National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594

DCA22MA009

OPERATIONAL FACTORS/HUMAN PERFORMANCE

Group Chair's Factual Report

October 26, 2022

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A. ACCIDENT

Location: Brookshire, Texas
Date: October 19, 2021
Time: 1000 central daylight time (CDT)[1]
1500 coordinated universal time (UTC)
Airplane: DC-9-87, N987AK, Serial No. 49404

B. OPERATIONAL FACTORS/HUMAN PERFORMANCE GROUP

Group Chair	Shawn Etcher National Transportation Safety Board Washington, DC
Group Chair	Katherine Wilson National Transportation Safety Board Washington, DC
Group Member	Dusan Vukotic Federal Aviation Administration Lakewood, CA
Group Member	Sam Goodwill The Boeing Company Seattle, WA

C. SUMMARY

On October 19, 2021, at about 10:00 am central daylight time, a McDonnell Douglas DC-9-87, N987AK, operated by 987 Investments LLC, overran the departure end of runway 36 at Houston Executive Airport (TME), Brookshire, Texas, after the crew executed a rejected takeoff. Of the 23 passengers and crew onboard the airplane, two passengers received serious injuries and one received minor injuries. A postcrash fire ensued, and the airplane was destroyed. The airplane was operating as a 14 *Code of Federal Regulation* Part 91 flight from TME to Laurence G. Hanscom Field Airport (BED), Bedford, Massachusetts.

D. DETAILS OF THE INVESTIGATION

On October 19, 2021, the Group Chairmen were notified of the accident, about an hour after it occurred, and began collecting data for the investigation. Request for

[1] All times central daylight time (CDT) unless otherwise noted.

pilot records, information, and manuals as well as a list of potential personnel to be interviewed were sent via email to the pilot's primary employer[2] point of contact.

On October 20, 2021, the Group Chairmen attended an organizational meeting which was held at 1000 CDT and groups were formed. The Operational Factors/Human Performance Group was formed, and party members assigned. The group went to the accident location to look at the airplane, set up interviews with the flight crew for the following day and began reviewing records from the operator. The Human Performance chair interviewed the maintenance manager for the airplane with the Airworthiness group chairmen.

On October 21, 2021, the group interviewed the accident first officer, accident flight mechanic, and accident captain. Additionally, the group requested and was provided access to an exemplar airplane, owned by 987 Investments, LLC. The group documented the cockpit and exterior of the exemplar airplane located at TME.

On November 18, 2021, the group interviewed the owner of N987AK in The Woodlands, Texas, with the Survival Factors group chairmen.

On November 30, 2021, the group reconvened at the Everts Air Cargo facility in Fairbanks, Alaska. The group interviewed the Everts Air Cargo manager of training, the director of operations. and the check airman, who recently provided the first officer with a simulator evaluation and had flown the accident airplane in April of 2021.

On December 1, 2021, the group interviewed the flight follower who prepared the flight plan and weight and balance information for the accident flight. Also interviewed was an Everts Air Cargo captain that had recently flown with the accident first officer.

On February 8, 2022, the group interviewed an Everts Air Cargo technical publication employee on the process of obtaining information from MyBoeingFleet and how the technical publication department manages and disseminates the information it has attained.

On February 15, 2022, the group interviewed the Everts Air Cargo chief inspector of maintenance to understand how he manages the MyBoeingFleet for Everts and what his role was to distribute the information to the respective groups at Everts.

[2] The pilot's primary employer was Everts Air Cargo and throughout the report will be referred to as Everts or Everts Air Cargo.

On March 8, 2022, the group reinterviewed the director of operations for Everts Air Cargo to understand the process at Everts to obtain information from MyBoeingFleet and then disseminate it to the flightcrews at Everts.

On March 11, 2022, the Operational Factors/Human Performance group and other NTSB group chairmen were provided a webinar on the MyBoeingFleet website, including how an operator would access it, what would be available to the operator, and how an operator would customize the website for their specific operation.

E. FACTUAL INFORMATION

1.0 History of Flight

According to the flight mechanic's interview transcript, he was notified about five days prior of the flight and was asked if he "*wanted to go to the Boston game*[3]." The day prior to the accident, he assisted with prepping the airplane which included "*a lot of visuals, walkarounds…general visual inspection…it's not very in depth.*"[4]

According to the flight crew's interview transcripts, the accident flight was an off duty flying contract with the owner of the airplane. They arrived in Brookshire, Texas, the day prior, flying in on a commercial flight. They stayed at a nearby hotel and met the maintenance manager for 987 Investments LLC for dinner the evening prior. The captain had requested 12,500 kilograms[5] of fuel to be uploaded on the airplane as well. The day of the accident they departed the hotel and arrived at TME about 0800 with the 987 Investments LLC maintenance manager. They were planning to fly to BED, attend the baseball game with the owner and passengers, and return to TME later that night.

According to the first officer, when he arrived at the airplane, he started going through all his flows. He conducted the preflight of the airplane and specified that when looking at the elevator it was *"normal."* He further stated that it was "*an amazingly clean airplane compared to what I'm used to*."

