NATIONAL TRANSPORTATION SAFETY BOARD
Office of Aviation Safety
Washington, D.C. 20594

December 10, 2002

Group Chairman's Factual Report

OPERATIONS

DCA02MA054

A. ACCIDENT

Operator:	Federal Express Corporation (FedEx)
Location:	Tallahassee, Florida
Date:	July 26, 2002
Time:	0537 Eastern Daylight Time[1]
Airplane:	Boeing B-727-200, N497FE

B. OPERATIONS GROUP

Captain David J. Ivey
Operations Group (AS-30)
National Transportation Safety Board
490 L'Enfant Plaza East, SW
Washington, D.C. 20594

Malcolm Brenner, Ph.D.
Human Performance (AS-50)
National Transportation Safety Board
490 L'Enfant Plaza East, SW
Washington, D.C. 20594

William J. Bramble, Jr. Ph.D.
Human Performance (AS-50)
National Transportation Safety Board
490 L'Enfant Plaza East, SW
Washington, D.C. 20594

Captain Dustin H. Swanson
B-727 Flight Standards
FedEx
3056 Country Place Drive, West
Collierville, TN 38017

Captain Robert Rugarber
Senior Pilot, Flight Operations
P.O. Box 3707, MC 14-HA
Seattle, WA 98124-2207

Captain Robert E. Moore
Asst. Principal Operations Inspector
Federal Aviation Administration
310 Driver Circle Court
Alpharetta, GA 30022

[1] All times are Eastern Daylight Time (EDT) based on a 24-hour clock, unless otherwise noted. Actual time of accident is approximate, determined by the Flight Data Recorder (FDR) and Air Traffic Control (ATC) transcripts.

Mr. Timothy L. Sparks, First Officer B-727
FedEx Pilots Association/Air Line Pilots
Association
5365 Tailhook Lane
Unionville, IN 47468

C. SUMMARY

On July 26, 2002, at approximately 0537 EDT, a Boeing B-727-232, N497FE, operating as FedEx flight 1478, crashed into trees on short final approach to runway 9 at the Tallahassee Regional Airport (TLH), Tallahassee, Florida. The flight was operating under provisions of Title 14, Code of Federal Regulations Part 121 as a scheduled cargo flight from Memphis, Tennessee (MEM) to TLH. Night visual meteorological conditions prevailed at the time of the accident. The three flight crewmembers were injured, two seriously, and the aircraft was destroyed by impact and resulting fire.

D. DETAILS OF THE INVESTIGATION

The operations group convened at 1800 on July 26, 2002 in TLH. Interviews were conducted with FedEx ramp personnel who had been contacted by the accident flight crew on the company radio and others who witnessed the approach and subsequent crash of the airplane. The group performed a review of weight and balance calculations for the accident flight. On July 27, 2002 the operations group interviewed the accident flight engineer in the hospital. The following day, the operations group interviewed the accident captain in the hospital, and visited a B-727-200 (N486FE) on the FedEx ramp. The purpose was to familiarize the operations group with the airplane, systems, flight instruments, and the operation of the Aircraft Performance Laptop Computer (APLC). On July 30, 2002, the operations group visited the accident scene to inspect the airplane, flight path and runway orientation. The operations group departed TLH for the FedEx headquarters in MEM July 31, 2002 at 1730.

On August 1, 2002, the operations group reconvened at the FedEx Flight Air Operations Complex to conduct interviews with pilots who had flown with the accident crew. Also interviewed were the Chief Pilot, Manager of Crew Scheduling, Manager of B-727 Flight Standards and Technical Support, Manager of B-727 Flight Training, and the B-727 Aircraft Program Manager (APM) for the FAA. A simulator visitation was made to see an approach with a VASI on the left hand side of the runway and no approach lighting. The Operations Group concluded its activities in Memphis on August 3, 2002.

The Operations Group reconvened in Brunswick, Maine on August 26, 2002, for The purpose of interviewing the accident first officer at his residence. The group's activity concluded on the same day.

1.1 HISTORY OF FLIGHT

The crew of flight 1478 consisted of three FedEx reserve pilots. Although the captain and second officer had flown together on one prior occasion, flight 1478 was the crew's first flight together. The crew was required to report for duty in Memphis, Tennessee an hour before the flight, at 0312 on July 26, 2002. Flight 1478 was scheduled to depart MEM at 0412 and arrive in TLH at 0536. The crew was scheduled to lay over in Tallahassee during the day on July 26, 2002, and depart TLH for MEM on Flight 1278 at 2315.

The captain received notification of his assignment to flight 1478 between 1900 and 1930, July 25, 2002 at his residence. He had flown the same trip on July 17, 2002. After receiving notification, the captain slept for three and a half hours, then drove to the airport to report for his flight. He met the first officer in FedEx's Air Operations Center (AOC), where they reviewed departure paperwork for flight 1478 and then proceeded to the airplane.

