National Transportation Safety Board
Aviation Accident Final Report

Location:	Gaithersburg, MD	**Accident Number:**	NYC08LA049
Date & Time:	12/01/2007, 1445 EST	**Registration:**	N259ER
Aircraft:	CESSNA 172N	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	2 Minor
Flight Conducted Under:	Part 91: General Aviation - Instructional		

Analysis

The 12-hour student pilot and the certificated flight instructor (CFI) were conducting their first flight together. The student had completed one takeoff, traffic pattern circuit, and landing, and initiated another takeoff in response to the CFI's instruction. After lift off, the airplane began to veer to the left, and despite verbal commands by the CFI, the drift and turn continued. The CFI then tried to physically intervene on the flight controls, but was initially resisted by the student. The CFI recognized that they could not avoid a treeline located 80 feet from the runway edge, so he leveled the wings and attempted to shut down the engine. The airplane impacted the trees approximately 10 feet above ground level. Subsequent to the accident, the CFI stated that he normally emphasized transfer of control in the preflight briefing, but he did not discuss that with this student. The surface weather observation reported winds of 5 knots. The accident was the fifth one in 24 years that involved the same treeline. While the treeline was coincident with the runway proximity limit specified in the advisory circular for airport design, the airport's 2002 improvement plan prescribed an increase in the distance between the treeline and the runway edge. As of July 2009, the treeline had not been relocated.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The student pilot's failure to maintain aircraft control during an attempted touch-and-go. Contributing to the accident was the instructor's delay in taking remedial action, and the presence of trees in proximity to the side of the runway.

Findings

Occurrence #1: LOSS OF CONTROL - IN FLIGHT
Phase of Operation: GO-AROUND (VFR)

Findings
1. TOUCH-AND-GO - ATTEMPTED - DUAL STUDENT
2. (C) DIRECTIONAL CONTROL - NOT MAINTAINED - DUAL STUDENT
3. (F) IMPROPER USE OF EQUIPMENT/AIRCRAFT - DUAL STUDENT
4. (F) REMEDIAL ACTION - INADEQUATE - PILOT IN COMMAND(CFI)
5. (F) RELINQUISHING OF CONTROL - DELAYED - PILOT IN COMMAND

Occurrence #2: IN FLIGHT COLLISION WITH OBJECT
Phase of Operation: GO-AROUND (VFR)

Findings
6. (F) OBJECT - TREE(S)

Factual Information

HISTORY OF FLIGHT

On December 1, 2007, about 1440 eastern standard time, a Cessna 172N, N259ER, was substantially damaged during an attempted takeoff from Montgomery County Airpark (GAI), Gaithersburg, Maryland. The student pilot and the certificated flight instructor (CFI) were uninjured. The instructional flight was operated under the provisions of 14 Code of Federal Regulations (CFR) Part 91. Visual meteorological conditions prevailed, and no flight plan had been filed.

According to the CFI, the accident flight was his first flight with this student pilot, since her regular instructor was not available. After completing the first takeoff, circuit of the traffic pattern, and landing on runway 32, and in response to the CFI's command to initiate another takeoff, the student pilot applied power and lifted off. After lift off, the airplane began to drift to the left, and despite verbal commands by the CFI, the student pilot did not respond, and did not correct the drift. The CFI then tried to physically intervene on the flight controls, but was initially resisted by the student pilot. According to the student pilot, she heard the CFI speak, but she did not understand what he said.

According to the CFI, the drift and turn continued until the airplane heading was offset approximately 40 degrees from the runway heading. The CFI recognized that they would be unable to either turn away from, or fly over, the line of trees just south of the runway. The CFI leveled the wings, and retarded the throttle and pulled the mixture control to shut down the engine. The airplane impacted the trees at approximately 10 feet above ground level, and came to rest in a nose down attitude. Structural deformation prevented the cabin doors from being opened. The CFI kicked out the windshield, and both occupants exited the airplane through the opening.

Subsequent to the accident, the CFI stated that normally, in his preflight briefing with a primary flight student, he emphasized the procedures for transfer of airplane control between the student and the instructor. He also stated that he did not discuss airplane control transfer procedures in his preflight briefing with this particular student.

