National Transportation Safety Board
Aviation Accident Final Report

Location:	Anderson, IN	**Accident Number:**	CHI02FA097
Date & Time:	03/25/2002, 0901 EST	**Registration:**	N617BG
Aircraft:	Mitsubishi MU-300	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	6 None
Flight Conducted Under:	Part 135: Air Taxi & Commuter - Non-scheduled		

Analysis

The MU-300 on-demand passenger charter flight sustained substantial damage during a landing overrun on a snow/ice contaminated runway. The captain, who was also the company chief pilot and check airman, was the flying pilot, and the first officer was the non flying pilot. Instrument meteorological conditions prevailed at the time of the accident. Area weather reporting stations reported the presence of freezing rain and snow for a time period beginning several hours before the accident. The captain did not obtain the destination airport weather observation until the flight was approximately 30 nautical miles from the airport. The flight received radar vectors for a instrument landing system approach to runway 30 (5,401 feet by 100 feet, grooved asphalt). The company's training manual states the MU-300's intermediate and final approach speeds as 140 knots indicated airspeed (KIAS) and Vref, respectively. Vref was reported by the flight crew as 106 KIAS. During the approach, the tower controller (LC) gave the option for the flight to circle to land or continue straight in to runway 30. LC advised that the winds were from 050-070 degrees at 10 knots gusting to 20 knots, and runway braking action was reported as fair to poor by a snow plow. Radar data indicates that the airplane had a ground speed in excess of 200 knots between the final approach fix and runway threshold and a full-scale localizer deviation 5.5 nm from the localizer antenna. The company did not have stabilized approach criteria establishing when a missed approach or go-around is to be executed. The captain stated that he was unaware that there was 0.7 percent downslope on runway 30. The company provided a page from their airport directory which did not indicate a slope present for runway 30. The publisher of the airport directory provided a page valid at the time of the accident showing a 0.7 percent runway slope. Runway slope is used in the determination of runway performance for transport category aircraft such as the MU-300. The airplane operating manual states that MU-300 landing performance on ice or snow covered runways has not been determined. The airplane was equipped with a cockpit voice recorder with a remote cockpit erasure control. Readout of the cockpit voice recorder indicated a repetitive thumping noise consistent with manual erasure. No notices to airman pertaining to runway conditions were issued by the airport prior to the accident.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: Missed approach not executed and flight to a destination alternate not performed by the flight crew. The tail wind and snow/ice covered runway were contributing factors.

Findings

Occurrence #1: OVERRUN
Phase of Operation: LANDING - ROLL

Findings
1. (F) WEATHER CONDITION - TAILWIND
2. (C) MISSED APPROACH - NOT PERFORMED - FLIGHTCREW
3. CONDITION(S)/STEP(S) NOT LISTED - COMPANY/OPERATOR MANAGEMENT
4. (F) WEATHER CONDITION - SNOW
5. (C) FLIGHT TO DESTINATION ALTERNATE - NOT PERFORMED - FLIGHTCREW
6. (F) WEATHER CONDITION - ICING CONDITIONS
7. FLARE - INADEQUATE - FLIGHTCREW
8. PERFORMANCE DATA - INADEQUATE - FLIGHTCREW

Factual Information

HISTORY OF FLIGHT

On March 25, 2002, at 0901 eastern standard time (EST), a Mitsubishi MU-300, N617BG, operated by Corporate Flight Management, Inc. (CFM), was substantially damaged during a landing overrun on runway 30 at Anderson Municipal-Darlington Field Airport (AID), Anderson, Indiana. Instrument meteorological conditions prevailed at the time of the accident. The 14 CFR Part 135 on-demand air-taxi flight was operating on an instrument rules flight rules flight plan. The two flight crew members and four passengers were uninjured. The flight departed from the Memphis International Airport (MEM), Memphis, Tennessee, and was en route to AID.

At 0430 central standard time (CST), the captain reported receiving a briefing at his residence via telephone from Nashville Flight Service Station for a route from Smyrna Airport (MQY), Smyrna, Tennessee to MEM to AID. He stated that the METAR for AID was not available, but light rain and light snow were forecast for the area. When he arrived at the office, he printed out the weather on DUAT. The captain's DUAT weather was obtained at 0452 and indicated that no reports were available at the time for AID. During a telephone interview, the captain said that weather information indicated light rain and freeing precipitation. The first officer concurred with this statement. The captain did not go into great deal with the first officer regarding the weather. The first officer said during a telephone interview that he had also checked the weather. It was the first time that the captain had flown to AID.