The first officer received notification of the trip to TLH sometime after 0000 on July 26, 2002, when he arrived at MEM on FedEx flight 0137 from Winnipeg International Airport (YWG), Manitoba, Canada.[2] Because the assignment had been made with less than 24 hours notice, he inquired with a company duty officer about the legality of the assignment. After speaking with the duty officer and reviewing his copy of the union's bargaining agreement, he accepted the trip. The first officer slept for about an hour and a half in a private sleep room at the AOC crew rest facilities. After sleeping, he had coffee, met the captain, reviewed the departure paperwork for flight 1478, and proceeded to the airplane.

The second officer received notification of his assignment to flight 1478 on the afternoon of July 25, 2002, at his layover hotel in Ottawa, Canada. After learning of his assignment to flight 1478, he called FedEx headquarters to reschedule a job interview he had planned for a FedEx B-727 second officer line check airman's position. The second officer departed Ottawa International Airport (YOW) on flight 0181 at 2106. His flight arrived in MEM at 0059. After arrival, the second officer stated that he relaxed for 30 to 60 minutes in a recliner at the AOC crew rest facilities. At 0235 on July 26, 2002, he began preparing departure paperwork for flight 1478. After completing the departure paperwork, he went to the airplane to perform a preflight inspection.

The second officer stated he did not see the inbound crew or any mechanics before

[2] This flight included a stop at Grand Forks International Airport, North Dakota.

departure. The only maintenance write-up was an inoperative instrument; the captain's turn rate needle.

Airplane loading was delayed because one pallet containing hazardous material exceeded maximum weight requirements and had to be adjusted. Once loaded, flight 1478 was pushed back at 0424, twelve minutes behind schedule.

The first officer was the flying pilot and climbed to an altitude of 29,000 feet (FL 290)[3] for the flight to TLH. According to the flight crew, during climb and cruise the flight was routine and uneventful. About 0516, the flight crew contacted the Jacksonville Air Route Traffic Control Center (ARTCC) and indicated that they were cleared to FL 240 from FL 290. The controller then issued further descent clearance to 9,000 feet, and issued an altimeter setting of 30.10 inches of mercury. The flight crew acknowledged.

According to a ramp agent at the FedEx facility in TLH, flight 1478 called in-range between 0515 and 0517. They stated they were about 25 minutes from landing, and the condition of the airplane was "good." The ramp agent assigned them parking space two on the ramp, and indicated that ground power was available for the airplane. He also stated that he had called to arrange transportation for the flight crew to the layover
hotel.

During post-accident interviews, the second officer stated that during the descent, he got the ATIS[4] information and the tower was reported out of service. He then contacted a weather briefer to obtain the TLH weather. The winds were minimal, the temperature and dew point were the same, and the visibility was eight to nine miles, with several cloud layers reported. He stated that as they approached the field, it was clear with no clouds.

The first officer stated during post-accident interviews that he briefed the approach to runway 27 at TLH, and discussed the possibility of landing on runway 9 due to the winds. According to the captain, at first he planned to land on runway 27 but he was concerned about being heavy and landing with a "little bit of tailwind." He later asked the first officer if he wanted to land on runway 9 and said the first officer answered, "Yeah."

About 0523 flight 1478 was issued further clearance to descend to 3, 000 feet and to change frequencies to talk to the same controller. The flight crew acknowledged the transmission.

[3] FL 240 is a flight level of 24,000 feet with the altimeter set to 29.92 inches of mercury.
[4] Automatic Terminal Information Service.

About 0524 when the flight crew checked in on the new frequency, the controller asked if they had the TLH weather and they responded in the affirmative. The controller then told them to expect a visual approach into TLH and to report the airport in sight.

Captain Walsh stated that he saw the airport about 16 miles out and asked the first officer if he saw it. He stated he pointed to the lights south of town and told the first officer to look for the beacon. The first officer told him he saw it. They were about 4,000 to 5,000 feet and eight to ten miles from the airport when the first officer first thought he saw the airport. According to the second officer, the first officer thought he saw the runway at first but was mistaken. He later saw the runway and was positioned for a left base turn to the final approach for runway 9. He estimated they were about 3,000 feet in altitude. All three flight crew members reported seeing the PAPI.[5]

About 0530, flight 1478 reported the airport in sight and the controller issued a clearance for a visual approach into TLH. The controller further reported that runways 18 and 36 were closed. The flight crew reported to the controller that they intended to land on runway 9 at TLH. The controller stated, "you're cleared for the visual approach and report your down time this frequency; if unable, Gainesville radio, change to advisory [frequency] approved."