According to the captain, while the first officer did the preflight walkaround and cockpit preflight, he downloaded the flight plan and obtained a weather briefing from an Everts Air Cargo flight follower and used the runway analysis information for performance planning. Reviewing the paperwork for the flight, the fuel required was 12,750 kg[6]. and he requested the fuel be brought up to 13,000 kg[7]. Prior to closing the

[3] The game was the Houston Astros playing the Boston Red Sox in Game 4 of the League Championship Series, held at Boston's Fenway Park.
[4] Source: Operational Factors/Human Performance, Attachment 2 – "Flight Mechanic Transcript."
[5] The captain requested the fuel in kilograms which equates to 27,557.78 lbs.
[6] Equates to 28,108.94 lbs.
[7] Equates to 28,660.09 lbs.

main cabin door[8], he conducted the takeoff briefing with the first officer, which included the low altitude level off at 2,000 feet and to maintain less than 200 knots of airspeed. He also provided a takeoff abort brief, as was part of his full-time employer's briefing. The aborted takeoff briefing included what to do below 80 knots, what to do if between 80 knots and V1, and what they were going to do if they had a problem after V1. He stated that after V1, "*the only reason we're going to abort is if the aircraft won't fly*."

Once all the passengers were on board, the flight mechanic conducted one last exterior walk around of the airplane and as he was boarding the airplane the maintenance manager informed him that he was not feeling well and would not be going. The flight mechanic boarded the airplane and secured the main cabin door, secured the girt bar[9], and informed the flight crew that the main cabin door was secured. The owner of the airplane provided the passengers with a safety briefing and the operation of the seat belts. He took his seat in the crew rest area located in the right forward section of the cabin.

According to the flight crew, once the main cabin door was secured, they went through the before start and after start checklists. The captain began taxiing the airplane and the first officer selected flaps to 11 and conducted a flight control check, which included pushing the control yoke all the way forward and observing the "elevator light" illuminate. He then pulled the yoke to the full aft position, turned the control yoke to the left and right, and verified the trim setting was at 22.8 percent. The first officer classified the flight controls as "*normal*." They held short of runway 36 and when given takeoff clearance, taxied the airplane onto the runway and completed the before takeoff checklist. The captain, who was the pilot flying, advanced the thrust levers to 1.4 EPR[10] and the first officer, who was the pilot monitoring, advanced the thrust to 1.86 EPR which was the targeted power setting. The first officer then activated the auto-throttles and removed his hand from the thrust levers and the captain put his hands back on the thrust lever. The captain stated that as they were going down the runway "*everything's feeling right*" and that he may have added a little correction for yaw because of the crosswind. The first officer announced V1, the captain removed his hands from the thrust levers and put both hands on the yoke. The first officer announced "*rotate*" and the captain pulled back on the yoke but "*absolutely nothing happened.*" He further stated that it felt as though the yoke "*was in concrete.*" The pilots recalled they both attempted to pull back on the yoke. The first officer commanded "*abort*" and pulled the thrust levers to idle, and the captain activated the thrust reversers.

[8] The main cabin door was located on the left side in the front part of the passenger cabin.
[9] The girt bar is a metal bar which, when connected, arms the emergency evacuation slide to deploy in case of an emergency when the door is opened.
[10] Engine pressure ratio.

The first officer reported that as he applied manual braking "his butt was off the seat" and he could feel the airplane decelerating; however, the airplane left the departure end of the paved surface, impacted an airport fence, brush and trees, and he felt the airplane "go up and down and back and forth." The airplane came to rest in an adjacent field. The captain could see flames out the left cockpit window and commanded for everybody to get out. The first officer left the cockpit first and when he was in the cabin, he observed the flight mechanic had already opened the main cabin door and passengers were evacuating the airplane. The first officer began walking to the back of the airplane to make sure nobody was left; however, the captain told him to get off and went towards the back. The captain could only walk back about two thirds of the way because, although he did not see any fire inside the cabin, there was dense smoke; he yelled back to make sure no one was at the rear of the airplane.

Once the first officer exited the airplane, through the main cabin door, he could hear at least one of the airplane's engines still operating. The first officer informed the captain that the engine was still on, just as the captain was exiting the airplane. The crew continued ushering passengers away from the airplane, as airport personnel who had observed the takeoff and overrun, began to arrive.

2.0 Flight Crew Information

The accident crew consisted of a DC-9 captain in the left seat, a DC-9 first officer in the right seat, a flight mechanic, and the owner[11] who conducted the passenger pretakeoff briefing sitting in the flight crew rest areas, located in the forward portion of the cabin. There were 19 passengers and the airplane owner onboard the airplane. Both pilots were employed and trained by Everts Air Cargo; however, the accident flight was an off-duty flight, in which both pilots were on their days off and were contracted and paid by the owner of the airplane to operate the accident trip.

According to the crew, this was the first leg of a two-leg charter.