The captain stated that while en route from MEM to AID, they checked the AID automated surface observing system (ASOS) 100 nautical miles (nm) out, but were unable to receive it until 30 nm out due to what he called "frequency bleed over." He added that they checked the weather at IND when they were unable to receive the AID weather. He stated that, at 0847 EST, the AID weather reported: wind 060 at 9 knots; ceiling 1,300 feet overcast; visibility 2 1/2 statute miles (sm); light snow; temperature -3 degrees Celsius (C); dew point -3 degrees C; and an altimeter setting of 30.10 inches of mercury (Hg).

At 0858:26 EST, the AID air traffic control tower controller (LC) transmitted, "november six one seven bravo gulf runway three zero or circle to land to your choice wind is a zero five zero to zero seven zero at one zero gust two zero and the altimeter three zero zero niner cleared to land."

At 0858:47 EST, N617BG transmitted, "alright cleared to land and ah alright right now we'll plan three zero please."

At 0859:02 EST, LC transmitted, "very well have a slight quartering tailwind on the right hand side."

At 0859:10 EST, LC transmitted, "and the only braking action i have is by a snowplow fair to poor and about a fourth of the runway then plowed down the middle."

At 0859:19 EST, N617BG transmitted, "roger seven bravo gulf."

At 0900:04 EST, N617BG transmitted, "no sir we're off and collapsed a landing gear."

The captain stated the following in a written statement:

"IND approach had vectored us onto the downwind for the ILS, when the ice detection light illuminated. We turned on the remaining anti/de-ice components, and the ice detection light turned off after 1 or 2 minutes. We kept the anti-ice features on. During the vectors onto the approach, we extended flaps to 10 degrees, but the IND approach vectored us through the localizer. We were established prior to intercepting the GS, and lowered the landing gear 1 dot below GS. Just inside the marker flaps 30 degrees was extended, and a stabilized approach commenced.

The tower reported winds 050 at 10 knots and asked if we wanted to do straight in landing or circle to land runway 12. Tower also notified us that the braking action was reported fair to poor by a vehicle. We opted for the straight in since the reported tailwind was minimal, and it appeared that the ceiling and visibility were less than reported. We broke out at 600' AGL and visibility 1 mile in heavy precipitation.

We crossed the runway threshold at 30 feet at Vref (106 KIAS) at which point I closed the power levers. We touched down in a timely manner, without any float. The speed brakes were deployed and the brakes were applied. The FO verified deployment of the speed brakes. The aircraft appeared to be decelerating normal, until approximately the 3,000 foot marker. At that point the aircraft's deceleration slowed down and the aircraft began to skid. It became apparent that we would be unable to stop prior to the end of the runway. As we approached the end of the runway I noticed a drop off at beyond the end of the runway. The visibility was not good enough to determine what was beyond the drop-off. I decided to turn the aircraft to minimize the forward speed after exiting runway and to avoid going down the hill. The aircraft came to rest 30' beyond the departure end to the right of centerline.

We contacted the tower and shut down the aircraft and its systems. We determined that none of the persons on board, including the crew were injured. I noted the time to be 0805 CST.

After exiting the aircraft, I determined that the breaking action was nil, the visibility was approximately 1 mile, the precipitation was a mixture of sleet, snow and ice, and that the ceiling was 600'. Reports received from both the tower controller and the AWOS about weather and airport conditions were not as actually observed by me in flight and after exiting the aircraft. Based on my observations after exiting the aircraft, the airport should have been closed to traffic prior to our arrival due to runway conditions."

The pilot said during an interview that the runway was a sheet of ice with 3/4 of the runway plowed in the center. He did not see any sanding or chemical applicant on the runway.

The first officer stated the following in a written statement:

"The descent took us into icing conditions (as indicated by icing light and visual inspection of the wing). All anti-ice and de-ice was applied. I then observed all ice melt off the wing.

We received poor vectors for the approach-a close downwind to the inbound course and a turn too close to the airport. Controller assigned heading of 300 [degrees] to intercept-this is the inbound course. Because we were vectored so close to the final approach course, out turn to assigned heading took us through the inbound course, and we had to add 30 [degrees] more to re-intercept. Controller then tried to hand us off to Muncie tower. I asked if he meant Anderson tower, and he corrected himself, telling me to contact Anderson tower. We now had flaps 10 [degrees].

