



National Transportation Safety Board Aviation Accident Final Report

Location:	HYANNIS, MA	Accident Number:	NYC99LA151
Date & Time:	07/01/1999, 2224 EDT	Registration:	N219FX
Aircraft:	Learjet 60	Aircraft Damage:	Substantial
Defining Event:		Injuries:	4 None

Flight Conducted Under: Part 91: General Aviation - Executive/Corporate

Analysis

The pilot in command (PIC) and first officer (FO) were on a return flight. While being vectored for the Runway 24 ILS approach, as the flaps were selected to 20 degrees and the landing gear was extended, the crew noted that the left and right amber HYDR PRESS lights began to illuminate. When the lights began to flash with more regularity, the crew discussed whether to continue or divert to another airport. The captain decided to proceed to the destination airport, with a 5,425-foot runway. After touchdown, the captain applied normal braking, but the brakes did not respond. Additionally, the crew attempted to use the reverse thrusters, which also did not respond. The captain then attempted to apply emergency braking, but the emergency brake lever would not move. The captain then requested the FO to apply emergency braking. The captain then declared he was aborting the landing, immediately after which, the FO successfully engaged the emergency brakes. The airplane proceeded off the departure end of the wet runway, struck a localizer antenna, and came to rest in a fence. Examination of the airplane revealed that the left main landing gear actuator extend hose leaked hydraulic fluid and was not torqued to specifications. According to a work item sheet, a corrective action was entered on the sheet on June 14, 'Replaced main gear actuator extend pressure hoses. Replaced uplock main gear hoses with new [Teflon] hoses.' The Airplane Flight Manual (AFM) stated that in the event of a hydraulic pressure loss, 'With no flaps, no spoilers, no thrust reversers, and no anti-skid, the landing distance will be greatly increased.' Multiply the Actual Landing Distance for Anti-Skid ON shown in Section V by a factor of 3.' The calculated landing distance, uncorrected, was 3,690 feet. The factor of three required an 11,000-foot runway. No abnormal or emergency quick reference checklists were found in the cockpit, and there was no mention of abnormal or emergency procedures in the cockpit voice recorder (CVR) transcript. An AFM, which contained an abnormal checklist and procedures section, was found in a side pocket next to the captain. Examination of company personnel files revealed that the captain had been issued an 'Employee Warning Notice,' in August 1998, for failure to follow instructions and rudeness to employees or customers. The notice also stated that numerous FO's reported that the pilot was rude and discourteous when he addressed them, and that he was not promoting good cockpit resource management (CRM). The captain had not received company CRM training. The airplane was part of a fractional ownership program and was operated under 14 CFR Part 91.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The flightcrew's inadequate coordination and their failure to utilize checklists. Also causal was the captain's improper decision to continue the approach to a runway with insufficient length. A factor in the accident was the improper maintenance.

Findings

Occurrence #1: AIRFRAME/COMPONENT/SYSTEM FAILURE/MALFUNCTION
Phase of Operation: APPROACH

Findings

1. HYDRAULIC SYSTEM, FITTING - LOOSE
2. (F) MAINTENANCE, INSTALLATION - IMPROPER - OTHER MAINTENANCE PERSONNEL

Occurrence #2: OVERRUN
Phase of Operation: LANDING - ROLL

Findings

3. LIGHT CONDITION - NIGHT
4. (C) CHECKLIST - NOT USED - FLIGHTCREW
5. AIRPORT FACILITIES, RUNWAY/LANDING AREA CONDITION - WET
6. (C) IN-FLIGHT PLANNING/DECISION - IMPROPER - PILOT IN COMMAND
7. (C) CREW/GROUP COORDINATION - INADEQUATE - FLIGHTCREW

Occurrence #3: ON GROUND/WATER COLLISION WITH OBJECT
Phase of Operation: LANDING - ROLL

Findings

8. OBJECT - APPROACH LIGHT/NAVAID
9. OBJECT - FENCE

Factual Information

HISTORY OF FLIGHT

On July 1, 1999, about 2224 Eastern Daylight Time, a Learjet 60, N219FX, operated by Bombardier Business Jet Solutions Inc., was substantially damaged while landing at the Barnstable Municipal Airport (HYA), Hyannis, Massachusetts. The certificated airline transport captain, first officer, and two passengers were not injured. Night visual meteorological conditions prevailed, and an instrument flight rules flight plan was filed for the flight that originated at the Dulles International Airport (IAD), Herndon, Virginia. The executive transport flight was conducted under 14 CFR Part 91.

