is a test flight and if we have a problem we're gonna need to come back quick."

At 1853:42, Local Control advised Grumman two one hotel "I gotcha five north primary only negative transponder."

At 1853:47, N121H responded that they were "trying to sort some things out."

At 1855:37, Local Control asked two one hotel if they are aware of the requirement to have a transponder under the TCA.

At 1855:42, N121H responded that they have full IFR equipment. "...if we got a transponder failure we got a transponder failure the aircraft just came out of JA."

At 1855:57, N121H affirmed, "This is a test flight."

At 1920:29, N121H called back to the tower stating "Good evening DuPage Grumman Goose one twenty one hotel."

At 1928:33, Local Control called N121H, "Goose two one hotel DuPage."

At 1928:35, N121H responded "one twenty one hotel is a couple miles northwest of the bend in the river like to make an approach in on a one zer- on uh runway one."

At 1935:52, Ground Control stated to Grumman two one hotel "taxi to runway one left and did you wanna just stay in the pattern then?"

At 1935:57, N121H responded in the affirmative saying they would like to get at least three so they would be current.

At 1939:56, Local Control stated to two one hotel that they are cleared for takeoff.

At 1941:54, Local Control told Goose one two one hotel to start a base turn now runway two eight, "you're cleared to land".

At 1941:59, N121H responded, "cleared to land two eight one twenty one hotel."

At 1947:38, N121H called tower stating "one twenty one hotel's ready in sequence at two eight we'd like one for landing."

At 1950:12, Local Control called Grumman two one hotel stating "you have to have runway one for your landing and takeoff just wanna make a full stop there and then park."

At 1950:19, N121H responded, "whatever's easier for you sir that's ---I'm sorry go ahead."

At 1950:22, Local Control called N121H stating a reason they wanted them on runway two eight.

At 1950:38, N121H responded, "Yeah I was gonna just make that was gonna be my last one that's why I asked for one left."

At 1950:42, Local Control stated, "that's no problem we can do that then."

At 1954:57, Local Control informed Grumman that runway two eight was cleared for takeoff.

At 1955:02, N121H responded, "For twenty one hotel."

At 1955:04, Local Control responded in the affirmative.

At 1955:06, N121H responded "Roger thank you."

There were no further transmissions from the aircraft.

Witnesses

Eleven witness statements are attached to this factual report. One witness observed the aircraft flying east of the airport after the first takeoff. This witness said "everything appeared to be normal" and the "engines sounded great". Most of the other witnesses were on the airport at various positions. A short takeoff roll (one witness stating 700 feet) is described and then a nose high attitude at about 60 feet in the air. Then witnesses describe a left turn ending in a near straight down nose attitude to impact. Engines sounds were described as good or no change to impact.

Personnel Information

The pilot held a private pilot certificate with a multi-engine and instrument rating. He held type ratings in the Grumman TBM and North American B25 aircraft. He had total flight time of about 4,200 hours with about 400 flight hours in this Grumman G-21E aircraft. This was

his first flight in this aircraft in approximately two years.

The pilot rated passenger had approximately 400 flight hours single engine flight time. He did not possess a multi-engine rating; however, he held an aircraft mechanic rating.

Aircraft Information

Airframe -- The aircraft was a Grumman G-21E McKinnon conversion. The model G-21E (Normal Category) Type Certificate Data Sheet, part III was approved July 17, 1969 (attached). The aircraft was originally manufactured in 1937. The McKinnon conversion was completed in 1970 with an airworthiness date of May 5, 1970 upon issuance of a standard normal airworthiness certificate.

The most recent logbooks for the aircraft were not located during the course of the investigation. All times are based upon reconstruction of times from records available.

The aircraft had a maximum gross take-off weight of 10,500 pounds on water and an empty weight of about 7,000 pounds.

The aircraft was equipped with two United Aircraft of Canada PT6A-27 engines producing 680 shaft horsepower each.

The engines had been repaired by Standard Aero, INC., of Winnipeg, Canada during the year and a half before the accident. The left engine was received on October 25, 1994, repaired, test run, and returned to on January 30, 1995. The left engine work was invoiced to Air Classics Inc., work order number S107791. The right engine was received on March 28, 1994, repaired, test run, and returned on April 4, 1994. The right engine work was invoiced to Air Classics Inc., work order number S99552. The engines were reinstalled at West Chicago, Illinois.