At 1 dot below glideslope intercept, gear was extended, ignitions came on, and landing lights

came out. At glideslope intercept, 30 [degrees] flaps were applied. Contacting tower, tower advised winds at 050 [degrees] at 10 knots and gusting and gave us the choice of straight-in runway 30 or circle 12. I did not immediately respond so that the captain and I could discuss and decide. We were still mostly IMC, and heavy precipitation limited visibility, so it was clear a circling approach could not be attempted without losing sight of the runway. We decided not to circle, and I advised we would land runway 30. Tower further advised braking action reported fair to poor.

We flew the profile to the runway, decreasing speed to Vref. ...the ALS [airport lighting system] was seen first, followed by the runway about 4 seconds later. I gave standard speed callouts to the runway, finally calling Vref at approximately 20-30 feet on the radar altimeter. The captain quickly and firmly put the airplane on the runway, including the nose wheel, and speed brakes were immediately extended. I would estimate that we landed no more than 800 feet from the end of the runway.

I sensed an initial deceleration, and I could also tell that the captain was applying brake pressure. However, I could see that we were traveling on an ice-covered runway. and friction for braking became poor to nil near midfield. We both looked at each other with a thought towards go-around, but that was immediately ruled out due to speed of aircraft and position on the runway. As I recall, one or both of us verbalized the decision to stay on the ground. As we passed midfield, I re-verified that speed brakes were extended.

Now the end of the runway was visible. There appeared a distinct drop-off, since nothing could be seen beyond the threshold. Apparently, the captain saw the same thing, and in the last 300-400 feet, pushed hard right rudder to put us sideways. He verbalized his actions for explanation, but I already understood what he was doing. If there had been a hard drop-off, we wouldn't have as much momentum and hopefully wouldn't travel as far. Fortunately, there was not.

I would estimate that we left the end of the runway at 25 mph. Once we came to a stop, the engines were shut down, and any source of spark was turned off. I then turned around to ask the passengers if they were all right. Everyone was fine, and we exited the aircraft with no problem."

PERSONNEL INFORMATION

The captain, age 33, was hired by CFM as a MU-2 captain in August 1998 and became the company's chief pilot for charter operations on April 21, 1999. He was qualified as a company ground and flight instructor on the MU-300 on March 5, 1999 and became a check airman on the MU-300 on May 26, 1999. He also became a company check pilot on April 13, 2000. He was the check airman during the first officer's Airman Competency/Proficiency Check, which was performed on March 27, 2001.

The captain held an airline transport certificate with single-engine land and multi-engine land ratings and an instrument airplane rating. He held a certified flight instructor certificate with single-engine land airplane, multi-engine land airplane, and instrument airplane ratings. He also held MU-300 and BE-400 type ratings. He accumulated a total flight time of 10,500 total hours, of which 1,000 hours were in MU-300 airplanes. He accumulated 700 hours of actual instrument flight time. His airman competency/proficiency check in a Mitsubishi MU-2B-60 turboprop airplane on October 31, 2001. The captain was issued a first class medical certificate on October 4, 2001, with no restrictions.

The captain had no record of any previous accidents or incidents. The captain received a violation of Federal Aviation Regulation (FAR) 135.340, on June 29, 2000, relating to the initial and transition training and checking of flight instructors. FAR 135.40(a) states: No certificate holder may use a person nor may any person serve as a flight instructor unless -

(1) That person has satisfactorily completed initial or transition flight instructor training; and

(2) Within the preceding 24 calendar months, that person satisfactorily conducts instruction under the observation of an FAA inspector, an operator check airman, or an aircrew designated examiner employed by the operator. The observation check may be accomplished in part or in full in an aircraft, in a flight simulator, or in a flight training device. This paragraph applies after March 19, 1997.

The first officer, age 32, was hired by CFM as a Jetstream first officer on October 23, 2000. He held a commercial certificate with single-engine land, multi-engine land, and instrument airplane ratings. The first officer also held a certified flight instructor certificate with a single engine airplane rating. He accumulated approximately 1,575 total hours, of which 275 hours were in MU-300 airplanes. He also accumulated 69 hours of actual instrument flight time. The first officer was issued a first class medical certificate on May 8, 2001 with a restriction, "must wear lenses for distant -posses glasses for near vision."

