National Transportation Safety Board
Aviation Accident Final Report

Location:	DALLAS, TX	**Accident Number:**	FTW00LA084
Date & Time:	01/27/2000, 1015 CST	**Registration:**	N900WJ
Aircraft:	Mitsubishi MU-300	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	6 None
Flight Conducted Under:	Part 91: General Aviation - Business		

Analysis

Freezing rain, mist, and ice pellets were forecast for the destination airport with temperatures 34 to 32 degrees F. During the daylight IMC descent and vectors for the approach, the airplane began to accumulate moderate clear ice, and a master warning light illumination in the cockpit indicated that the horizontal stabilizer heat had failed. The airplane was configured at 120 knots and 10 degrees flaps in accordance with the flight manual abnormal procedures checklist; however, the crew did not activate the horizontal stabilizer deice backup system. The aircraft touched down 1,500 ft down the runway, which was contaminated with slush, and did not have any braking action or antiskid for 3,000 ft on the 7,753-ft runway. Therefore, 3,253 ft of runway remained for stopping the aircraft, which was 192 feet short of the 3,445 ft required for a dry runway landing. Upon observing a down hill embankment and support poles beyond the runway, the captain forced the airplane to depart the right side of the runway to avoid the poles. After the airplane started down the embankment, the nose landing gear collapsed, and the airplane came to a stop.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The diminished effectiveness of the anti-skid brake system due to the slush contaminated runway. Factors were the freezing rain encountered during the approach, coupled with a failure of the horizontal stabilizer heat.

Findings

Occurrence #1: IN FLIGHT ENCOUNTER WITH WEATHER
Phase of Operation: APPROACH - IAF TO FAF/OUTER MARKER (IFR)

Findings
1. (F) WEATHER CONDITION - FREEZING RAIN
2. (F) ANTI-ICE/DEICE SYSTEM,EMPENNAGE - FAILURE
3. CHECKLIST - NOT COMPLIED WITH - FLIGHTCREW

Occurrence #2: ON GROUND/WATER ENCOUNTER WITH WEATHER
Phase of Operation: LANDING - ROLL

Findings
4. (C) AIRPORT FACILITIES,RUNWAY/LANDING AREA CONDITION - SLUSH COVERED
5. (C) BRAKES,ANTI-SKID - DIMINISHED

Occurrence #3: OVERRUN
Phase of Operation: LANDING - ROLL

Factual Information

HISTORY OF FLIGHT:

On January 27, 2000, at 1015 central standard time, a Mitsubishi MU-300, N900WJ, overran runway 31R during landing at the Dallas Love Field Airport, Dallas, Texas, and struck the terrain. The aircraft was owned and operated by Matrix Aviation, of Denver, Colorado, under 14 Code of Federal Regulations Part 91. The two commercial pilots and their 4 passengers were not injured. The airplane sustained substantial damage. Instrument meteorological conditions prevailed for the cross-country business flight, and an IFR flight plan was filed. The flight departed Austin, Texas, at 0940.

During the descent and vectors for the approach to runway 31R, the airplane began to accumulate moderate clear ice, and a master warning light illumination in the cockpit indicated that the horizontal stabilizer heat had failed. The crew continued the approach to get the airplane out of the icing conditions and on the ground as soon as possible. Landing weight was 12,500 lbs. Considering the possibility of additional ice accumulation on the horizontal stabilizer, the crew, per the flight manual abnormal procedures checklist, configured the airplane for a touchdown speed of 120 knots in lieu of 108 knots, and a flap extension of 10 degrees in lieu of 30 degrees. The first officer made the approach call outs. The captain stated that "on the approach, we broke out as expected and had good visibility of the runway and noticed that the runway had slush on it." The aircraft touched down approximately 1,500 feet down the runway and the captain began applying the brakes. The captain reported that the aircraft did not have any braking action for approximately 3,000 feet and the anti-skid was not pulsing. With about 1,500 feet of runway remaining, it looked to the captain like there would not be enough available runway to stop the aircraft. Beyond the departure end of the runway, there was a steep down hill embankment and support poles for the approach lights for runway 13L. The captain forced the aircraft to depart the right side of the runway to avoid the poles. After the aircraft started down the embankment, the nose gear collapsed and the airplane came to rest. The crew and passengers exited the aircraft, and the captain and passengers walked to the fixed base operator (FBO) while the first officer remained with the aircraft. At the FBO, the captain called the control tower to advise them of the situation, since the captain had not observed any emergency vehicles responding to the site.