The airplane had been previously positioned to Bradley International Airport (BDL), Windsor Locks, Connecticut, for maintenance work. The flight crew was instructed by dispatch personnel to fly the airplane from BDL, to IAD, and pick up two passengers.

According to the captain, the flight departed IAD, and proceeded uneventfully to HYA. While being vectored for the Runway 24 ILS approach, with the flaps selected to 20 degrees and the landing gear retracted, the airplane was turned to intercept the localizer. The captain said he called for the extension of the landing gear and "flaps down." The landing gear extended and three green lights were confirmed. The flaps moved to what "appeared" to be a full down indication. As the landing checklist was being completed, the left and right amber HYDR PRESS lights flickered. The captain stated that he checked the hydraulic pressure indicator, and noted that it still remained at the normal level. The flight crew reported to Cape Approach Control that they had a hydraulic problem and continued on the approach. The left and right amber HYDR PRESS lights began to flash with more regularity and the flight crew discussed whether to continue or divert to another airport. A check of the hydraulic pressure indicator by the captain revealed that the level was at 1,000 PSI, which was "the bottom of the green arc." The captain also stated that, in preparation for landing, he pulled the emergency brake lever out of its detent.

The flight continued to the airport, and the airplane "broke out" of the clouds about 800 feet above the ground. The captain stated that, at a point prior to touchdown, the flight crew was "alerted to windshear" and the airspeed climbed to 160 knots. The captain corrected and continued. The flight crew estimated that the airplane touched down within the first 300 feet of the runway. The captain applied normal braking, but the brakes did not respond. The captain then immediately reached for and tried to apply emergency braking, but the emergency brake lever would not move. The captain then requested that the first officer apply emergency braking. The first officer used both of his hands to free the lever and began to apply the emergency brakes. The captain stated that after regaining braking authority, there was not enough remaining runway to stop. The airplane proceeded off the departure end of Runway 24, struck a localizer antenna array, and came to rest in a fence.

Excerpts of the cockpit voice recorder (CVR) transcript revealed the following:

2212:24, as the airplane was being vectored for the Runway 24 ILS approach, the captain called for "flaps to twenty."

2214:11, the captain called for "gear down" and the "before landing check." The flight crew confirmed the landing gear was extended and "three green lights" were observed.

2218:03, the captain noted the "left and right hydraulic pressure lights" had illuminated.

2218:21, the captain called for "flaps to land," which was confirmed by the first officer.

2218:24, the captain stated, "do the landing checklist. make sure it's reviewed complete."

2218:31, the first officer stated, "land checklist. autospoilers. landing lights. anti skid. ignition. flight navigation instruments. engine sync. nose wheel. flaps full to go. yaw dampener."

2218:38, the captain called out "we're losing hydraulic pressure."

2218:40, the first officer stated, "yeah the gear ah the flaps okay."

2218:43, the captain called out "flaps aren't down all the way," which the first officer responded "aren't down all the way no. so ah you wanna continue on this runway here? five thousand feet." The captain replied, "yeah."

2219:04, the first officer stated, "probably could go to the longer runway where also where they could do repairs on it."

2219:36, the captain stated, "all right let's see. gear's down. flaps're twenty. how much fuel do we got? we got enough fuel. [sound of sigh]. Oh boy."

2219:50, the first officer stated, "what was the alternate you had? Albany?"

2219:52, the captain said, "no. new-"

2219:57, the first officer stated, "okay well if you go missed we can't won't be able to bring the flaps up."

2220:00, the captain responded, "I know and we won't be able to bring the gear up. we got plenty of fuel."

2220:12, the captain stated, "let's continue."

2220:21, the captain stated, "ah advise approach control that ah we may have hydraulic problems. okay."

2220:28, the first officer stated, "okay and ah." The captain replied, "and ah we're gonna continue in."

2220:31, the first officer replied, "rog."

2221:39, the first officer stated, "okay we got gear and brake air at least. It's pretty high in the green."

