



# National Transportation Safety Board Aviation Accident Final Report

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<b>Location:</b>	Swanton, OH	<b>Accident Number:</b>	NYC03FA080
<b>Date &amp; Time:</b>	04/08/2003, 1349 EDT	<b>Registration:</b>	N183GA
<b>Aircraft:</b>	Dassault Aviation DA-20	<b>Aircraft Damage:</b>	Destroyed
<b>Defining Event:</b>		<b>Injuries:</b>	3 Fatal
<b>Flight Conducted Under:</b>	Part 91: General Aviation - Instructional		

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## Analysis

The flight crew of the Fan Jet Falcon (DA-20) were practicing ILS approaches in instrument meteorological conditions with low clouds and rime ice. A first officer (FO) in training occupied the right seat, while the pilot-in-command (PIC), who was also the company chief pilot/check airman/designated flight instructor, occupied the left seat and was handling the radios. On the second approach, the airplane struck trees and burned, 1.57 nm from approach end of the runway. The landing gear was found extended, and the trailing edge and droop leading edge flaps were retracted. The wing and engine cowl anti-ice valves were found closed, consistent with it being off in the cockpit. Radar data revealed that on approach, the airspeed decreased from 188 knots to 141 knots at the outer marker, and continued to decrease down to 106 knots, when the airplane entered an abrupt descent and disappeared from radar. Simulator flights matched the radar profile with a flight idle approach, a power reduction inside the outer marker, and 1/4 inch of ice on the wings. In the simulator, the airplane stalled about 2 miles from the end of the runway with an airspeed of 103 kts. At flight idle, the engine power in the last 2 minutes of approach was below the recommended power setting for wing or engine anti-ice to be effective. Vref and stall speeds were computed to be 129 kts and 96 kts, with wing flaps and droop leading edges retracted. The PIC had about 1,100 hours in the make and model. The PIC did not have any documented previous flight instruction experience in make and model or any other multi-engine airplanes. The PIC had given 4 pilot proficiency checks in the DA-20 since receiving his check airman designation. The company Director of Operations reported that the accident FO was the first student the PIC had taken through the initial second-in-command course. The PIC and FO had received all of their turbojet experience with the operator.

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The flight instructor's inadequate supervision of the flight, including his failure to maintain an approach airspeed consistent with the airplane's configuration, which resulted in an aerodynamic stall due to slow airspeed, and subsequent uncontrolled descent into trees. Factors were the icing conditions, the flight instructors failure to turn on the wing and engine

anti-ice, and his lack of experience as an instructor pilot in the airplane.

## Findings

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Occurrence #1: IN FLIGHT ENCOUNTER WITH WEATHER

Phase of Operation: APPROACH

Findings

1. (F) WEATHER CONDITION - ICING CONDITIONS
2. (F) ANTI-ICE/DEICE SYSTEM - IMPROPER - PILOT IN COMMAND(CFI)

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Occurrence #2: LOSS OF CONTROL - IN FLIGHT

Phase of Operation: APPROACH - FAF/OUTER MARKER TO THRESHOLD (IFR)

Findings

3. (C) SUPERVISION - INADEQUATE - PILOT IN COMMAND(CFI)
4. (F) LACK OF TOTAL EXPERIENCE IN TYPE OPERATION - PILOT IN COMMAND(CFI)
5. (C) AIRSPEED - NOT MAINTAINED - PILOT IN COMMAND(CFI)
6. STALL/MUSH - INADVERTENT - PILOT IN COMMAND(CFI)

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Occurrence #3: IN FLIGHT COLLISION WITH OBJECT

Phase of Operation: DESCENT - UNCONTROLLED

Findings

7. OBJECT - TREE(S)

## Factual Information

### HISTORY OF FLIGHT

On April 8, 2003, at 1349 eastern daylight time, a Dassault Fan Jet Falcon (DA-20), N183GA, operated by Grand Aire Express Inc. (GAE), as flight 183, was destroyed when it struck trees while on an instrument approach to Toledo Express Airport (TOL), Swanton, Ohio. The two certificated airline transport pilots, and pilot rated passenger were fatally injured. Instrument meteorological conditions prevailed for the instructional flight, which last departed from Cherry Capital Airport (TVC), Traverse City, Michigan. The flight was conducted on an instrument flight rules (IFR) flight plan under 14 CFR Part 91.