Flight 1478 acknowledged by stating to the controller, "Good morning." This was the last recorded transmission on the ARTCC frequency by flight 1478.

According to the ramp agent operating the radios at the FedEx facility, flight 1478 called and stated they were about five minutes out and wanted to confirm that ground power was available. He thought the crewmember did not hear or understand his earlier transmission and he radioed back and said, "That is affirmative, we do have ground power and we're standing by." He also repeated the parking assignment as spot two. Flight 1478 responded by saying, "okay, we'll see you on the ground." This was the last radio transmission he received from the flight crew.

According to the second officer, the airplane was configured with flaps while on the left base leg. The flaps were selected to 2^0, 5^0, 15^0, and 25^0. He performed the landing checklist and was waiting for the final flap selection of 30^0 in order to complete the checklist.

The first officer stated when he turned on to final approach he saw that he was lined up and the PAPI indicated that he was on glide slope. He said he added a little power because he was slow. According to the captain, at about 800 feet on the radio altimeter, he asked the first officer if he wanted flaps 30^0 and the first offer said, "Roger, flaps 30." The captain stated he believed that he made the required callout "Stable" at 500 feet.

[5] Precision Approach Path Indicator.

According to the captain, he then reported seeing a “thin layer of mist” or a “translucent layer of moisture” that did not obstruct his visibility of the airport. The captain then reported feeling turbulence, hearing sounds, severe shaking, and thumping of the airplane.

The airplane crashed at about 0537.

According to ramp personnel that witnessed the crash of flight 1478, they indicated that they could see lights and strobes on the airplane during the approach. While looking down towards runway 9, ramp personnel stated they saw the airplane flying from their right to left before making a left turn to the final approach. During the approach one agent stated that the approach appeared “normal, steady, and descending.” The agents reported they heard a series of explosions and saw fire after the crash.

1.5 PERSONNEL INFORMATION

All threeflight crewmembers were certificated in accordance with FedEx and Federal Aviation Administration (FAA) certification requirements. A review of FAA accident/incident and enforcement records for the flight crewmembers indicated that there was no history of certificate actions.

Areviewof the records of the National Crime Information Center (NCIC) and of State driving records from the previous five years indicated a history of no violations for any of the flight crewmembers.

Companyrecords provided the following times and dates for the three flight crewmembers.

1.5.1 Captain William Russell Walsh

Date of birth: [redacted] 1947
Date of hire with FedEx Corporate Aviation: April 10, 1989[6]
Date of hire with FedEx: August 6, 1992

Airline Transport Pilot Certificate (issued August 6, 1999)
Airplane Multiengine Land
Airplane Single Engine Land/Commercial Pilot
Limitations: B-727 CIRC. APCH.-VMC ONLY
Type Ratings: B-727, CE-500, /CL-600

Flight Engineer Certificate (issued October 19, 1992)
Turbojet Powered

[6] Captain Walsh was initially hired by FedEx Corporate Aviation, which was a separate department of FedEx. He later applied and was accepted by the FedEx Corporation as a flight crew member. According to company records, he accumulated 300 hours as captain flying corporate airplanes. The calculation of flight times for FedEx does not include that flying time.

Certified Flight Instructor (issued February 5, 1973)
Rating/Level: Airplanes

Medical: First Class (issued June 17, 2002)
Limitations: MUST WEAR CORRECTIVE LENSES

Flight Times[7]:

Total flying time:	13,000-14,000 hours[8]
Total FedEx flying time:	3,893.7 hours
Total FedEx Pilot-in-Command (PIC) B-727:	860.6 hours
Total FedEx Second-in-Command (SIC) B-727:	514.5 hours
Total FedEx Flight Engineer (F/E) B-727:	1,378.3 hours
Total flying time last 24 hours:	1.2 hours
Total flying time last 7 days:	7.6 hours
Total flying time last 30 days:	39.7 hours
Total flying time last 90 days:	101.5 hours
Total flying time last 12 months	356.7 hours
Initial type rating with FedEx (B-727):	August 6, 1999
Completed captain Initial Operating Experience (IOE):	August 27, 1999
Last recurrent ground training:	July 22, 2002
Last recurrent training Simulator, (Appendix F):	February 15, 2002
Last PIC Simulator check:	August 13, 2001
Last PIC line check:	February 7, 2002

1.5.2 First Officer William Lee Frye

Date of birth: [redacted]1958
Date of hire with FedEx: October 29, 1997

Airline Transport Pilot Certificate (issued October 27, 1995)
Airplane Multiengine Land
Commercial Privileges L-188

Type Ratings: None

Flight Engineer Certificate (issued December 23, 1997)
Turbojet Powered

Medical: First Class (issued October 9, 2001)
Limitations: NO LIMITATIONS (see waiver)
Statement of Demonstrated Ability (issued August 1, 1995)
Limitations: None

[7] Totals include the accident flight time which was about 1.2 hours in duration.
[8] Estimated by Captain Walsh.