The first officer did not have any record of accidents, incidents or violations.

The company's Flight Duty Records for both flight crew members show that they were off duty on March 24, 2002. Entries show that both flight crew members began their duty time at 0430 on the day of the accident.

AIRCRAFT INFORMATION

The airplane, serial number 0675A, was a fixed wing, twin-engine, turbo jet, airplane with a maximum certified gross weight of 15,500 pounds. The MU-300 has 2 flight crew member and 9 passenger seats. The airplane was powered by two Pratt & Whitney JT15D-4Ds rated each at 2,500 lbs of thrust. The airplane was equipped with speed brakes and was not equipped with thrust reversers.

According to the MU-300 Diamond 1 Airplane Flight Manual, "Icing conditions at the destination airport are defined as 8 degrees C or colder temperatures with visible moisture present, whether or not icing has been reported or forecast. Landing weights limits will be predicated on those associated with anti-ice and deice systems operating using the procedures and configuration prescribed.

If ice conditions are encountered during fight, the maximum landing flap is 10 degrees unless one of the following conditions has been met:

1. The icing conditions were encountered for less than 10 minutes, and the Ram Air Temperature (RAT) during the encounter was warmer than -8 degrees C.

or

2. A RAT of +10 degrees C, or warmer, is observed during the descent, approach or landing.

If either of the above two conditions has been met, flaps 30 degrees may be used for landing.

All takeoff and landing performance based upon smooth, dry, hard surfaced runway.

The flight's takeoff and landing distance (TOLD) card listed the landing weight as 12,500 lbs; temperature 1 degree C, elevation 919 feet msl; runway landing length required 2,680 feet; Vref 106 knots.

METEOROLOGICAL CONDITIONS

An aviation area forecast (FA) is a forecast of general weather conditions over an area the size of several states. It is used to determine forecast en route weather and to interpolate conditions at airports which do not have terminal area forecasts (TAFs) issued. The Chicago FA for central Indiana, issued at 0545 and valid until 1800, indicated: overcast ceiling at 1,000 feet agl, clouds layered to flight level 350, visibility 3-5 sm; light snow and mist; occasional light freezing rain. The outlook was for instrument meteorological conditions due to low ceilings, rain, freezing rain, and mist.

A TAF is a description of the weather conditions expected to occur at an airport and within a 5 nm radius of the runway complex. TAFs are valid for a 24-hour period. Indianapolis International Airport (IND), Indianapolis, Indiana, is located 39.2 nm southwest of AID. The IND TAF issued on March 25, 2002, at 0030, forecast conditions from 0500: wind from 040 degrees at 12 knots; 3 sm visibility; light snow and mist; overcast sky conditions at 800 feet agl. From 0514, the forecast indicated, conditions temporarily becoming: visibility 1 sm; light freezing rain and mist; overcast sky conditions at 400 feet agl. From 0900, the forecast indicated: wind from 040 degrees at 12 knots; 4 sm visibility; light rain and mist; overcast sky conditions at 1,200 feet agl. From 0918, conditions temporarily becoming: 2 sm visibility; light rain and mist; overcast sky conditions at 600 feet agl.

Automated surface observing system (ASOS) sky and ceiling measurements are determined from a sensor every 30 seconds and integrated over a 30 minute sampling period. Prevailing visibility is determined from sensor outputs every 10 second intervals that are used to compute a one minute average. The one minute visibility values are averaged over a 10 minute period to determine the reported visibility.

At 0845, the AID ASOS recorded: wind from 060 degrees at 10 knots gusting to 20 knots; visibility 2 1/2 sm; light snow; overcast sky conditions at 1,300 feet agl; temperature -3 degrees C, dew point: -3 degrees C; altimeter setting 30.10 inches of Hg.

The flight's TOLD card for the landing at AID shows, under ATIS information, the following annotations, "IND ... 5 ... -FZRA BR 012OVC 1/0 ..."

The Delaware County Airport-Johnson Field, Muncie, Indiana, ASOS, located 12.8 nm northeast of AID, recorded freezing rain from 0228-0900 with unknown precipitation recorded at 0711 and 0853. The 0900 ASOS observation remarked that the unknown precipitation ended at 1353 and freezing rain began at 1354.

A ground witness at AID stated that it had been snowing the night before and throughout the morning prior to the accident. Freezing rain began when a cloud moved in over the area while the airplane was on approach. He added that he could see the airplane on final approach to runway 30.