According to the Director of Operations (DO) for Grand Aire Express, the flight was dispatched from Toledo with a 14 CFR Part 135 qualified flight crew on board, and a first officer in training (FO), who occupied the jump seat with no required duties.

According to records from the Federal Aviation Administration (FAA), prior to departure from Toledo, the direct user access terminal system (DUATS) was accessed using a Grand Aire logon. Selected notices to airmen (NOTAMS), terminal forecasts (TAFs), and aviation routine weather reports (METARS) were requested by the logon user.

The airplane then flew from TOL to Grand Rapids (GRR), Michigan, where cargo was loaded. There was no servicing while the airplane was on the ground at Grand Rapids. However, flight service was contacted by the flight crew and an IFR flight plan was filed to Traverse City. The latest weather for Traverse City, and their alternate airport was also requested. When asked if any additional weather was needed, the offer was declined.

There were no reported problems on the flight between Grand Rapids and Traverse City. While on the ground at Traverse City, the airplane was serviced with 150 gallons of Jet-A aviation grade turbine fuel.

Flight service was again contacted by the flightcrew and an IFR flight plan to Toledo was filed. No weather information was requested.

The return flight to Toledo was planned as an instructional flight for the FO, who was being prepared for his 14 CFR 135, second-in-command checkride. The pilot-in-command (PIC) occupied the left seat. He was the company chief pilot, an FAA designated check airman, and a company designated flight instructor. The FO in training occupied the right seat, and the 14 CFR Part 135, DA-20 qualified first officer occupied the jump seat, as a pilot rated passenger with no required duties.

There were no reported problems with the departure or en route phases of the flight. The pilots initially contacted Toledo Approach Control at 1324.

The pilots initiated a practice ILS approach to runway 07, with the intent to perform a missed approach. During the missed approach, the airplane was radar vectored for a second ILS approach to runway 07.

The air/ground communications tape between the airplane and approach control was reviewed. The director of operations identified the voice that was responding to radio calls as the PIC.

According to an FAA transcript of air/ground communications, at 1345:29, Grand Aire flight

183 was requested to maintain 180 knots to TOPHR, the final approach fix. This instruction was acknowledged by the PIC.

At 1346:21, flight 183 was instructed to maintain 2,300 feet until established on the localizer, and cleared for the ILS runway 07 approach. The flight was again instructed to maintain 180 knots to TOPHR. This was acknowledged by the PIC.

At 1348:51, the arrival controller transmitted, "grand air one eighty three, contact tower."

At 1348:54, the PIC transmitted, "tower, grand air one eight three."

No further transmissions were received from the airplane, and radar contact was lost.

A witness driving south on a road, adjacent to the west side of Oak Openings Preserve Park, reported that she saw the airplane on final approach. She described it as lower than normal, and north of the final approach course. She stopped her vehicle, stepped out, and watched the airplane fly overhead. She reported that she could hear a popping noise as the airplane passed overhead. As the airplane disappeared from view, she thought she heard a power reduction from the engines. She then got into her vehicle and did not see or hear anything else.

A second witness who was located north of the localizer approach course reported that the tops of the trees, which were 80 to 100 feet high, were obscured by fog. He could hear the engines running intermittently, interspaced with "bangs."

A third witness reported hearing a noise, which she described as, "like a huge drum of nuts and bolts, and you shook it. It was very, very loud and then silence."

A ground search was initiated, and the airplane was located about 1415.

The accident occurred during the hours of daylight at 41 degrees, 34.371 minutes north latitude, and 83 degrees, 51.815 minutes west longitude.

#### PERSONNEL INFORMATION

##### Pilot-In-Command

The PIC held an airline transport pilot certificate for multi-engine airplanes, and a type rating for the DA-20. He held a commercial pilot certificate with ratings for single engine airplanes, rotorcraft helicopter, and instrument helicopter. He also held a flight instructor certificate with ratings for single and multi-engine, and instrument airplane. He was last issued a first class FAA airman medical certificate with no limitations on April 2, 2003.