PERSONNEL INFORMATION

The student pilot had approximately 12 hours total flight experience. Her most recent Federal Aviation Administration (FAA) second-class medical certificate was issued in October 2007.

The CFI held Commercial, Airline Transport and Flight Engineer certificates, with airplane single-engine and multiengine land and instrument airplane ratings, as well as airplane single-engine and multiengine land and instrument airplane instructor ratings. He had approximately 6,000 total hours of flight experience, including approximately 5,000 hours in the accident airplane make and model. His most recent FAA second-class medical certificate was issued in October 2007.

AIRPLANE INFORMATION

The airplane was owned and operated by the Washington Flying Club, and was based at GAI. It was first registered to the operator in 2000. According to information provided by the operator and the FAA, the airplane was manufactured in 1978, and was equipped with a Lycoming O-360 series engine and a two-bladed, fixed pitch metal propeller. The most recent 100 hour

inspection was accomplished in October 2007, at which time the airplane had accumulated a total time in service of approximately 15,362 hours.

METEOROLOGICAL INFORMATION

The 1435 GAI surface weather observation reported winds from 340 degrees at 5 knots, visibility 10 miles, clear skies, temperature 4 degrees C, dew point minus 12 degrees C, and an altimeter setting of 30.47 inches of mercury.

AIRPORT INFORMATION

The airport was owned and operated by Montgomery County, Maryland. Runway 14/32 was asphalt, and was 4,200 feet long by 75 feet wide. The southwestern airport boundary line was parallel to the runway, and was located approximately 350 feet from the runway centerline. A series of one and two story buildings and associated parking lots were located in the industrial park that abutted the southwest side of the airport.

The trees initially struck by the airplane were located approximately 120 feet from the runway centerline, or 80 feet from the runway edge. These trees were on airport property, were part of a wooded area which bounded the entire southwest side of the airport, and extended to the airport boundary line. Commercially available airport diagrams depicted these trees as being 20 feet high.

WRECKAGE AND IMPACT INFORMATION

The airplane came to rest approximately 2,200 feet along runway 32, and 150 feet southwest of the runway centerline. Both wings were deformed aft approximately 30 degrees, and exhibited multiple leading edge crush damage sites. Both trailing edge flaps were severely buckled. The forward lower cowl was crushed up and aft, and the nose landing gear was fracture-separated from the airplane. The aft cabin windows were fractured, and the leading edge of the left horizontal stabilizer exhibited crush damage.

ADDITIONAL INFORMATION

Previous GAI Tree Collision Accidents

A database search of previous accidents that occurred at GAI since 1983, and that involved the trees to the southwest of the runway, revealed four accidents in addition to the subject accident. Two of the accidents occurred during instructional flights, and two occurred during personal flights. All four previous accidents, as was the case for the subject accident, occurred while runway 32 was being used. Two were landing rollout accidents, one was an aborted landing after touchdown, and one was a takeoff accident. As was the case for the subject accident, none of the accidents resulted in serious injuries.

Airport Design Guidance

FAA Advisory Circular (AC) 150/5300-13 entitled "Airport Design," defined the Obstacle Free Zone (OFZ) as "the airspace below 150 feet (45 m) above the established airport elevation and along the runway and extended runway centerline that is required to be clear of all objects, except for frangible visual NAVAIDs that need to be located in the OFZ because of their function, in order to provide clearance protection for aircraft landing or taking off from the runway, and for missed approaches." It further defined the Runway OFZ as "the airspace above a surface centered on the runway centerline."

Paragraph 211 a (3) (Object Clearing Criteria) of the AC stated that the OFZ "require clearing of object penetrations, except for frangible visual NAVAIDs that need to be located in the OFZ because of their function," and that the dimensions were specified in paragraph 306 of the AC. Paragraph 306 a (1) (b) (Obstacle Free Zone) of the AC stated that the runway OFZ width was to be "250 feet for runways serving small airplanes," which meant that the OFZ extended 125 feet on either side of the runway centerline.

Comparison of the actual airport conditions with the above-specified criteria indicated that the treeline was coincident with the OFZ limits specified by AC 150/5300-13.