The FAA inspector, who responded to the accident site, found the left main landing gear and the lower fuselage damaged. The aircraft was recovered to a hangar at the airport. During the post accident examination on February 22, 2000, the FAA inspector and a mechanic found structural damage to the right wing rear spar at the wing root.

CREW INFORMATION:

The captain held a commercial pilot certificate with a type rating in the MU-300 aircraft. He had accumulated 5,960 total flight hours, of which 770 hours were in the accident make/model aircraft. The first officer held a commercial pilot certificate and had accumulated 751.9 hours second-in-command time in the MU-300 aircraft.

AIRCRAFT INFORMATION:

The aircraft, serial number AO28SA, was manufactured in 1982. The last 100-hour inspection was performed on December 29, 1999, and the accumulated time since the inspection was 12.3 hours. The Raytheon Aircraft Company (formerly Beechcraft) acquired the type certificate for

the MU-300 on June 30, 1998. Maintenance records were not available for review by the Safety Board. The airplane was not equipped with a cockpit voice recorder or a flight data recorder, and a thrust reverser system was not installed.

Landing Performance

According to the Raytheon Aircraft Company representative, the calculated field length requirement for the MU-300 aircraft, using a landing weight of 12,500 pounds (maximum gross weight is 15,500 pounds), using the Approved Flight Manual (AFM) Landing Field Length Chart would have been "2,650 feet of runway."

According to the MU-300 AFM Abnormal Procedures section, under the paragraph Horizontal Stabilizer Ice Protections Systems Failure, the crew is directed to turn OFF the horizontal stabilizer anti-ice and/or de-ice switches in the cockpit. Further, activate the horizontal stabilizer deice back-up by opening the guard and selecting manual at the cockpit toggle switch to energize the back-up system for 30 seconds. Repeat the manual selection every 2 minutes. The procedures section also specifies a landing flap setting of 10 degrees and an approach speed of Vref plus 15 KIAS when the horizontal stabilizer anti-ice fail or horizontal stabilizer de-ice fail light illuminates. The AFM notes that the landing field length will increase approximately 30 percent. According to the representative, this would "add 795 feet to the landing for a total of 3,445 feet required (with a dry runway and speed brakes extended after touchdown)."

The representative reported that "if you subtract the 1,500 feet of runway before touchdown and the 3,000 feet of sliding from the 7,753-foot runway length, you are left with 3,253 feet, 192 feet short of the 3,445 feet required for a dry runway. He also stated that the "MU-300 AFM does not have performance data for a contaminated runway" since the FAA has not defined what constitutes a "contaminated runway."

The representative further stated that flying the airplane at 120 knots and with 10 degrees of flaps, on the 3 degree glideslope with a threshold crossing height of 49 feet, would require a descent rate of 637.5 feet per minute in order to maintain the glideslope. In this configuration, the airplane should make contact with the runway at 933.71 feet beyond the threshold.

Service Bulletins

A review of Service Bulletins and Airworthiness Directives, by the NTSB IIC, revealed the data in the following paragraphs.

In September 1983, Mitsubishi issued Service Bulletin (SB) 30-001 for modification of the horizontal stabilizer system to install a horizontal stabilizer de-ice test switch and change the de-ice cycle sequence. Compliance with the SB was mandatory for operation in known icing conditions.

In September 1985, Mitsubishi issued SB 30-005 for the installation of a safety cap over the horizontal stabilizer de-ice backup switch to prevent inadvertent flight crew activation of the switch while on the ground.