According to the company, the PIC's total flight experience was 4,829 hours, with 4,384 hours as PIC. His total DA-20 experience was 1,100 hours including 923 hours as PIC. He had flown 82 hours in the preceding 90 days, and 28 hours in the preceding 30 days.

The PIC also held a mechanic's certificate with airframe and powerplant ratings.

The PIC completed initial training in the DA-20 on April 22, 2000. His last recurrent ground school was completed on May 3, 2002. His last proficiency check in the DA-20 occurred on January 3, 2003.

##### First Officer

The FO held an airline transport pilot certificate for multi-engine airplanes and a type rating for the EMB-120. He held a commercial pilot certificate with a single engine rating. He also held a flight instructor certificate with a single engine rating. He was last issued a first class

FAA airman medical certificate with no limitations on February 27, 2003.

According to the company, the FO's total flight experience was 4,632 hours, including 2,000 hours as PIC, and 7.1 hours in make and model. He had flown 63 hours in the preceding 90 days, and 21 hours in the preceding 30 days.

The FO completed DA-20 ground school on April 2, 2003. Prior to the accident flight, he had received 7.1 hours of dual instruction in the DA-20, all from the PIC. He started flight training on March 13, 2003, and his last instructional flight prior to the accident was on April 2, 2003.

#### AIRCRAFT INFORMATION

The type certificate data sheet referred to the airplane as a Fan Jet Falcon. The airplane was originally equipped with two General Electric CF 700-2C engines, and had been upgraded to the CF 700-2D2 engines by service bulletin.

The wings were equipped with trailing edge flaps, and droop leading edges (DLE) on the outboard half of the wings.

The fuel system consisted of two wing tanks, and two rear compartment tanks located aft of the aft pressure bulkhead, and between the engines. The wing tanks held 552 gallons on each side, and the rear compartment tanks held 71 gallons on each side.

The airplane had been converted from passenger carrying to a freighter by removal of the main cabin door, and the interior liner and seats. Entrance to the airplane was through the cargo door, forward of the leading edge of the left wing. There were three methods to exit the airplane. The main cargo door and the sliding left side direct vision window in the cockpit could both be used as an emergency exit. In addition, there was an overhead plug type emergency exit which measured 18.5 inches wide, and 13.5 inches deep. This emergency exit was located behind the pilot seats and in front of the cockpit jump seat.

#### METEOROLOGICAL INFORMATION

Interviews with the pilots of two airplanes that were following the accident airplane revealed they had their anti-ice systems ON at the time of the accident. One pilot reported light to moderate rime ice, between 1048 and 1210, while operating in the Toledo area. When he returned to Toledo, he did not notice any ice buildup on the airplane. The other pilot reported rapidly building rime ice, and he requested an altitude change to avoid the ice.

A meteorological factual report was completed by a Safety Board Meteorologist. According to the report, there was no frontal activity. However, there was an area of low pressure, with high humidity. In addition, the surface temperatures were near freezing over Michigan and Northern Ohio.

The report also listed six pilot reports from the Toledo area, between 0707 and 1215. Five of the reports listed light to moderate rime ice, and the tops of the overcast to be between 5,000 feet and 6,000 feet. The airplanes ranged from single engine airplanes not approved for flight in icing conditions, to a Gulfstream IV in which the crew reported moderate rime ice.

The 1333 Special weather observation at Toledo included winds from 300 degrees at 9 knots, visibility 1 statute mile, mist, ceiling 300 feet overcast, temperature 0 C, dewpoint -1 C, remarks, surface visibility 1 1/4 statute miles.

The 1352 METAR weather observation at Toledo included winds from 300 degrees at 9 knots,

visibility 1 statute mile, mist, ceiling 300 feet overcast, temperature 0 C, dewpoint -1 C, remarks, surface visibility 1 3/4 statute miles.

According to the terminal forecast for Toledo issued at 0958, between 1200 and 1500, the visibility was forecast to be 3 statute miles and included freezing drizzle, and mist, and a ceiling of broken clouds at 500 feet.

The terminal forecast that was contained in the DUATS weather received by the pilot, forecast that between 1200 and 1600, the visibility would be 4 statute miles with freezing drizzle, mist, and a ceiling of broken clouds at 500 feet.