Physical Defects: Defective Color Vision
Basis of Issuance: Operational Experience

Flight Times[9]:

Total flying time:	7,500 – 8,000 hours[10]
Total FedEx flying time:	1,983.2 hours
Total FedEx Second-in Command (SIC):	525.9 hours
Total Second-in-Command (SIC) B-727:	525.9 hours
Total Flight Engineer (F/E) B-727:	1457.3 hours
Total flying time last 24 hours:	6.0 hours[11]
Total flying time last 7 days:	11.8 hours
Total flying time last 30 days:	37.3 hours
Total flying time last 90 days:	102.7 hours
Total flying time last 12 months	482.8 hours
Completed SIC IOE:	June 21, 2001
Last recurrent ground training:	July 13, 2002
Last recurrent training Simulator, (Appendix F):	December 18, 2001
Last SIC Simulator proficiency check:	June 19, 2002
Last SIC Line Check	October 17, 2001

1.5.3 Second Officer David J. Mendez

Date of birth: [redacted] 1969
Date of hire with FedEx: September 3, 2001

Airline Transport Pilot Certificate (issued December 14, 2000)
Airplane Multiengine Land
Commercial Privileges/Airplane Single Engine Land

Type Ratings: None

Flight Engineer Certificate (issued: March 15, 2002)
Turbojet Powered

Medical: First Class (issued July 8, 2002)
Limitations: None

Flight Times[12]:

Total flying time:	2,600 hours[13]

[9] Total times include the accident flight.
[10] Flight time estimated by First Officer Frye.
[11] Flight time includes only 2.1 hours of the 2.8 hours conducted as flight 134. The flight departed before the 24-hour period prior to the accident. The flight time used in the calculation was from 0537 until the flight arrived at 0745 on July 25, 2002. See Human Performance Factual Report for more details.
[12] Total times include the accident flight.

Total FedEx flying time:	346.2 hours
Total FedEx Flight Engineer (F/E) B-727:	346.2 hours
Total flying time last 24 hours:	6.3 hours
Total flying time last 7 days:	6.3 hours
Total flying time last 30 days:	27.1 hours
Total flying time last 90 days:	166.8 hours
Total flying time last 12 months:	346.2 hours
Initial ground training:	September 28, 2001
Completed Initial training Simulator, (Appendix F):	October 22, 2001
Completed F/E IOE:	November 8, 2001
Initial F/E Line Check	November 8, 2001
Last F/E proficiency training Simulator	April 8, 2002

1.6 WEIGHT AND BALANCE

The FedEx weight and balance calculations provided to the flight crew contained the following information:

	Weight (pounds)	Moment Index
Payload	44,350	902
Basic Operating Weight (BOW)	95,616	577
Zero Fuel Weight (ZFW)	139,966	479
Maximum ZFW	150,000	
Takeoff Fuel	32,200	991
Actual Ramp Gross Weight	173,066	
Maximum Ramp Gross Weight	191,000	
Actual Takeoff Gross Weight (TOGW)	172,166[14]	470
Maximum TOGW	190,500	
Planned Landing Weight	160,726[15]	
Maximum Landing Gross Weight	161,000	
ZFW Center of Gravity (CG)	17.8	
ZFW CG Limits	14.2 Forward	36.8 Aft
TOGW CG	17.2	
TOGW CG Limits	12.1 Forward	36.8 Aft

Thelanding information was calculated using the FedEx Airport Performance Laptop Computer (APLC)[16]. The following information was used to calculate the landing data:

[13] Flight time estimated by Second Officer Mendez.
[14] The TOGW for the accident flight was limited by the destination maximum landing gross weight.
[15] The planned landing weight was derived by subtracting the planed en-route fuel consumption from takeoff gross weight.
[16] The APLC is carried in the airplane and is the primary source used by flight crews to determine takeoff and landing data.