2221:43, the captain stated, "okay hydraulic pressure's fluctuating."

2221:45, the first officer replied, "roger."

2222:15, the first officer stated, "are you gonna do if you need to use the brakes are you gonna go ahead and use them?"

2222:18, the captain replied, "we won't be able to clear the runway?"

2222:23, the first officer replied, "why not?"

2222:39, there was a sound similar to a GPWS windshear tone. An automated voice called "windshear. windshear. windshear."

2223:05, there was a sound similar to touchdown. Three seconds later, the captain stated "okay no brakes. i'm going to."

2223:11, the first officer stated, "okay reverse. no re-."

2223:17, the captain stated, "can you pull it out?"

2223:21, there was a sound similar to a takeoff configuration warning.

2223:22, the captain stated, "'kay I'm going around."

2223:23, the first officer replied, "there it is. there it is. I got it. I got it."

2223:24, the captain stated, "hard. hard. hard. hard."

2223:26, the first officer stated, "it is. it's all the way down. it's all the way down."

Throughout the CVR transcript, there was no mention of, or calls for, Hydraulic Pressure Light(s), Hydraulic Systems Failure/Alternate Gear Extension, Emergency Braking, or Emergency Evacuation checklists. There was also no landing brief requested or performed by the captain.

A passenger seated in the main cabin of the airplane stated that he felt the landing gear extend as the airplane began its final approach. To the passenger's recollection, the crew did not give the normal sign to assure that the safety belts were fastened. The operator's standard procedure was to illuminate the seat belt sign. When the airplane touched down, it "hit" extremely hard and proceeded down the runway. After a few seconds, it became noticeable to the passenger that the airplane was not slowing down and the engines had not deployed the reverse thrusters.

When the airplane came to a stop, the passenger attempted to exit from the forward boarding door, but could not open it. The first officer then came from the cockpit and said to exit from the back of the airplane. A second passenger then opened the "rear door" and exited, followed by the first officer, the first passenger, and the captain. After the accident, the passenger stated to a Federal Aviation Administration (FAA) inspector that he and the other passenger were not briefed on any safety items as they boarded the airplane at IAD.

The accident occurred during the hours of darkness, approximately 41 degrees, 40 minutes north latitude, and 70 degrees, 16 minutes west longitude.

FLIGHT CREW INFORMATION

Captain

The captain held an airline transport certificate with a rating for airplane multi-engine land, and commercial privileges for airplane single engine land. In addition, the captain was type rated in the Boeing 737, Lear 60, and Lear Jet. The captain reported his total flying experience in airplanes was 7,806 hours. He also reported that he had accumulated about 1,431 hours in the Learjet 60, of which about 129 hours were in the last 90 days.

The captain's most recent FAA first class medical certificate was issued on May 19, 1999.

The captain received his initial Learjet 60 training between June 9 and June 28, 1997, when he was first employed by Business Jet Solutions (Flex Jet). The course was taught by Flight

Safety. The ground school consisted of 52 hours, which covered 23 areas from "Aircraft General" to "Systems Integration." These included a systems review, examination, and critique. Cockpit Resource Management (CRM) was not a listed topic. On the summary of daily training, CRM was 1 of 82 items listed that could be evaluated. The captain received a rating of "2" under CRM, on day 2 through 7 of the training, which the form listed as "normal progress." He received a "1" for days 8 and 9 of the training, which the form listed as "proficient." One comment was entered in the daily written remarks of the training regarding CRM. On the training flight on June 25, 1997, it stated, "LOFT sim complete Good Flight - Situation Awareness and CRM."

During subsequent pilot recurrent courses at Flight Safety in December 1997, April 1998, and April 1999, the captain continued to receive "1's" under CRM on the training form. Additionally, hand written notes after some of the training included "CRM is Good" or "Excellent CRM."

The captain's most recent training in April 1999, included abnormal procedures related to hydraulics, and emergency evacuation procedures.

According to a representative of the operator, the captain had not yet attended the CRM training course recently initiated by the company.

Examination of company personnel files revealed that the captain had been issued an "Employee Warning Notice," on August 3, 1998. The warning notice included a failure to follow instructions and rudeness to employees or customers. The notice also included "Numerous First Officers report that [the captain] is rude and discourteous when he addresses them. He is not promoting good CRM and has not taken to mentoring his FO's."