According to the AID ASOS log book, an annual inspection was performed on September 28, 2001, which included ceilometer verification. Ceilometer verification checks that the ceilometer is not reporting "missing" and is producing a report consistent with current sky conditions. The log book indicates the ceilometer passed its verification check. A visibility

sensor verification was logged as passing its verification check during the annual inspection. A semiannual inspection was performed on March 29, and no discrepancies were logged. According to the AID ASOS maintenance technician, the ASOS self calibrates its ceilometer and visibility sensors and if they are out of calibration, the ASOS would not transmits those values, but instead report them as "missing."

AIRPORT INFORMATION

AID has a field elevation of 919 feet msl and is served by runway 12-30 (5,401 feet by 100 feet, grooved asphalt) and runway 18/36 (3,399 feet by 75 feet, asphalt). Runway 30 is equipped with an instrument landing system (ILS) which has straight-in minima of 1,169 feet msl and 1 sm visibility for all categories of aircraft and circling minima of 1,400 feet msl and 1 sm visibility for category B aircraft. The circling visibility minimum is increased to 1 1/2 sm for category C aircraft. The glide slope intercept altitude for the AID ILS 30 approach is 2,543 feet msl near the outer marker, which is located 4.9 nm from the runway threshold. The touchdown elevation for runway 30 is 919 feet msl. The localizer antenna was located 3,404 feet down runway 30.

The Airport/Facility Directory (AFD) lists AID as having limited airport rescue fire fighting index (ARFF Index Ltd.). The airport was not served by an air carrier. According to the AFD's directory legend An airport certified under FARs 139 is required to provide for the collection and dissemination of airport condition information to air carriers through the notices to airman (NOTAM) system and, as appropriate, other systems and procedures acceptable to the Administrator.

AID was attended by airport personnel during its scheduled hours of operation from 0600-2200 as listed in the AFD. Airport personnel arrived at 0600 and began plowing the runways. The airport manager was not present on the day of the accident. The following NOTAMs were issued for AID:

On March 6, 2002, ABN was out of service

On March 25, 2002, at 0905, indicating that runway 12-30 was closed, which was later cancelled at 1848.

On March 26, 2002, AWOS ceiling unreliable

On March 27, 2002, taxiway A and B; patchy thin snow, ice, rain; braking action poor

FLIGHT RECORDERS

Federal Aviation Regulation 135.151(c) states, "In the event of an accident, or occurrence requiring immediate notification of the National Transportation Safety Board which results in termination of the flight, the certificate holder shall keep the recorded information for at least 60 days or, if requested by the Administrator or the Board, for a longer period. Information obtained from the record may be used to assist in determining the cause of accidents or occurrences in connection with investigations. The Administrator does not use the record in any civil penalty or certificate action."

The airplane was equipped with an Allied Signal model AV-557 Cockpit Voice Recorder (CVR), which had a cockpit bulk erasure control. Readout of the CVR was performed by the National Transportation Safety Board. According to the CVR Group Chairman's Report, the CVR 30 minute recording contained no human voices or air noise consistant with aircraft operation in

the air or on the ground. When the recording was played at high speeds, a repetitive thumping noise was heard consistent with a manual erasure of a CVR tape.

WRECKAGE AND IMPACT INFORMATION

The airplane was located approximately 30 feet beyond the departure end of runway 30 and to the right of its centerline. The airplane was facing the departure end of runway 30.

MEDICAL AND PATHOLOGICAL INFORMATION

Breath alcohol test results were negative for both crewmembers.

TESTS AND RESEARCH

During March 2002, CFM operated and managed 1 Learjet 35A, 2 MU-300s, 1 Citation III, 4 BAe Jetstream 31s, 1 Bae Jetstream 32, 2 MU-2s, and 1 King Air 200. CFM employed 15 full-time pilots and 4 part-time pilots.

The AFD and United States Department of Transportation instrument approach charts depict runway slope in terms of a percentage value, which was listed for AID as 0.7 percent up towards the southeast for runway 12-30. The flight crew used Jeppesen airport information and Jeppesen instrument approach charts for AID for the flight. Jeppesen instrument approach charts do not depict runway gradient in terms of a percentage value. Jeppesen airport directory information for AID, which was provided to the Safety Board by CFM, showed no runway gradient information. The captain said that he was unaware that runway 30 had a 0.7 percent down slope. The company's copy of the Jeppesen airport directory for AID was provided to the investigator-in-charge (IIC) and it showed no slope for runway 30. Jeppesen was then contacted by the IIC to provide a copy of airport directory that would have been valid for the day of the accident. The Jeppesen copy showed a 0.7 percent slope for runway 30.