When the accident flight made initial contact with approach control, they reported that they had airport terminal information service (ATIS) TANGO. The ATIS was updated twice, first with UNIFORM, and then with VICTOR, as the pilots performed practice approaches. On the first approach, the control tower gave the flight the latest runway visual range (RVR).

ATIS TANGO - Issued 1255:26 reported:

"toledo express information tango, one seven zero zero metar, weather, wind zero two zero at niner, visibility three, mist, ceiling 500 overcast, temperature zero, dew point minus one, altimeter three zero two six, i l s runway seven approach in use, all airborne aircraft contact toledo approach on one three four point three five, on initial contact advise that you have tango."

ATIS UNIFORM - Issued 1327:49 reported:

"toledo atis information uniform, one seven two four zulu special weather observation, wind zero one zero at one two, visibility one, mist, ceiling five hundred overcast, temperature zero, dew point minus one, altimeter three zero two five, i l s runway seven approach in use, advise on initial contact you have information uniform."

ATIS VICTOR - Issued 1339:15 reported:

"toledo atis information victor, one seven three three zulu special weather observation, wind zero two zero at niner, visibility one, mist, ceiling three hundred overcast, temperature zero, dew point minus one, altimeter three zero two six, i l s runway seven approach in use, advise you have information victor."

#### AIDS TO NAVIGATION

The glideslope for the ILS runway 7 approach was set at 3 degrees. The glideslope altitude over the outer marker was 2,168 feet msl. A flight check was performed by the FAA on the ILS runway 7 approach to Toledo airport on April 18, 2003. The results were satisfactory.

#### FLIGHT RECORDERS

The airplane was not equipped with a cockpit voice recorder, or flight data recorder, nor was it required by regulations.

#### RADAR AND OTHER REMOTELY RECORDED DATA

CDR radar data was received from the Toledo TRACON. The rate of rotation on the antenna was about 4.5 seconds, and recorded altitudes represented the airplane's received altitude, plus or minus 50 feet. The radar data was reviewed by a Performance Engineer with the Safety Board.

At 1446:32.56, the airspeed of the airplane was 188 KCAS, the altitude was 2,700 feet, and airplane was about 3 miles from the outer marker. At 1447:42.07, the airplane passed over the outer marker at 2,300 feet, and 141 KCAS. Between 1348:19.15, and 1348:28.22, the airplane momentarily leveled at 1,800 feet, and then continued in a descent that progressively increased in rate as the airspeed continued to decrease. The recorded altitude change between the last two radar contacts was 300 feet down. The last radar contact occurred at 1349:00.7, with a recorded altitude of 900 feet, and an airspeed of 106 KCAS. This radar contact was 1.77 nautical miles from the approach end of runway 07. The published airport elevation was 684 feet.

#### WRECKAGE AND IMPACT INFORMATION

The airplane was examined at the accident site on April 9, and 10, 2003. The examination revealed that the airplane impacted trees, and came to rest on level ground, 1.57 nautical miles from the approach end of runway 07. The debris trail measured 360 feet from the first tree strike, to the nose of the airplane. The airplane and debris trail were on a magnetic heading of 060 degrees. Multiple trees were broken, in a descending flight path angle of about 20 degrees, which led to the airplane.

The three landing gear were separated from the airplane, and laying nearby. Gouges in the dirt that corresponded to the position of both main landing gear were found adjacent to the tail of the airplane. The condition of the landing gear was consistent with the landing gear being extended at ground impact.

A post crash fire consumed the fuselage. Major components including the cockpit center pedestal, crew seats, forward and aft cargo compartment bulkheads, and the rear compartment fuel tanks were destroyed by fire. The cargo door was distorted, and open about 2 inches at the base. The door was blocked from further opening by a tree adjacent to the left side of the fuselage. The left side direct vision (DV) window was found in the open position. The fuselage structure located above the cockpit windows, including the overhead instrument panel, upper escape hatch, aft pressure bulkhead, and upper fuselage, to the vertical stabilizer were destroyed by fire and not identified.