Estimated landing weight:[17]	159,000 pounds
Altimeter:	30.10 inches of mercury
Winds:	120 degrees at 5 knots
Temperature/dew point:	22/22 degrees centigrade
Runway:	Runway 9

The APLC calculated the following landing information:

Minimum Maneuvering Speeds (MMS)

0^0 Flaps:	202 knots
2^0 Flaps	192 knots
5^0 Flaps	162 knots
15^0 Flaps	152 knots
V_{APP}[18]	147 knots
V_{REF}[19]	137 knots

Go-around Engine Performance Ratio (EPR) Settings:

2.07 Left Engine
2.10 Center Engine
2.10 Right Engine

The APLC also provided a flashing controlled flight into terrain (CFIT) notation for the TLH airport. The flashing display indicated was the following:

CFIT RISK …..MOD[20]

1.10 AIRPORT INFORMATION

The TLH airport located southwest of the city of Tallahassee, Florida. The airport elevation was 81 feet. The airport is located 170.7 degrees at 9.6 nautical miles from the Seminole Very High Frequency Omni-directional Range (VOR). Two runways serve the airport[21]. Runway 18-36 is 6,076 feet long and 150 feet wide. Runway 9-27 is 8,000 feet long and 150 feet wide. Runway 9 was the runway being used by the accident flight. Runway 9 had high intensity runway lights (HIRL), runway centerline lights (CL), and runway end identifier lights (REIL). There was a 4 light precision approach path indicator (PAPI) located on the left hand side of runway 9 with a published 3-degree visual glideslope, for flight path guidance and reference. The runway

[17] The second officer stated he used 159,000 pounds as the estimated landing weight of the airplane when he performed the APLC calculations.
[18] V_{APP} is the reference speed that is used during the final approach segment. During a normal approach, V_{APP} is equal to flaps 25 MMS. The airspeed reference marker is set to this speed.
[19] V_{REF} is always the reference speed for flaps 30 and is equal to 1.3 times the stalling speed in the landing configuration.
[20] FedEx provided a *Threat and Error Management* card that could be carried by flight crews to identify operational risks and to reduce the potential for human error.
[21] See Attachment 1, Custom FedEx Jeppesen Charts for Tallahassee, FL.

was grooved and had runway visual range (RVR) transmissometers. The control tower hours of operation were not continuous. According to the FedEx flight plan release, the tower was closed during the period between 2300 to 0600 hours. During the time the tower was not in operation, the approach lights were pilot controlled on the common traffic advisory frequency (CTAF) 118.7 MHz. Keying the airplane microphone the appropriate number of times controls the intensity of the approach lighting; three times-low, five times-medium, seven times-high. There was not a published instrument approach for runway 9 at TLH.

1.10.1 Jeppesen FedEx Airport Charts

The TLH airport had numerous approaches to the various runways at the airport. In addition to the approach charts, airport chart pages 10-9 and 10-9A contained overview information related to airport. FedEx provided flight crews an additional set of pages (10-10 and 10-10A) that were salmon in color and depicted Control Flight Into Terrain (CFIT) as Moderate for the airport. The "Salmon Page" as it was called, was an internally generated page and provided information pertinent to FedEx operations such as noise abatement procedures, special qualification airports, non tower operations, engine out departure procedures, minimum flap retract altitudes, ramp coordinates, field location, frequencies, and any other unusual procedures. The moderate CFIT Risk at TLH was due to local ATC and radar coverage being unavailable at certain times, an ILS not being installed in all directions, and potential non-precision approaches. Further, non-tower operations and information was provided, to assist flight crews during those hours of non-tower operation at TLH.

1.17 ORGANIZATIONAL AND MANAGEMENT INFORMATION

1.17.1 FedEx Operations

According to the FedEx website, the company, incorporated in June 1971, and officially began operations on April 17, 1973, with the launch of 14 small aircraft from Memphis International Airport. The company's growth gained rapidly following air cargo deregulation in 1977; which allowed Federal Express to use larger aircraft, such as the Boeing 727s and McDonnell-Douglas DC-10s. In recent years, it had acquired McDonnell-Douglas MD-11s, Airbus A-300s, and A-310s for use in its operations. FedEx had 4,256 pilots and operated 127 B-727s, not including the accident airplane.

1.17.2 Management Personnel

In accordance with Federal Aviation Regulation (FAR) 119.65(a), the following personnel are assigned to the required management positions within the FedEx organization:

The Chief Pilot was Captain John M. Lewis. His responsibility was to perform as the direct representative of the Vice President, Flight Operations and act with the authority of the Director of Operation when assigned. Captain Lewis reported to the Vice President of Flight Operations, Captain Bruce B. Cheever, who in turn, reported to the Senior Vice President Air Operations, Mr. Donald O. Barber.

The Director of Operations was Captain Albert T. Glenn. The duties and responsibilities of the Director of Operations position was to plan, organize, and direct daily flight operations, and ensure safe and efficient use of aircraft, resources, and compliance with the FARs. He reported to the Vice President of Flight Operations, Captain Bruce B. Cheever.

The Director of Safety was Captain. Edward A. Lyons. His duties and responsibilities included the FedEx Flight Safety program for the flight crews and other support agencies. The Director of Safety reported to the Vice President of Safety and Airworthiness, Mr. Robert Rachor.