FAR 25.1587(b), Performance information, requires each airplane flight manual contain the performance information computed under the applicable provisions of this part for the weights, altitudes, temperatures, wind components, and runway gradients, as applicable, within the operation limits of the airplane. The MU-300 landing field length is based on ambient air temperature, landing weight, wind, runway slope (percent), and anti-skid system on or off. MU-300 landing distance information for slippery runways is provided in the aiplane flight manual for United Kingdom registered aircraft. A copy of slippery runway landing distance information is included in this report.

The elements of the company's approach brief are;

Type approach, runway, course and frequency (ID)

Minimum altitudes - MSA, IAF, DH or MDA

Altitude calls - 1,000 feet, 500 feet, 100 feet to mins and minimums

Missed approach point - timing, distance or altitude

Missed approach procedure - initial heading and altitude

Speeds - Vref and Vac

Flap Setting

According to the company's training manual for the MU-300, the indicated airspeed and flap setting during the procedure turn inbound and prior to the initial approach fix inbound is 140

KIAS and 10 degrees. The indicated airspeed and flap setting from glideslope intercept to the runway threshold is Vref and flaps 30 degrees.

A plot of radar data indicates that the flight's groundspeed was in excess of 200 knots about 4 nm and full scale localizer deviations from about 10-14 nm and 5.5 nm from the localizer antenna.

A Flight Standards Handbook Bulletin for Air Transportation (HBAT) 98-22, Stabilized Approaches, states: "Principal Operations Inspectors shall ensure that their operator's operations and training manuals contain criteria for the stabilized approach as referenced in FAA Order 8400.10, Air Transportation Operations Inspector's Handbook, volume 4, chapter 2, section 3, paragraph 511. These manuals shall contain:

(1) Minimum requirements for the stabilized approach and the immediate actions needed to be taken if the stabilized approach conditions are not met (i.e., missed approach or go/around)..."

Review of the company's operations and training manuals indicated that there were no criteria (i.e. airspeed, glide slope, localizer or sink rate tolerances) to define when a missed approach or go around should be performed during visual and instrument approaches.

According to Aerodynamics for Naval Aviators, "The technique necessary for minimum landing distance can be altered to some extent in certain situations. For example, low aspect ratio airplanes with high longitudinal control power can create very high drag at the high speeds immediate to touchdown. If the landing gear configuration or flap or incidence setting precludes a large reduction of [coefficient of lift], the normal force on the braking surfaces and braking friction force capability are relatively small. Thus, in the initial high speed part of the landing roll, maximum deceleration would be obtained by creating the greatest possible aerodynamic roll, maximum deceleration would be obtained by creating the greatest possible amount of drag. By the time the aircraft has slowed to 70 or 80 percent of the touchdown speed, aerodynamic drag decays but braking action will then be effective..."

"When the runway surface is dry, brush finished concrete, the maximum value for the coefficient of friction for most aircraft tires is on the order of 0.6 to 0.8. ...When the runway has water or ice on the surface, the maximum value for the coefficient of friction is reduced greatly below the value obtained for the dry runway condition. When water is on the surface, the tread design becomes of greater importance to maintain contact between the rubber and the runway and prevent a film of water from lubricating the surfaces. When the rainfall is light, the peak value for friction coefficient is on the order of 0.5. With heavy rainfall it is more likely that sufficient water will stand to form a liquid film between the tire and the runway. In this case, the peak coefficient of friction rarely exceeds 0.3. In some extreme conditions, the tire may simply plane along the water without contact of the runway and the coefficient of friction is much lower than 0.3. Smooth, clear ice on the runway will cause extremely low values for the coefficient of friction. In such a condition, the peak value for the coefficient of friction may be on the order of 0.2 or 0.15."

"Figure 6.11 shows the reduction in the coefficient of friction for a tire on smooth, clear ice, with the peak coefficient of friction being approximately 0.2. The figure also shows that the coefficient of friction for any set of conditions reduces with a greater percentage of tire slip. "...Thus, once a skid begins, a reduction in friction force and rolling torque must be met with a reduction in braking torque, otherwise the wheel will decelerate and lock. This is an important

factor to consider in braking technique because the skidding tire surface on the locked wheel produce considerably less retarding force than when at the incipient skid condition which causes the peak coefficient of friction."