Both engines were mounted to their respective pylons, and the pylons had separated from the fuselage structure. The engine cowlings were in place, and exhibited burn damage. The compressor and fan section of each engine could be rotated. The tips of the first stage of compressor blades were bent in the opposite direction of rotation on both engines. The fuel shutoff valve for the left engine was halfway closed, and attached to the engine. The cable that actuated the shut off valve was melted at a cable connection. The right engine fuel shut off valve was separated from the engine and found partially covered by melted aluminum debris.

The vertical and horizontal stabilizer were attached to the fuselage. The elevator trim jackscrew was found set at 4.5 degrees, which corresponded to the bottom of the green arc for takeoff.

Both wings had separated from the fuselage, and were fragmented into multiple pieces. The pieces were scattered along the debris trail with the outboard sections located first. The inboard sections were found closer to the main wreckage. The wing flaps were positioned by three jackscrews on each wing. Five of the six jackscrews were identified, and all were in the retracted position, which corresponded to the wing flaps retracted.

The two locking hydraulic cylinders that control extension and retraction for the wing DLEs

were found locked in the retracted position.

## MEDICAL AND PATHOLOGICAL INFORMATION

The toxicological testing report from the FAA Toxicology Accident Research Laboratory, Oklahoma City, Oklahoma, was negative for drugs and alcohol for the PIC and the FO.

Autopsies were conducted on the occupants on April 9, and 10, 2003, by the Lucas County Coroner's Office, Toledo, Ohio.

## TESTS AND RESEARCH

### Engines

The engines were examined at the Garrett Facility in Ronkonkoma, New York, under the supervision of a Safety Board Powerplants engineer. The examination revealed no evidence of a mechanical failure with the engines.

The power levers on the fuel control units were found to be set at 52 degrees on the left engine and 90 degrees on the right engine. In addition, the engine fuel shut off valves were examined, and both were found to be in the mid-range position with about a 50 percent opening. However, both of these were cable actuated, and both engines had separated from the fuselage, and dropped to the ground during the fire. The pre-impact position of the power levers and the fuel shutoff valves were not determined.

The compressor blades of both engines had leading edge damage that included nicks, dents, and soft body impact damage.

Fibrous material was ingested in both engines, and collected around the circumference of the rear of the combustor case, and in the 1st stage turbine nozzle shroud ring cooling air cavity.

On the left engine, the fibrous material was found to be charred around the entire circumference, while on the right engine, the fibrous material was found to be charred from 5 o'clock to 2 o'clock. On the right engine, unburned fibrous material was found from 2 o'clock to 5 o'clock.

Samples of the fibrous material, from both engines, both burned and unburned, was forwarded to the USDA, Forest Service, Wood Products Laboratory, Madison, Wisconsin for further examination. They reported:

"...In all bags, the material is in very small pieces. For plant material to take on this appearance, it must be subjected to vigorous mechanical action...The bags from engine 1 [left side] were distinctly darker and more charred than those from engine 2 [right side]. Material from engine 1 was also of a smaller size than that of engine 2...Charred wood is brittle and thus more likely to break into smaller fragments than uncharred wood, but charring of wood is time and temperature dependent...."

A fuel sample was taken from the right engine, and found to conform to the specifications for Jet-A. No fuel was found in the left engine.

### Anti-Ice Valves

There were three anti-ice switches in the cockpit, mounted on the overhead panel. One each for the left and right engines, and one for the wings. Actuation of these switches to ON ported engine bleed air to the respective area.

The left and right engine anti-ice switches controlled their respective engine anti-ice valves, and engine nacelle anti-ice valves. With a loss of electrical power, the engine anti-ice valves will fail to open, if closed, and the nacelle anti-ice valves will remain in their last position. The left and right engine anti-ice valves were found in their fail-safe position of open, and the left and right engine nacelle anti-ice valves were found in the closed position.

The wing anti-ice switch controlled both the left and right wing anti-ice valves. With a loss of electrical power, these valves remain in their last position. The left wing anti-ice valve was found closed, and the right wing anti-ice valve, located in an area of fire damage was not identified.