In 1994, Beechcraft obtained data generated during icing tests on the Model 400A to satisfy the requirements of Canadian Icing Certification. These requirements were more stringent than the FAA Part 23 icing certification requirements. During the wind tunnel test, ice accumulated on the horizontal stabilizer. Beechcraft determined that, if the conditions experienced during the test occurred in flight in icing conditions with all ice protection systems operating, the

accumulated ice could result in an uncommanded nose down pitch at flaps settings greater than 10 degrees. In July 1994, Beechcraft issued a Safety Communique to the MU-300-10, 400, 400A, and the 400T operators to extend no more than 10 degrees flaps for landing if icing conditions were encountered during flight. Beech Aircraft did not own the MU-300 type certificate in 1994; therefore, the MU-300 was not included in the Safety Communique.

In December 1994, the FAA issued Airworthiness Directive (AD) 94-25-10 requiring that all Mitsubishi Model MU-300 airplanes; and all Beech Model 400, 400A, 400T, and MU-300-10 airplanes comply with the Safety Communique procedures to extend no more than 10 degrees of flaps for landing if icing conditions were encountered in flight.

In January 1996, Mitsubishi issued SB 30-007 as an alternate means of compliance with AD 94-25-10 for the MU-300 airplanes (serial numbers A003SA through A091SA). The SB detailed the installation of the Rosemont Ice Detection System (Supplemental Type Certificate ST00383WI).

In February 1996, Beechcraft issued Mandatory SB 2600 (excluded MU-300) as an alternate means of compliance with AD 94-25-10 for the MU-300-10, 400, and 400A airplanes. The improved horizontal stabilizer ice protection system announced by the mandatory SB replaced the existing system and made changes in the horizontal stabilizer anti/de-icing controls and annunciation.

In June 1996, Mitsubishi issued SB 30-006 for an inspection of the ice detection system in the MU-300 airplanes (serial number A003SA through A091SA) for the correct placement of the left horizontal stabilizer temperature sensors.

According to the manufacturer's representative, "Beechcraft conducted an operator survey in 1998 to determine if the MU-300 operators would invest an estimated $60,000 per airplane for an improved horizontal stabilizer ice protection system. Only 10 percent of the operators returned the survey, and most of them replied no."

In October 1999, Raytheon Aircraft issued SB 30-3204 to install an improvement in the MU-300 airplane's (serial number A0003SA through A091SA) horizontal stabilizer de-ice wiring circuit to prevent an uncommanded activation of the heater horn.

METEOROLOGICAL INFORMATION:

The crew reported the temperature at 32 degrees Fahrenheit with a broken cloud layer at 600 feet AGL and an overcast layer at 1,200 feet AGL. The 3/4-mile visibility was reduced at times to 1/2 statute mile due to mist. Wind was reported as calm. A review of meteorological data revealed that light rain, freezing rain, mist, and ice pellets were forecast for the Dallas area during the daylight hours. Temperatures during this time period were forecast between 34 degrees and 32 degrees Fahrenheit.

COMMUNICATION INFORMATION:

A review of Dallas Love Air Traffic Control Tower data, transcripts, statements, and the airport operations log and report revealed the following summary information.

0735: Freezing rain reported. Taxiways and runways in fair condition and less than one inch slush.

1015: The temperature was 32 degrees Fahrenheit and light sleet was falling. The ramps and movement areas had less than 1/2 inch accumulation on their surface. A Boeing 737 crew

reported braking action fair. All air carriers were performing de-icing operations.

1025: A Boeing 737 crew reported braking action fair.

1025:50 N900WJ reported on the tower frequency approximately 5 miles out on final to 31R. The pilot was given the wind from 090 degrees at 7 knots, the runway 31R RVR 5,000 feet, and that a Boeing 737 had reported the braking action fair.

1029:45 The tower controller called N900WJ for a report on the braking action. The pilot did not respond and the controller advised airport operations that visual contact was lost with the aircraft on short final. The controller did not know if the pilot landed the airplane or initiated a go-around. The controller reported that fog restricted visibility from the tower.