1.17.3 Flight Crew Training

According to the *Flight Operations Training Manual* (FOTM) Single Visit Training (SVT) had been approved by the FAA for FedEx recurrent training. However, FedEx had returned to Part 121 Appendix F training in the B-727. According to the Chief Pilot, and the FOTM, all B-727 flight crewmembers receive Recurrent Flight Training at six month intervals, although it is not required for first and second officers.

The first PIC Recurrent Flight Training session, after qualification, consisted of an approved course of Proficiency Training (PT) in the simulator. The second recurrent training session will be completed by the first twelve-month interval and will consist of Recurrent Ground Training and a Proficiency Check (PC) in the simulator. The cycle would repeat itself. The PC was conducted by an approved check airman in accordance with FAR Part 121, Appendix F. According to the *FedEx 727 Instructor Guide*, the PC consisted of a 4 hour training period (warm-up) to train and prepare the crewmember for the subsequent PC. Part of the PC consisted of a required 2-hour briefing. Both a briefing and debriefing were required components of the PC. Annual Cockpit Resource Management (CRM) training would be conducted during the briefing prior to the PC and would consist of one topic, normally provided by the FedEx CRM group[22]. The topic changed annually. Line checks were given to the captain at the interval corresponding to the PT on an annual basis.

[22] During Basic Indoctrination, a nine-hour course in Human Factors/CRM skills was presented and all crew members must complete this course one time prior to operating FedEx airplanes. Additionally, a portion of Human Factors/CRM training shall be reviewed annually in recurrent training. The course length is 1.5 hours.

The SIC and F/E completed Recurrent Ground Training and PC in the simulator at twelve month intervals and Recurrent Flight Training at six month intervals. The cycle would repeat itself. In accordance with CRM concepts, both the SIC and the F/E were scheduled to support the PIC PT or Recurrent Training.[23]

1.17.4 Approach Procedures

1.17.4.1 Non Tower Operations

A review of the FAA approved *Operations Specifications* for FedEx under Paragraph C064 (in part) allows the certificate holder to conduct operations at airports without an operating control tower specified in accordance with the limitations and provisions of this paragraph.

a. The certificate holder is authorized to conduct these operations, provided that the certificate holder determines that:

(1) The airport is served by an authorized instrument approach procedure.

(2) The airport has an approved source of weather.

(3) The airport has a suitable means for the pilot-in-command to acquire timely air traffic advisories and the status of airport services and facilities.

(4) The facilities and services necessary to safely conduct IFR operations are available and operational at the time of the particular operation.

The FedEx Basic Indoctrination Training Curriculum is required for all flight crewmembers that are enrolled in an Initial New-Hire category of training. It is the first curriculum segment of instruction conducted for newly-hired flight crewmembers at FedEx. The curriculum outline contains FedEx specific subjects to include the *FedEx Flight Operations Manual (FOM).*

Chapter 6, Arrival, page 21 NON-OPERATIONAL CONTROL TOWER-ARRIVALS, in part, states:

> Operations into airports during hours when the control tower is closed are not permitted unless the flight crew possesses briefing information describing non-tower operations for that airport.
>
> Briefing information may be supplied as:
>
> - Jepp Insert
> - Photocopy of information placed in trip folder
> - Information relayed from GOC[24] with authority of Duty Officer.

[23] A recurrent Line Oriented Flight Training (LOFT) may be given in lieu of a PT. The recurrent LOFT was also used to accomplish CRM training.

[24] Global Operations Control.

The briefing information contains the following:

- The method for obtaining current weather from an approved source.
- The Common Traffic Advisory Frequency (CTAF).

Ramp personnel are an additional source of advisories during tower off-hours.

FOM, page 6-22, VFR TRAFFIC PATTERN ENTRY-NON OPERATING CONTROL TOWER in part states:

> Plan to be established on the extended centerline of the runway in use NO LATER than 4 NM from the runway threshold.

The *Flight Operations Training Manual* (FOTM) ground school curriculum contains FedEx-Specific Subjects, one of which contained reference to the FOM. A review of the FOM ground school presentation contained the related subject material found on pages 6-21 and 6-22.

1.17.4.1.1 Straight-In Approach Magazine Articles

Numerous articles have been published as part of the B-727 Newsletter from the Flight Standards and Technical News in the *Straight-In Approach* and distributed to flight crews.

In April 1997, an article called Straight-in approaches at UNCONTROLLED airports was reprinted from a May 1996, *Straight- In Approach.*

In April 1998, another article entitled, Straight-in approaches at UNCONTROLLED airports was published.

In July 1999, another article called Duck-Under Approaches was written and published in the *Straight-In Approach* publication. The article featured stabilized approaches.

In December 1999, an article on the Visual Approach was published and contained information about remaining clear of clouds, and information about controlled and uncontrolled airports.