#### Annunciator Lights

The annunciator panel mounted in the center instrument panel, left of the engine instruments was forwarded to the Safety Board Materials Laboratory for further examination. Initial examination of the light bulbs in the unit found the glass melted and discolored. Examination of all bulbs in the panel revealed none of the bulbs had filament stretch.

#### ADDITIONAL INFORMATION

##### Company Flight Training

Grand Aire Express had previously conducted their training using simulators. The FAA had placed a requirement that half the total training must be accomplished in the airplane. At the time of the accident, all flight training was conducted in the airplane during non-revenue flights.

##### Stabilized Approach

The Grand Aire Express Operations manual referenced stabilized approaches. Included in the criteria was an airspeed of plus or minus 10 knots from Vap, but no less than Vref. For precision approaches, the stabilized approach criteria applied from the final approach fix inbound.

##### Approach Callouts

A review of the operations manuals revealed that Grand Aire Express had defined an approach window, and stated any deviations outside of the approach window required callouts. Parameters that were within the approach window were:

- Within one dot deflection on localizer or glideslope.

- Vertical speed at 1,000 fpm or less.

- Indicated airspeed within plus or minus 10 knots for Vapproach.

- Indicated airspeed no less than Vref.

##### Flight In Icing Conditions

According to Advisory Circular 91-51A Effect of Icing on Aircraft Control and Airplane Deice and Anti-Ice Systems:

"...The most hazardous aspect of structural icing is its aerodynamic effects. Ice can alter the shape of an airfoil. This can cause control problems, change the angle of attack at which the aircraft stalls, and cause the aircraft to stall at a significantly higher airspeed. Ice can reduce the amount of lift that an airfoil will produce and increase drag several fold...."

## Use Of Engine & Wing Anti Ice

According to the airplane flight manual, Section 4, Sub-section 40, page 1, engine and wing anti-ice should be used in flight when the total indicated temperature (TAT) is below 5 degrees Celsius. In order for the wing and engine anti-ice to be effective in the temperature range the flight was operating in, a minimum N1 speed of 82 percent was necessary, and the recommended N1 speed was 84 percent.

To achieve the minimum power setting necessary to maintain wing and engine anti-ice, the airplane was equipped with speed brakes, and wing flaps, both of which could be deployed to increase drag and thus engine rpm to maintain airspeed.

According to the Grand Air Chief Pilot (appointed to that position after the accident), a typical flight idle power setting in flight was between 60 and 65 percent N2. Testing on an exemplar DA-20 revealed that with a N2 speed of 62 percent, the corresponding N1 speed was 38 percent and 42 percent on the left and right engines respectively. With the engine anti-ice on and the wing anti-ice off, the N1 rpms were 35 percent and 40 percent for the left and right engines respectively.

## Takeoff & Landing Data Card

The takeoff and landing data card was recovered at the accident site. The takeoff portion of the card from Traverse City had been filled out, but the landing portion of the card had not been filled out. According to the card, the takeoff weight at Traverse City was 21,000 pounds. The actual fuel burn for the departure, en route and first approach could not be computed with a high degree of accuracy. The Operational Factors Group Chairman reported that the airplane most likely impacted with about 800 pounds of fuel remaining, which would have corresponded to a landing weight of about 17,000 pounds.

At 17,000 pounds, the Vref and stall speed for flaps 40 degrees was 104 knots, and 83 knots, while the Vref and stall speed for flaps up was 129 knots, and 96 knots.

## Simulator Evaluations

On July 23, 2003, the Operational Factors Group reconvened at the Flight Safety International (FSI), facility in Dallas, Texas. FSI operated a DA-20 simulator, equipped with the General Electric CF 700-2D2 engines, and FAA certified to level "D". Several approach scenarios were flown including flaps up and flaps down, icing degradation/no degradation, and anti-ice on and off. All approaches were flown from the right seat to simulate the first officer in training operating the flight controls.

According to the report on the activities, the simulator was preprogrammed to a landing weight of 17,450 lbs, with 1,000 pounds of fuel onboard. Three consecutive ILS rwy 07 approaches were flown to observe workload.

Multiple approaches were flown in various configurations. Besides observing general flight characteristics, the group was also looking for a profile that most closely matched the known profile of the accident flight. The exercise revealed that the ninth approach flown in the simulator most closely matched the radar information.