First Officer

The first officer held an airline transport certificate with a rating for airplane multi-engine land, and commercial privileges for airplane single engine land. In addition, the first officer was type rated in the Cessna CE-500. The first officer also held a flight instructor certificate for airplane single engine and multi-engine land. The first officer reported his total flying experience in airplanes was 4,230 hours. He also reported that he had accumulated a total of 85 hours in make and model, all of which were in the last 90 days.

The first officer's most recent FAA first class medical certificate was issued on December 29, 1998.

The first officer received his initial Learjet 60 training between April 26, 1999, through May 8, 1999, when he was first employed by Business Jet Solutions (Flex Jet). The course was taught by Flight Safety. The ground school consisted of 47 hours, which covered 22 areas from "Aircraft General" to "Systems Integration." These included a systems review, examination, and critique. Cockpit Resource Management (CRM) was listed as one of the topics during his training. On the summary of daily training, CRM was 1 of 112 items listed that could be evaluated. The first officer received a rating of "2" under CRM, on day 2 through 4 of the training, which the form listed as "normal progress," and received a "1" for the fifth and last day of the training, which the form listed as "proficient." A comment entered on the fourth day in the daily written remarks of the training stated "CRM improving."

During the initial training, the first officer was trained on abnormal procedures related to hydraulics and emergency evacuation procedures.

During the first officer's company line check, a written statement included, "[the first officer] possesses good flying skills and is aware of his abilities and the abilities of the airplane. [the first officer] has good people skills and interacts well with the passengers. [the first officer] accepted criticism well and made great efforts to get better in all areas as the week progressed."

AIRCRAFT INFORMATION

Before the accident, the airplane arrived at BDL on June 13, 1999, for a "3 month/3,000 landing check" maintenance inspection. A maintenance technician accomplished a primary inspection walk around, on June 16, 1999.

A discrepancy was noted on a work item sheet on June 13, 1999, to "Verify main landing gear actuator hoses are [Teflon]. If hoses are rubber, replace." A corrective action was entered on the sheet on June 14, "Replaced main gear actuator extend pressure hoses. Replaced uplock main gear hoses with new [Teflon] hoses IAW MM60 Chapter 20-30-00." A satisfactory landing gear cycle and leak check of hoses was accomplished and inspected on June 15, 1999. The work order item was "Lead Closed" on June 27, 1999.

On July 1, 1999 a maintenance technician, "I.A.W. Learjet checklist", performed a final walk around, and the discrepancy action was corrected, inspected and closed the same day.

METEOROLOGICAL INFORMATION

At 2236, the reported weather at HYA was: winds from 230 at 18 knots, gusts to 25 knots; visibility of 7 statute miles; broken clouds at 1,000 feet; overcast cloud layer at 1,500 feet.

AERODROME INFORMATION

Runway 24 at HYA was a 5,425-foot long, 150-foot wide, hard surfaced asphalt transverse grooved runway. A 139-foot long blast pad was also located at the departure end of Runway 24. At the time of the accident the runway conditions were wet.

FLIGHT RECORDERS

Cockpit Voice Recorder

The airplane was equipped with a Universal CVR30, solid state cockpit voice recorder. The CVR was transported to the Safety Board, Office of Research and Engineering, on July 6, 1999. The CVR group convened on July 20, 1999. A transcript was prepared for the last 21:36 minutes of the 30 minute recording.

Flight Data Recorder

There was no flight data recorder installed in the airplane, nor was it required.

WRECKAGE INFORMATION

Examination of the wreckage on July 2, by a FAA inspector, revealed a stream of hydraulic fluid on the underside of the airplane that ran from the left wheel well to the tail section. The fluid trail was most noticeable on the lower surface of the "delta fins." The hydraulic reservoir was drained and the fluid measured approximately 49 ounces. Of the 49 ounces drained from the reservoir, 38 ounces was available for use by the electric hydraulic pump. After servicing the hydraulic reservoir, the hydraulic pump switch was turned on. Hydraulic pressure built up until the pressure gauge indicated 1,100 PSI, and the pump shut off. Both the pilot's and copilot's brake pedals were actuated and had a "normal feel and holding pressure." While the

hydraulic pump was actuated, the left main landing gear actuator extend hose leaked hydraulic fluid at the actuator hose fitting. The actuator hose fitting was tightened 1/3rd turn, and the leak stopped. The hydraulic system pressure did not deplete to the point of actuating the hydraulic system low-pressure switch after the leak was stopped. The hydraulic system was then checked for leaks, and none were observed.