In October 2000, an article entitled, Non-Tower Ops (One more time) was published. This article featured TLH and how to get into and out of the airport.

In September 2001, a featured an article was Non-Tower Operations. The article featured TLH as the example of a non-towered operation.

1.17.4.2 Visual Approaches

Information regarding visual approaches and landings was contained in the *FOM, Chapter 6* and stated above.

Flight Training consisted of use of a Flight Training Device (FTD) and Advanced Simulation Training (AST). The FTD was used, in part, to develop standard operating procedures, checklists, and standard callouts. The AST would provide a review of the power settings and pitch attitudes learned during FTD training. During B-727 Initial New-Hire, Initial Equipment, Transition and Upgrade flight training, visual approaches were flown during the AST 1 period. The FOTM indicated both 15 and 30 flap visual approaches would be accomplished during that period. A review of the *FedEx 727 Instructor Guide* contained the following Overview statement in AST 1:

> The importance of getting the correct sight picture for landing cannot be over emphasized.

During AST 5, visual landings were also listed as part of the maneuvers and procedures to be accomplished during the period.

A briefing item regarding non-tower operations for arrival and departure was contained in the AST 6 simulator session.

During B-727 Flight Training, a FOM briefing is given to pilots who are in the Transition/Upgrade training. The briefing is a power point presentation which contained information related to visual approaches and visual descent points.

During B-727 PIC/SIC Recurrent Flight Training, the FOTM required Normal Approaches using VFR procedures. This requirement was different than that required during PIC/SIC Transition and Upgrade Flight Training. During Upgrade and Transition Flight Training a Visual Approach listed under VFR Procedures was required.

1.17.4.3 Stabilized Approach Corridor

The FedEx FOM contains language pertaining to stabilized approaches in Chapter 6, page 13. According to the FOM, the stabilized approach corridor begins at 500 feet above ground level (AGL) for those airplanes receiving a clearance for a visual approach and 1000 feet AGL for those airplanes receiving a clearance for an instrument approach.

In part, the stabilized approach is defined by the following requirements:

- The aircraft must have landing gear down and locked; the flaps/slats must be in the final landing configuration.
- The engines must be spooled-up and steady at the proper approach setting.
- The proper descent angle and rate of descent must be established and maintained. All available landing aids (ILS, VASI, PAPI, etc.) must be

used. Non-precision approaches may require a slightly steeper angle until reaching MDA [minimum descent altitude].

- Airspeed must be stable and within the range of target speed (+/- 5 knots of target). Momentary and minor deviations are only tolerated if immediate corrections are made.

The procedure and parameters listed above are not merely targets, THEY ARE MANDATORY CONDITIONS AND LIMITS. ANY DEVIATION OCCURRING AT OR BEYOND THE BEGINNING OF THE STABILIZED APPROACH CORRIDOR REQUIRES A MANDATORY GO-AROUND.

In accordance with FAR 91.129(e)(2)(3), FedEx airplanes must use all available navaids, including VASI and glideslope.

1.17.4.4 Go-Around Philosophy

According to FedEx policy, the decision to execute a go-around is both prudent and encouraged anytime the outcome of an approach or landing becomes uncertain. Further, the FOM Chapter 6 states, in part, under the heading of CONCEPT OF MDA/DA/DH:

> The decision a pilot must make before descending below the minimum altitude for the approach is not a commitment to land.
>
> The operation decision to continue an approach using visual means, must be based on information the pilot accumulates throughout the approach. Since any variables are involved, the final decision to commit to a landing is the Captain's and is primarily a judgment based on all relevant factors.

1.17.4.5 Cockpit Resource Management Recurrent Training

During the recurrent ground training cycle of 1995-1996, the topic of "The Black Hole Approach and Workload Management" was presented to the FedEx flight crews. Subject areas included night visual approaches, depth perception, ability to judge altitude/distance, black hole countermeasures, and workload management.[25]

1.17.5 Federal Aviation Administration Oversight

1.17.5.1 General

The Federal Express Corporation was issued an Air Carrier Certificate Number FDEA140A on March 7, 1972 in Memphis, Tennessee. The Certificate Holding District

[25] For additional information regarding CRM, see the Human Factors Group Chairman's Report.

Office (CHDO) is the Southern Region's Flight Standards District Office (FSDO) 25, located in Memphis, Tennessee.

According to Air Operator Listing information provided by the FAA, on August 1, 2002, FedEx had a total of 1,738 captains, 1,620 first officers, 869 flight engineers, 50 aircrew program designees, and 285 check airmen in the company. There were three primary pilot domiciles: Memphis, Tennessee, Anchorage, Alaska and Subic Bay, Philippines. The company operated 382 airplanes consisting of MD-11, DC-10, B-727, A300, and A310 airplanes. There were 152 B-727s listed on the certificate.