J.A Air Center of West Chicago, Illinois, worked on the aircraft May 22, 1995 to June 9, 1995, primarily rigging the engines and propellers. See attached 5 page J.A. work order for details. The aircraft was reclaimed by the owner prior to completion and approval of work.

Communications

A transcript of communications between DuPage Air Traffic Control Tower and N121H is an attachment to this factual report.

Wreckage

The aircraft impacted the ground about 1,900 feet from the departure end of runway 28 and 235 feet to the left edge of runway 28. The aircraft was resting flat heading about 065 degrees magnetic. Air Traffic Controllers from the FAA tower stated the aircraft struck the ground going almost nose straight down and caught fire. After burning for an undetermined period, the aircraft settled down on the underside. The entire aircraft was consumed in the post crash fire except the empennage. See attached photographs.

The right engine remained with the fuselage. The left engine separated at the firewall and was forward of the left wing. Both propellers had separated just aft of the flange attach point. The propellers were in left and right craters each about 58 feet forward of the of the wings. See attached photographs.

There was a nose impact about 28 feet forward of the nose. There was an impact hole from the left wingtip floats about 18 feet out from the left propeller crater. There was an impact hole from the right wing tip floats about 16 feet out from the right propeller crater. Both wing tip

floats were in the retracted position.

The left and right flap actuators were extended 3 inches. This equates to about 30 degrees of total flap extension, or half flaps. The elevator trim tab, measured at the trailing edge of the elevator, was measured one quarter inch above the elevator trailing edge. The rudder trim tab was 7/8 inch left of the end of the rudder fairing.

Medical and Pathological

A post-mortem examination was performed on the pilot at the DuPage County Coroner's Office in Wheaton, Illinois. Forensic toxicology specimens were sent for testing to the FAA Civil Aeromedical Institute in Oklahoma City, Oklahoma. All reports were negative for specimens tested.

Survival Factors

Both front seatbelt buckles were found buckled.

Fire

There was a post crash fire that consumed the entire wreckage except the empennage. (See photographs) Witnesses report no fire or smoke prior to impact. Witnesses reported that there initially was a small fire which grew quickly until flames were higher than the tail while the aircraft was still in a near vertical position. The first fire crew from the West Chicago Fire Department was on scene about five minutes after the crash. The tail was still vertical upon their arrival and then slowly settled to the ground.

Tests and Research

The engines were disassembled and inspected by the investigation team, under the supervision of the NTSB, on October 25, 1995 at P & W Aircraft Services in Naperville, Illinois. The "Powerplant Inspection N121H" report prepared by the NTSB and The United Technologies "Accident/Incident Report" are attached to this factual report. No evidence of any inflight problem with either engine was found. Both engines exhibited signatures of rotational damage of the compressor and turbine sections with heat discoloration consistent with developing power at impact.

The propellers were disassembled and inspected by the investigation team, under the supervision of the NTSB, on November 1, 1995, at Aircraft Propellers in Wheeling, Illinois. Disassembly disclosed no evidence of any inflight problem with either propeller. Five of the six propeller blades had slipped in their blade clamps. Blade angles were not measured due to damage and slippage of blades from impact. The propeller hubs were further disassembled under the supervision of the NTSB at DuPage Airport, West Chicago, Illinois. The left propeller hub low pitch stop was measured at 20.0 degrees. The right propeller hub low pitch stop was measured at 18.5 degrees. Measurement of damage to the pitch link mechanisms on the left propeller hub yielded angles 30.0 degrees for L-1, 26.5 degrees for L-2, and 27.0 degrees for L-3. Measurement of damage to the pitch link mechanisms on the right propeller hub yielded angles of 25.5 degrees for R-1, 28 degrees for R-2 and 28 degrees for R-3. A calibrated electronic angle measuring instrument, provided by a fixed base operator, was used for all measurements. Photographs of measurements are attached to this factual report.

Additional Data

From the Air Plane Flight Manual, it is stated:

"The wing flaps are vacuum operated, controlled by a Flap Selector Valve on the overhead instrument panel which permits selection of 30 degrees or 60 degrees extension."

"Vacuum for flap operation is supplied by bleed air from either engine. A vacuum storage tank in the bow compartment has sufficient capacity to operate the flaps to the 60 degree position at least once in the event of engine failure."

Per the Airplane Flight Manual, stall speed in miles per hour, at a gross weight of 8,500 pounds with flaps down full, gear down is 70 mph. Stall speed in clean configuration, with flaps up is 77.5 mph.