The ninth approach was flown under the following criteria. The wing and engine anti-ice were off. The landing gear was extended, and the trailing edge wing flaps, and droop leading edges were retracted. The wings were programmed with 1/4 of an inch of wing ice. The report

further stated:

"...At 190K, 2 miles from the OM, power was reduced to idle and the [landing] gear extended. The approach speed at the OM was observed to be about 150K. The right engine was failed [shut off] 3 1/2 miles from the runway and at a speed of 133K. With the pilot attempting to maintain the glide slope, the simulator entered a stall and rapidly lost 500 feet of altitude and a speed of 103K was observed about 2 miles from the runway...."

#### Flight Instructor Experience

A review of the PIC's flight history revealed multiple failures on flight checks. Included in these failures, were his flight instructor checkride for single engine airplanes, which was failed twice, both times due to his failure to instruct. In addition, the PIC failed his airline transport pilot multi-engine rating, and was required to complete the entire flight check.

According to company records, the PIC had logged a total 889 hours as a flight instructor as of May 1, 2002. These flight instructor hours were documented as being in single engine airplanes. There was no documentation to support any previous multi-engine flight instruction experience.

The PIC had been designated a check airman in the Piper PA-60 on August 9, 2000, and a check airman in the DA-20 on October 7, 2002. He had given 4 proficiency checks in the DA-20. However, the director of operations reported that this was the first time the PIC had taken an initial first officer through the entire second in command training program.

Both the PIC and FO had obtained all of the turbojet experience at Grand Aire Express.

#### Wreckage Release

The airplane was released to the insurance adjustor on April 10, 2003. The engines and fuel shutoff valves were released to the insurance adjustor on April 28, 2003. The annunciator panel was released to the insurance adjustor on April 2, 2004.

## Flight Instructor Information

<b>Certificate:</b>	Airline Transport; Flight Instructor; Commercial	<b>Age:</b>	34, Male
<b>Airplane Rating(s):</b>	Multi-engine Land; Single-engine Land	<b>Seat Occupied:</b>	Left
<b>Other Aircraft Rating(s):</b>	Helicopter	<b>Restraint Used:</b>	Seatbelt, Shoulder harness
<b>Instrument Rating(s):</b>	Airplane; Helicopter	<b>Second Pilot Present:</b>	Yes
<b>Instructor Rating(s):</b>	Airplane Multi-engine; Airplane Single-engine; Instrument Airplane	<b>Toxicology Performed:</b>	Yes
<b>Medical Certification:</b>	Class 1 Valid Medical--no waivers/lim.	<b>Last FAA Medical Exam:</b>	04/02/2003
<b>Occupational Pilot:</b>		<b>Last Flight Review or Equivalent:</b>	01/03/2003
<b>Flight Time:</b>	4829 hours (Total, all aircraft), 1100 hours (Total, this make and model), 4384 hours (Pilot In Command, all aircraft), 82 hours (Last 90 days, all aircraft), 28 hours (Last 30 days, all aircraft)		

## Co-Pilot Information

<b>Certificate:</b>	Airline Transport; Commercial	<b>Age:</b>	37, Male
<b>Airplane Rating(s):</b>	Multi-engine Land; Single-engine Land	<b>Seat Occupied:</b>	Right
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	Seatbelt, Shoulder harness
<b>Instrument Rating(s):</b>	Airplane	<b>Second Pilot Present:</b>	Yes
<b>Instructor Rating(s):</b>	Airplane Single-engine	<b>Toxicology Performed:</b>	Yes
<b>Medical Certification:</b>	Class 1 Valid Medical--no waivers/lim.	<b>Last FAA Medical Exam:</b>	02/27/2003
<b>Occupational Pilot:</b>		<b>Last Flight Review or Equivalent:</b>	12/18/2002
<b>Flight Time:</b>	4632 hours (Total, all aircraft), 16 hours (Total, this make and model), 2000 hours (Pilot In Command, all aircraft), 63 hours (Last 90 days, all aircraft), 21 hours (Last 30 days, all aircraft)		