On January 19, 2002, the accident airplane was involved in an incident at DeKalb-Peachtree Airport, Atlanta, Georgia, following an ILS approach. The approach was reported as normal and at Vref speed. The anti-skid system then reacted as if it were hydroplaning. The pilot powered up for a go around, but decided to use maximum braking to stop the aircraft. The airplane stopped short of the localizer antenna, receiving only minor damage to the right brake.

ADDITIONAL INFORMATION

The FAA and CFM were parties to the investigation.

Pilot Information

Certificate:	Airline Transport	**Age:**	33, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	**Seat Occupied:**	Left
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 1 Valid Medical--no waivers/lim.	**Last FAA Medical Exam:**	10/04/2001
Occupational Pilot:		**Last Flight Review or Equivalent:**	01/31/2001
Flight Time:	10500 hours (Total, all aircraft), 1000 hours (Total, this make and model), 10000 hours (Pilot In Command, all aircraft), 80 hours (Last 90 days, all aircraft), 20 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

Co-Pilot Information

Certificate:	Commercial	**Age:**	32, 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 Single-engine	**Toxicology Performed:**	No
Medical Certification:	Class 1 Valid Medical--w/ waivers/lim.	**Last FAA Medical Exam:**	05/08/2001
Occupational Pilot:		**Last Flight Review or Equivalent:**	12/12/2001
Flight Time:	1575 hours (Total, all aircraft), 275 hours (Total, this make and model), 590 hours (Pilot In Command, all aircraft), 190 hours (Last 90 days, all aircraft), 75 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Mitsubishi	**Registration:**	N617BG
Model/Series:	MU-300	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	No
Airworthiness Certificate:	Transport	**Serial Number:**	0675A
Landing Gear Type:	Retractable - Tricycle	**Seats:**	10
Date/Type of Last Inspection:		**Certified Max Gross Wt.:**	15500 lbs
Time Since Last Inspection:		**Engines:**	2 Turbo Fan
Airframe Total Time:	4078.4 Hours	**Engine Manufacturer:**	Pratt & Whitney
ELT:	Installed, not activated	**Engine Model/Series:**	JT15D-4D
Registered Owner:	JMB Aviation LLC	**Rated Power:**	2500 lbs
Operator:	CORPORATE FLIGHT MANAGEMENT INC	**Operating Certificate(s) Held:**	On-demand Air Taxi (135)
Operator Does Business As:		**Operator Designator Code:**	FJTA

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument Conditions	**Condition of Light:**	Day
Observation Facility, Elevation:	AID, 919 ft msl	**Distance from Accident Site:**	
Observation Time:	0845 EDT	**Direction from Accident Site:**	
Lowest Cloud Condition:	Clear	**Visibility**	2.5 Miles
Lowest Ceiling:	Overcast / 1300 ft agl	**Visibility (RVR):**	
Wind Speed/Gusts:	10 knots / 20 knots	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	60°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.1 inches Hg	**Temperature/Dew Point:**	-3°C / -3°C
Precipitation and Obscuration:			
Departure Point:	Memphis, TN (MEM)	**Type of Flight Plan Filed:**	IFR
Destination:	Anderson, IN (AID)	**Type of Clearance:**	IFR
Departure Time:	0700 CST	**Type of Airspace:**	Class D

Airport Information

Airport:	ANDERSON MUNICIPAL-DARLINGTON (AID)	**Runway Surface Type:**	Asphalt
Airport Elevation:	919 ft	**Runway Surface Condition:**	Ice; Snow--compacted
Runway Used:	30	**IFR Approach:**	ILS
Runway Length/Width:	5401 ft / 100 ft	**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	2 None	**Aircraft Damage:**	Substantial
Passenger Injuries:	4 None	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	6 None	**Latitude, Longitude:**	

Administrative Information

Investigator In Charge (IIC):	Mitchell F Gallo	**Report Date:**	11/25/2003
Additional Participating Persons:	Jose O Berrios; Federal Aviation Administration; Indianapolis, IN Dwayne A McMurry; Corporate Flight Management; Smyrna, TN		
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 pubinq@ntsb.gov, or at 800-877-6799. Dockets released after this date are available at http://dms.ntsb.gov/pubdms/.		