1.17.5.2 FSDO Staffing

According to FAA records, there was a total of 52 positions allocated for the Memphis FSDO. Eleven positions comprised the operations unit. The unit consisted of the Principal Operations Inspector (POI), the Assistant POI, (APOI), an Aviation Safety Assistant and eight Aviation Safety Inspectors (ASI) positions. Of those, one ASI was being moved into the vacant APOI position and one ASI for operations was vacant. The resultant move would leave two ASI positions vacant. A request had been made to regional staffing committee to backfill these positions.

1.17.5.3 FAA Inspections

1.17.5.3.1 National Aviation Safety Inspection Program (NASIP)

According to documents provided by the FAA, the last NASIP was conducted from August 14, 1995 through August 25, 1995. A total of 3 findings were reported, all were Category "C":

Operations Training:

FedEx was using contract flight instructors at American Airlines in the B-727 and DC-10 training programs. The contract flight instructors were required to complete a training program administered by FedEx.

FedEx required special training for designated crewmembers that were authorized to conduct engine-out ferry operations. The crewmembers had received the training but the program had not been approved at the time.

Both of these findings were corrected with the POI's approval of the training programs.

Crew Qualifications:

FedEx computerized Crew Management System did not include tracking of duty assigned outside flight crew duty. Individual pilots were required to keep track of consecutive days worked.

1.17.5.3.2 Office Safety Inspection Program (OSIP)

During the period February 23, 1998 through April 3, 1998, an OSIP was conducted at FedEx. There were 13 findings during the OSIP inspection in operations; 5 Category "A" and 8 Category "B". Findings documented during the inspection were in the areas of Management and Administration, Manuals and Procedures, Operations Records, Duty/Flight Time Limitations and Rest Requirements, and Flight Operations.

1.17.5.3.3 Regional Aviation Safety Inspection (RASIP)

During the period December 13-17, 1999 and January 7-27, 2000 a RASIP focused inspection was conducted on FedEx. The inspection was limited to issues involving the MD-11 aircraft flight crew member training and qualification program. The RASIP was scheduled at the request of the Manager of the Memphis FSDO. At the time, FedEx had experienced eight landing incidents with the MD-11 since the first incident in 1994. Two of the eight were directly attributed to causes other than pilot training/qualification issues. Of the remaining six landing incidents, three involved tail strikes, one involved nose/forward fuselage damage, and the other two resulted in total loss of the airplanes.

A total of 9 findings were reported in the areas of Operations Records, Operations Training, and Crew Qualification. As a follow-up to the RASIP, the FAA revisited FedEx during the periods August 15-17 and November 3, 2001 to determine the effectiveness of corrective actions taken by the carrier. Corrective actions were found to be effective and check airmen observed during the various simulator sessions performed satisfactorily.

1.17.5.3.4 Surveillance and Evaluation Report

During March 7-11, 2002, a Surveillance and Evaluation Report was prepared in partnership with the Memphis 25 FSDO and the Surveillance and Evaluation Program personnel. In part, one area of risk identified was a "very likely" probability that due to the geographic support being assigned to the Air Transportation Oversight System (ATOS) and would not be available for Certificate Management Team (CMT) Support. The consequence would be the ability of the CMT to obtain oversight of world-wide operation being greatly reduced. The impact would be "medium."

Other risk areas identified included the lack of assigned maintenance, avionics and operations personnel, and lack of training compromised the ability of the CMT to adequately provide the required oversight of the Air Carrier Certificate.

The lack of funds in a timely manner the limited funds only allow the accomplishment of R-items and certification activities. This precluded the accomplishment of other critical inspections and regulatory requirements.

APMs and PPMs are assigned other duties that were unrelated to their assigned programs.

The last three risk areas cited had a low impact on the CMT.

1.17.5.4 FAA Flight Crew Surveillance/Activities

A review of FAA records for Captain Walsh indicated since August 31, 1999 there had been seven activity codes associated with his name. The last activity was recorded on November 7, 2000 and the last activity was an enroute check which contained the following remarks:

> During approach into Atlanta, 1st officer had difficulty maintaining aircraft on localizer beam. Captain took control and still could not maintain aircraft on beam. Missed approach was declared and go-around executed.
>
> Second approach, indication was steadier but still not stable. Suspect equipment malfunction or effect from aircraft movement in close proximity to runway.

The Second Officer Mendez had a total of five activity codes associated with his name. All were completed and closed with no remarks.

There were no activities reported for First Officer Frye.

Submitted by:

[redacted]

David J. Ivey
Air Safety Investigator, AS-30
December 10, 2002

[redacted] 12/12/02

ATTACHMENTS

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