Planned Airport Improvements

According to a representative of the Maryland Aviation Authority (MAA), which oversees public-use airport compliance with Maryland standards, GAI met all the applicable safety standards, and had developed future safety improvement plans. The most recent GAI "Airport Layout Plan" was finalized in February 2002. The plan specified the removal of certain obstructions, including some of the trees southwest of the runway. The plan also called for clearing trees and/or other obstructions off the ends of the runway, but land-acquisition issues delayed the project funding, and the airport improvements had not been started as of July 2009.

Flight Instructor Information

Certificate:	Airline Transport; Flight Instructor; Commercial; Flight Engineer	**Age:**	42, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	None	**Restraint Used:**	Seatbelt, Shoulder harness
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	Airplane Multi-engine; Airplane Single-engine; Instrument Airplane	**Toxicology Performed:**	No
Medical Certification:	Class 2 Without Waivers/Limitations	**Last Medical Exam:**	10/15/2007
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	01/01/2007
Flight Time:	6000 hours (Total, all aircraft), 5000 hours (Total, this make and model), 6000 hours (Pilot In Command, all aircraft)		

Student Pilot Information

Certificate:	Student	**Age:**	25, Female
Airplane Rating(s):	None	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	Seatbelt, Shoulder harness
Instrument Rating(s):	None	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 2 Without Waivers/Limitations	**Last Medical Exam:**	10/21/2007
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	12 hours (Total, all aircraft), 12 hours (Total, this make and model), 10 hours (Last 90 days, all aircraft), 10 hours (Last 30 days, all aircraft), 3 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Manufacturer:	CESSNA	**Registration:**	N259ER
Model/Series:	172N	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	No
Airworthiness Certificate:	Normal	**Serial Number:**	17271298
Landing Gear Type:	Tricycle	**Seats:**	4
Date/Type of Last Inspection:	10/01/2007, 100 Hour	**Certified Max Gross Wt.:**	2550 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	15362 Hours	**Engine Manufacturer:**	Lycoming
ELT:	Installed, not activated	**Engine Model/Series:**	O-360-AHM
Registered Owner:	Washington Flying Club	**Rated Power:**	180 hp
Operator:	Washington Flying Club	**Air Carrier Operating Certificate:**	None

Meteorological Information and Flight Plan

Observation Facility, Elevation:	GAI, 500 ft msl	**Observation Time:**	1435 EST
Distance from Accident Site:		**Condition of Light:**	Day
Direction from Accident Site:		**Conditions at Accident Site:**	Visual Conditions
Lowest Cloud Condition:	Clear	**Temperature/Dew Point:**	4°C / -12°C
Lowest Ceiling:	None	**Visibility**	10 Miles
Wind Speed/Gusts, Direction:	5 knots, 340°	**Visibility (RVR):**	
Altimeter Setting:	30.47 inches Hg	**Visibility (RVV):**	
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Gaithersburg, MD (GAI)	**Type of Flight Plan Filed:**	VFR
Destination:	Gaithersburg, MD (GAI)	**Type of Clearance:**	None
Departure Time:	1430 EST	**Type of Airspace:**	

Airport Information

Airport:	Montgomery County Airpark (GAI)	**Runway Surface Type:**	Asphalt
Airport Elevation:	539 ft	**Runway Surface Condition:**	Dry
Runway Used:	32	**IFR Approach:**	None
Runway Length/Width:	4202 ft / 75 ft	**VFR Approach/Landing:**	Touch and Go; Traffic Pattern

Wreckage and Impact Information

Crew Injuries:	2 Minor	**Aircraft Damage:**	Substantial
Passenger Injuries:	N/A	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Minor		

Administrative Information

Investigator In Charge (IIC):	Michael C Huhn	**Adopted Date:**	11/09/2009
Additional Participating Persons:	Sandra McClure; FAA/FSDO; Baltimore, MD		
Publish Date:	03/04/2010		
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 pubinq@ntsb.gov, or at 800-877-6799. Dockets released after this date are available at http://dms.ntsb.gov/pubdms/.		

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