The only performance charts with the available records were for a gross weight of 10,500 pounds.

Takeoff distance at a density altitude of 1,909 feet while using the chart weight of 10,500 pounds was computed to be 3,000 feet.

Takeoff weight was approximated to be 8,500 pounds from the available information. Allowable center of gravity range for the McKinnon G-21E with the PT6A-27 engines is +22.0 to +29.5 at all weights (see attached Type Certificate Data Sheet No. 4A24). Computed center of gravity for this takeoff, with available information and records, was +22.0.

Four pilots who flew the Grumman Turbo Goose were interviewed. They said normally flaps are not used for takeoffs on land or water. They said the Turbo Goose has substantial power for the weight especially if flown without a load. They said flaps would rapidly pull the aircraft in the air and although not a normal procedure, it is known in operations of the Goose to "drop" half flaps just before rotation to pull the aircraft in the air. One pilot said without a load, with a forward C.G., the aircraft would feel nose heavy.

Pilot Information

Certificate:	Private	Age:	53, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	Seat Occupied:	Left
Other Aircraft Rating(s):	None	Restraint Used:	Seatbelt
Instrument Rating(s):	None	Second Pilot Present:	No
Instructor Rating(s):	None	Toxicology Performed:	Yes
Medical Certification:	Class 3 Valid Medical--no waivers/lim.	Last FAA Medical Exam:	06/03/1994
Occupational Pilot:		Last Flight Review or Equivalent:	
Flight Time:	4200 hours (Total, all aircraft), 400 hours (Total, this make and model)		

Aircraft and Owner/Operator Information

Aircraft Make:	Grumman	Registration:	N121H
Model/Series:	G-21E G-21E	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	No
Airworthiness Certificate:	Normal	Serial Number:	1211
Landing Gear Type:	Amphibian	Seats:	7
Date/Type of Last Inspection:	Unknown	Certified Max Gross Wt.:	10500 lbs
Time Since Last Inspection:		Engines:	2 Turbo Prop
Airframe Total Time:		Engine Manufacturer:	P&W
ELT:	Not installed	Engine Model/Series:	PT6A-27
Registered Owner:	STALLION AIRCRAFT, INC.	Rated Power:	680 hp
Operator:	RODGERS, JOHN D.	Operating Certificate(s) Held:	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	DPA, 756 ft msl	Distance from Accident Site:	0 Nautical Miles
Observation Time:	1956 CDT	Direction from Accident Site:	0°
Lowest Cloud Condition:	Scattered / 25000 ft agl	Visibility	30 Miles
Lowest Ceiling:	None / 0 ft agl	Visibility (RVR):	0 ft
Wind Speed/Gusts:	Calm /	Turbulence Type Forecast/Actual:	/
Wind Direction:		Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	29 inches Hg	Temperature/Dew Point:	-18°C
Precipitation and Obscuration:			
Departure Point:	(DPA)	Type of Flight Plan Filed:	None
Destination:		Type of Clearance:	None
Departure Time:	1850 CDT	Type of Airspace:	Airport Advisory Area

Airport Information

Airport:	DUPAGE (DPA)	Runway Surface Type:	Asphalt
Airport Elevation:	756 ft	Runway Surface Condition:	Dry
Runway Used:	28	IFR Approach:	None
Runway Length/Width:	4751 ft / 75 ft	VFR Approach/Landing:	Full Stop

Wreckage and Impact Information

Crew Injuries:	1 Fatal	Aircraft Damage:	Destroyed
Passenger Injuries:	1 Fatal	Aircraft Fire:	On-Ground
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	2 Fatal	Latitude, Longitude:	

Administrative Information

Investigator In Charge (IIC):	CARL E DINWIDDIE	Report Date:	12/10/1996
Additional Participating Persons:	GERALD D WYATT; WEST CHICAGO, IL THOMAS D SOERENS; WEST CHICAGO, IL DENNIS ROBICHAUD; ROSCOE, IL WAYNE R SANCHEZ; WEST CHICAGO, IL		
Publish Date:			
Investigation Docket:	NTSB accident and incident dockets serve as permanent archival information for the NTSB's investigations. Dockets released prior to June 1, 2009 are publicly available from the NTSB's Record Management Division at pubinquiry@ntsb.gov , or at 800-877-6799. Dockets released after this date are available at http://dms.nts.gov/pubdms/ .		

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](#).