The FAA inspector checked the torque value on both the actuator and the airframe hydraulic fitting connections of the left main landing gear actuator extend hose. The hydraulic actuator hose fitting was tightened a total of two thirds of a turn, to a value of 300 inch-pounds. The airframe hydraulic hose fitting was tightened a total of one-third turn, to the same torque value of 300 inch-pounds. The torque value was obtained from the Learjet 60 Maintenance Manual, Chapter 20-30-00. The right main landing gear actuator extend hose was checked with the same results as the left main landing gear. No leakage of hydraulic fluid was observed from the right actuator extend hose.

The emergency brake lever was inspected and operated properly when tested.

The FAA inspector further stated that when the airplane was inspected on the night of the accident, the auxiliary hydraulic pump was selected to the on position. When the captain was asked why the auxiliary pump was actuated, the captain stated that he had selected it to the on position after the accident.

TOXICOLOGY

Post accident drug and alcohol tests were administered to the pilots after the accident. The results were unremarkable.

CRASH FIRE RESCUE

The HYA air traffic control tower hours of operation were from 0600 to 2200. The airport also maintained a staffed, airport rescue fire fighting (ARFF) response team, 24 hours a day.

When the flight crew arrived in the airport area, they notified the approach controller that they had a "hydraulic problem failure" and "we're going to continue on the approach." The controller replied "I'm sorry, you had a problem with your gear sir, is that what it was?" The flight crew responded, "ah no sir. we got, the gear is down. we're just starting to lose some hydraulic pressure."

An ARFF team member was located on the east ramp of the airport, fueling an airplane at the time of the accident. He observed the accident airplane touchdown at an "excessive speed" and did not hear any thrust reversers. The ARFF team member then reeled in the fuel hose, proceeded back to the firehouse, and responded to the accident.

After the accident, authorities were not notified of the accident, until one of the passengers made a cell phone call to 911.

ADDITIONAL INFORMATION

According to the Learjet 60 Airplane Flight Manual (AFM) abnormal procedures section, when the HYDR PRESS light(s) illuminated, the checklist called for:

1. Monitor hydraulic pressure
2. If pressure is normal, continue to monitor. If pressure is low, refer to [the] HYDRAULIC SYSTEM FAILURE/ALTERNATE GEAR EXTENSION [checklist].

The HYDRAULIC SYSTEM FAILURE/ALTERNATE GEAR EXTENSION checklist stated that the "Hydraulic system failure is indicated by illumination of both the L & R HYDR PRESS lights and/or by a loss of hydraulic system pressure. Landing gear, flap, spoiler, thrust reversers, and wheel brake systems will be affected. If engine driven hydraulic pressure is not regained, spoilers and thrust reversers will not be available. If hydraulic pressure is not regained emergency brakes will be required after landing. Landing distance with no flaps, no spoilers, no thrust reversers, and no anti-skid will be greatly increased. Multiply the Actual Landing Distance for Anti-Skid ON shown in Section V by a factor of 3. This ensures adequate landing distance provided the weight/altitude parameters under ABNORMAL LANDINGS in this section are observed."

Landing Data

Using a Basic Operating Weight of 15,025 pounds and a fuel on board of 3,536 pounds, which were both found in the Flight Management System, the total weight at landing was estimated to be 18,561 pounds. Those weights did not include passenger or baggage weight. Estimating 340 pounds for standard weight passengers, the airplane's total landing weight was approximately 18,901 pounds. No baggage weight was provided.

The accident airplane did not have auto-spoiler wheel speed detection (SB 60-27-6). The Take Off and Landing information card, found in the cockpit, listed the landing weight at 18,500 pounds with a runway-landing requirement of 3,200 feet. According to the AFM, the estimated uncorrected landing distance for an airplane without auto-spoiler wheel speed detection, weighing 18,500 pounds, at 23 degrees Celsius, was approximately 3,634 feet. The estimated uncorrected landing distance for an airplane weighing 18,900 pounds, at 23 degrees Celsius, was approximately 3,690 feet.