1033:11 The ground controller advised airport operations that he had not talked to N900WJ and to initiate a ramp search for the aircraft.

1037:04 The controllers were advised by airport operations that N900WJ was off of the departure end of runway 31R. Runway 31R was closed and traffic was diverted to runway 31L.

1038 Sleet was falling with the accumulation of approximately 1/2 inch.

1045 The pilot of N900WJ reported to airport operations personnel that he had "NIL" braking action.

1050 Southwest Airline reported runway 31L braking action poor.

1133 Airport operations and the FAA inspector inspected runway 31L and reported 1 1/2 in to 2 inches of slush accumulation.

1150 Airport operations and Southwest Airline pilots measured the accumulated slush on runway 31L at 3/8 inch. Southwest Airlines cleared their aircraft to operate under the current conditions.

1548 Airport operations and maintenance personnel removed clear slush and standing water from runway 31R in preparation for re-opening.

ADDITIONAL INFORMATION

In October 2000, portions of the airplane were examined at Dodson International, Rantoul, Kansas, by a Raytheon Aircraft representative. This representative found the horizontal deice back-up system cockpit switch guarded and safetyied.

The captain stated that the "Diamond jets [Mitsubshi MU-300] should be equipped with the Beechcraft tail de-icing system. If this system had been installed, a flaps 10 landing may not have been necessary which in turn would have reduced the landing distance."

The Safety Board did not take possession of the accident airplane.

Pilot Information

Certificate:	Flight Instructor; Commercial	**Age:**	27, 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 2 Valid Medical--w/ waivers/lim.	**Last FAA Medical Exam:**	03/12/1999
Occupational Pilot:		**Last Flight Review or Equivalent:**	
Flight Time:	5960 hours (Total, all aircraft), 770 hours (Total, this make and model), 5670 hours (Pilot In Command, all aircraft), 55 hours (Last 90 days, all aircraft), 11 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Mitsubishi	**Registration:**	N900WJ
Model/Series:	MU-300 MU-300	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	No
Airworthiness Certificate:	Transport	**Serial Number:**	A028SA
Landing Gear Type:	Retractable - Tricycle	**Seats:**	10
Date/Type of Last Inspection:	12/29/1999, 100 Hour	**Certified Max Gross Wt.:**	15500 lbs
Time Since Last Inspection:	12 Hours	**Engines:**	2 Turbo Fan
Airframe Total Time:	5266 Hours	**Engine Manufacturer:**	P&W
ELT:		**Engine Model/Series:**	JT15D-4D
Registered Owner:	MATRIX AVIATION	**Rated Power:**	2500 lbs
Operator:	MATRIX AVIATION	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument Conditions	**Condition of Light:**	Day
Observation Facility, Elevation:	, 0 ft msl	**Distance from Accident Site:**	0 Nautical Miles
Observation Time:	0000	**Direction from Accident Site:**	0°
Lowest Cloud Condition:	Unknown / 0 ft agl	**Visibility**	0.75 Miles
Lowest Ceiling:	Broken / 600 ft agl	**Visibility (RVR):**	0 ft
Wind Speed/Gusts:	Calm /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:		**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30 inches Hg	**Temperature/Dew Point:**	0°C / 0°C
Precipitation and Obscuration:			
Departure Point:	AUSTIN, TX (AUS)	**Type of Flight Plan Filed:**	IFR
Destination:	(DAL)	**Type of Clearance:**	IFR
Departure Time:	0945 CST	**Type of Airspace:**	Class B

Airport Information

Airport:	DALLAS LOVE FIELD AIRPORT (DAL)	**Runway Surface Type:**	Concrete
Airport Elevation:	476 ft	**Runway Surface Condition:**	Slush covered; Wet
Runway Used:	31R	**IFR Approach:**	ILS
Runway Length/Width:	7753 ft / 150 ft	**VFR Approach/Landing:**	

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):	JOYCE ROACH	**Report Date:**	04/06/2001
Additional Participating Persons:	GENE BLAND; DALLAS, TX		
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/.		