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	Dassault Aviation	<b>Registration:</b>	N183GA
<b>Model/Series:</b>	DA-20	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>		<b>Amateur Built:</b>	No
<b>Airworthiness Certificate:</b>	Transport	<b>Serial Number:</b>	147
<b>Landing Gear Type:</b>	Retractable - Tricycle	<b>Seats:</b>	3
<b>Date/Type of Last Inspection:</b>	02/06/2003, AAIP	<b>Certified Max Gross Wt.:</b>	28660 lbs
<b>Time Since Last Inspection:</b>	38 Hours	<b>Engines:</b>	2 Turbo Fan
<b>Airframe Total Time:</b>	19093.7 Hours at time of accident	<b>Engine Manufacturer:</b>	General Electric
<b>ELT:</b>	Not installed	<b>Engine Model/Series:</b>	CF-700-2D2
<b>Registered Owner:</b>	Czars Inc	<b>Rated Power:</b>	4500 lbs
<b>Operator:</b>	Grand Aire Express, Inc.	<b>Operating Certificate(s) Held:</b>	On-demand Air Taxi (135)
<b>Operator Does Business As:</b>		<b>Operator Designator Code:</b>	GXPA

## Meteorological Information and Flight Plan

<b>Conditions at Accident Site:</b>	Instrument Conditions	<b>Condition of Light:</b>	Day
<b>Observation Facility, Elevation:</b>	TOL, 684 ft msl	<b>Distance from Accident Site:</b>	3 Nautical Miles
<b>Observation Time:</b>	1352 EDT	<b>Direction from Accident Site:</b>	78°
<b>Lowest Cloud Condition:</b>		<b>Visibility</b>	1 Miles
<b>Lowest Ceiling:</b>	Overcast / 300 ft agl	<b>Visibility (RVR):</b>	
<b>Wind Speed/Gusts:</b>	9 knots /	<b>Turbulence Type Forecast/Actual:</b>	/
<b>Wind Direction:</b>	300°	<b>Turbulence Severity Forecast/Actual:</b>	/
<b>Altimeter Setting:</b>	30.25 inches Hg	<b>Temperature/Dew Point:</b>	0°C / -1°C
<b>Precipitation and Obscuration:</b>			
<b>Departure Point:</b>	Traverse City, MI (TVC)	<b>Type of Flight Plan Filed:</b>	IFR
<b>Destination:</b>	Swanton, OH (TOL)	<b>Type of Clearance:</b>	IFR
<b>Departure Time:</b>	1230 EDT	<b>Type of Airspace:</b>	Class C

## Airport Information

<b>Airport:</b>	Toledo Express Airport (TOL)	<b>Runway Surface Type:</b>	Asphalt
<b>Airport Elevation:</b>	684 ft	<b>Runway Surface Condition:</b>	Dry
<b>Runway Used:</b>	07	<b>IFR Approach:</b>	ILS; Practice
<b>Runway Length/Width:</b>	10600 ft / 150 ft	<b>VFR Approach/Landing:</b>	None

## Wreckage and Impact Information

<b>Crew Injuries:</b>	3 Fatal	<b>Aircraft Damage:</b>	Destroyed
<b>Passenger Injuries:</b>	N/A	<b>Aircraft Fire:</b>	On-Ground
<b>Ground Injuries:</b>	N/A	<b>Aircraft Explosion:</b>	None
<b>Total Injuries:</b>	3 Fatal	<b>Latitude, Longitude:</b>	41.572778, -83.863611

## Administrative Information

<b>Investigator In Charge (IIC):</b>	Robert L Hancock	<b>Report Date:</b>	06/02/2004
<b>Additional Participating Persons:</b>	Leigh J White; Federal Aviation Administration; Cleveland, OH Tahir Cheema; Grand Aire Express; Toledo, OH Daniel Lucas; Dassault Falcon Jet; Columbus, OH Ken Wolski; General Electric; Cincinnati, OH		
<b>Publish Date:</b>			
<b>Investigation Docket:</b>	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 <a href="mailto:pubinquiry@ntsb.gov">pubinquiry@ntsb.gov</a> , or at 800-877-6799. Dockets released after this date are available at <a href="http://dms.nts.gov/pubdms/">http://dms.nts.gov/pubdms/</a> .		

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](#).