According to the runway-landing requirement computed by the crew on the Take Off and Landing information card, multiplying the distance by a factor of 3 would have equaled approximately 9,600 feet.

According to the abnormal checklist for HYDRAULIC SYSTEM FAILURE/ALTERNATE GEAR EXTENSION, multiplying the estimated uncorrected landing distance by a factor of 3 would have equaled approximately 11,070 feet.

A review of flight planning charts revealed that there were 2 airports within a 50 nautical mile radius and 9 airports within a 200 nautical mile radius of HYA, which had a runway length in excess of 9,000 feet.

An FAA inspector boarded the airplane after the accident and noted that the checklist in the cockpit was a company quick reference checklist that contained only normal procedures. The inspector did not observe any other checklist in the cockpit and found an AFM still stowed in the left-hand cockpit side pocket. The AFM contained an abnormal checklist and procedures section.

When asked about the checklist in the cockpit, the captain responded that he had removed a different checklist from the airplane after the accident, which was used during the flight, to personally review the tabulated landing data in the back of it. The captain said he then took the checklist with him to Texas, before forwarding it to the Safety Board. The Safety Board reviewed the checklist, and it did contain abnormal and emergency procedure sections. The checklist; however, did not contain any descent, approach, before landing, or landing checklists.

FRACTIONAL OWNERSHIP

The operator was part of a fractional ownership program, and operated under 14 CFR Part 91. According to the Master Interchange Agreement, which would be agreed to by a fractional owner, each person having entered into a "Purchase Agreement" would have individually retained the "Manager" to manage his/her aircraft. Such management services were to include administrative services to enable the persons to participate in an interchange agreement as provided for in Section 91.501 (c)(2) of the Federal Aviation Regulations (FARs). The "Manager" was Bombardier Business Jet Solutions, Inc.

According to a representative of the operator, Bombardier Business Jet Solutions Inc. operated a fleet of over 40 aircraft, including Learjet 31As, Learjet 60s and Canadair Challengers. It employed more than 175 pilots.

In reviewing the FARs, the investigation revealed differences between Parts 135 and 91, in the operation of large and turbine-powered multiengine airplanes. Some of the differences included:

Passenger Briefings

Part 135 required that before takeoff, an oral briefing be conducted by the pilot in command or a member of the crew.

Part 91 required that a passenger briefing be completed orally, but need not have been given when the pilot in command determined that the passengers were familiar with the contents of the briefing.

Turbine Engine Powered Landing Limitations at Destination Airports

Part 135 stated that no person operating a turbine engine powered large transport category airplane could take off, unless the airplane's weight, on arrival, would allow a full stop landing at the intended destination airport within 60 percent of the effective length of each runway.

Part 91 did not contain any landing limitations on turbine engine powered airplanes.

IFR Destination Weather Reporting

Part 135 stated that no person could take off in an aircraft under IFR, or begin an IFR or "over the top" operation, unless the latest weather reports or forecasts, or any combination of them, indicated that weather conditions at the estimated time of arrival at the next airport of intended landing would be at or above authorized IFR landing minimums. Part 135 also included that no pilot could begin an instrument approach procedure to an airport unless that airport had a weather reporting facility operated by the U.S. National Weather Service, a source approved by U.S. National Weather Service, or a source approved by the Administrator.

Part 91 did not contain any limitations for an airfield to have reported weather to conduct IFR operations.

Manual Requirements

Part 135 stated that each certificate holder, other than one who used only one pilot in the certificate holder's operations, would have to prepare and keep current a manual setting forth the certificate holder's procedures and policies acceptable to the Administrator. The certificate holder's flight, ground, and maintenance personnel would have had to use this

manual in conducting its operations.

Part 91 did not require an operator to produce or maintain an operations manual.

FAA Oversight

Part 135 required that an operator allow the Administrator, at any time or place, to make inspections or tests to determine the operator's compliance with the FARs, the operator's certificate, and operations specifications.

Part 91 did not require any direct FAA oversight in operations.

CREW RESOURCE MANAGEMENT TRAINING

FAA Advisory Circular 120-51C presented guidelines for developing, implementing, reinforcing, and assessing crew resource management (CRM) training programs for flight crewmembers and other personnel essential to flight safety. These programs were designed to become an integral part of training and operations. All Part 121 operators were required by regulations to provide CRM training for pilots.

Part 135 operators electing to train in accordance with Part 121 requirements also could have utilized the guidelines, but were not required to train flight crewmembers in CRM.

Part 91 did not require training in CRM.

Pilot Information

Certificate:	Airline Transport	Age:	43, 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--w/ waivers/lim.	Last Medical Exam:	05/19/1999
Occupational Pilot:		Last Flight Review or Equivalent:	
Flight Time:	7806 hours (Total, all aircraft), 1431 hours (Total, this make and model), 6619 hours (Pilot In Command, all aircraft), 129 hours (Last 90 days, all aircraft), 27 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Manufacturer:	Learjet	Registration:	N219FX
Model/Series:	60 60	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	No
Airworthiness Certificate:	Transport	Serial Number:	007
Landing Gear Type:	Retractable - Tricycle	Seats:	10
Date/Type of Last Inspection:	07/01/1999, AAIP	Certified Max Gross Wt.:	23500 lbs
Time Since Last Inspection:	2 Hours	Engines:	2 Turbo Jet
Airframe Total Time:	4294 Hours	Engine Manufacturer:	P&W
ELT:	Not installed	Engine Model/Series:	PW300
Registered Owner:	BOMBARDIER AEROSPACE CORP.	Rated Power:	5200 lbs
Operator:	BOMBARDIER AEROSPACE CORP.	Air Carrier Operating Certificate:	None
Operator Does Business As:	BUSINESS JET SOLUTIONS	Operator Designator Code:	

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Night/Dark
Observation Facility, Elevation:	HYA, 55 ft msl	Observation Time:	2236 EDT
Distance from Accident Site:	0 Nautical Miles	Direction from Accident Site:	0°
Lowest Cloud Condition:	Unknown / 0 ft agl	Temperature/Dew Point:	23° C / 22° C
Lowest Ceiling:	Broken / 1000 ft agl	Visibility	7 Miles
Wind Speed/Gusts, Direction:	18 knots/ 25 knots, 230°	Visibility (RVR):	0 ft
Altimeter Setting:	30 inches Hg	Visibility (RVV):	0 Miles
Precipitation and Obscuration:			
Departure Point:	HERDON, VA (IAD)	Type of Flight Plan Filed:	IFR
Destination:	, MA (HYA)	Type of Clearance:	IFR
Departure Time:	2118 EDT	Type of Airspace:	Class D

Airport Information

Airport:	BARNSTABLE MUNICIPAL (HYA)	Runway Surface Type:	Asphalt
Airport Elevation:	55 ft	Runway Surface Condition:	Wet
Runway Used:	24	IFR Approach:	ILS
Runway Length/Width:	5425 ft / 150 ft	VFR Approach/Landing:	None

Wreckage and Impact Information

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

Administrative Information

Investigator In Charge (IIC):	STEPHEN M DEMKO	Adopted Date:	08/31/2000
Additional Participating Persons:	RONALD WILLIAMS; BEDFORD, MA JAMES B TIDBALL; WICHITA, KS MARCUS D BLACKETER RICHARD I BUNKER; BOSTON, MA		
Publish Date:			
Investigation Docket:	NTSB accident and incident docket 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.nts.gov/pubdms/ .		

The National Transportation Safety Board (NTSB), established in 1967, is an independent federal agency mandated by Congress through the Independent Safety Board Act of 1974 to investigate transportation accidents, determine the probable causes of the accidents, issue safety recommendations, study transportation safety issues, and evaluate the safety effectiveness of government agencies involved in transportation. The NTSB makes public its actions and decisions through accident reports, safety studies, special investigation reports, safety recommendations, and statistical reviews.

The Independent Safety Board Act, as codified at 49 U.S.C. Section 1154(b), precludes the admission into evidence or use of any part of an NTSB report related to an incident or accident in a civil action for damages resulting from a matter mentioned in the report.