2.1 Captain

The captain was 67 years old and resided in Las Vegas, Nevada. He held an airline transport pilot (ATP) certificate with a rating for multiengine land, commercial pilot privileges for airplane single-engine land, helicopter, and instrument helicopter,

[11] Source: Operational Factors/Human Performance – Attachment 3 – "N987AK Owner Interview Transcript," pg. 42, Line 22-23.

and type ratings on the B-737[12], B-777[13], CV-580[14], DC-9[15], and BV-107[16] which included limitation of English Proficient. He held a flight engineer certificate with ratings for jet. He held an FAA second-class medical certificate dated September 15, 2021, with limitation of must wear corrective lenses. The captain stated he was wearing his glasses at the time of the accident.

He was the pilot flying for the accident flight.

According to his interview, Everts Air Cargo had hired him previously. After a few years he had an opportunity to fly with Omni Air International, flying B-777 aircraft for 18-months. After an unsuccessful checking event he decided to look for another job and was rehired at Everts Air Cargo as the chief pilot in the MD-80 series aircraft. After two and half years he turned 65 and was not eligible to fly under a 14 *CFR* Part 121 operation;[17] Everts Air Cargo transitioned him to being a simulator instructor and check airman for them.

2.1.1 Captain's Pilot Certification Records

FAA records of the captain indicated the following:

Commercial Pilot – Airplane Single-Engine Land, Rotorcraft – Helicopter, Instrument – Helicopter certificate issued on April 10, 1981.

Commercial Pilot – Airplane Single-Engine Land, Rotorcraft – Helicopter, BV-107, Instrument – Helicopter, carry passengers in airplane for hire is prohibited at night, and on cross-country flights of more than 50 nautical miles certificate issued on May 1, 1984.

Commercial Pilot – Airplane Single and Multiengine Land, Rotorcraft – Helicopter, Instrument – Airplane and Helicopter, BV-107 certificate October 24, 1984.

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[12] The Boeing Company, B-737-100, B-737-200, B737-300, B-737-400, B737-500, B737-600, B-737-700C, B-737-800, B737-900. Source: FAA Order 8900.1, Figure 5-88, dated July 15, 2019.
[13] The Boeing Company, 777-200 Series, 777-300 Series, 777-300ER Series, 777-200LR Series, 777-F Series. Source: FAA Order 8900.1 Figure 5-88, dated July 15, 2019.
[14] General Dynamics Corporation, USA, Convair 340, Convair 440, Convair 580. Source: FAA Order 8900.1, Figure 5-88, dated July 15, 2019.
[15] The Boeing Company DC-9-11, DC-9-12, DC-9-13, DC-9-14, DC-9-15, DC-9-15F, DC-9-21, DC-9-31, DC-9-32, DC-9-32F, DC-9-33F, DC-9-34, DC-9-34F, DC-9-41, DC-9-51, DC-9-81, DC-9-82, DC-9-83, DC-9-87, MD-88, MD-90-30, 717-200. Source: FAA Order 8900.1, Figure 5-88, dated July 15, 2019.
[16] Columbia Helicopters, Inc., 107-II and Kawasaki Heavy Industries, Limited KV107-II, KV-107-IIA. Source: FAA Order 8900.1, Figure 5-88, dated July 15, 2019.
[17] Title 14 *CFR* Part 121.383(d) eCFR :: 14 CFR 121.383 -- Airman: Limitations on use of services.

Commercial Pilot – Airplane Single and Multiengine Land, Rotorcraft – Helicopter, Instrument Airplane and Helicopter, Commercial Privileges, CV-580, BV-107 certificate January 9, 1987.

Airline Transport Pilot – Airplane Multiengine Land; Commercial Privileges Airplane Single-Engine Land, Rotorcraft – Helicopter, BV-107 CV-580, Instrument Helicopter certificate was issued on July 27, 1987.

Airline Transport Pilot – Airplane Multiengine Land; Commercial Privileges Airplane Single-Engine Land, Rotorcraft – Helicopter, BV-107 CV-580 DC-9, Instrument Helicopter certificate was issued on March 20, 1989.

Airline Transport Pilot – Airplane Multiengine Land, CV-580 DC-9; Commercial Privileges Airplane Single-Engine Land, Rotorcraft – Helicopter, BV-107, Instrument Helicopter certificate was issued on March 20, 1989.

Flight Engineer – Turbojet Powered certificate was issued November 15, 1990.

Airline Transport Pilot – Airplane Multiengine Land, CV-580 DC-9 B-737; Commercial Privileges Airplane Single-Engine Land, Rotorcraft – Helicopter, BV-107, Instrument Helicopter certificate was issued on July 31, 1999.

Airline Transport Pilot – Airplane Multiengine Land, B-737 B-777 CV-580 DC-9; Commercial Privileges Airplane Single-Engine Land, Rotorcraft – Helicopter, BV-107, Instrument Helicopter; Limitations: English Proficient certificate was issued on November 24, 2015.

2.1.2 Captain's Pilot Certificates and Ratings Held at Time of the Accident

AIRLINE TRANSPORT PILOT (issued November 24, 2015)
Airplane Multiengine Land
B-737, B-777, CV-580, DC-9
Commercial Privileges – Airplane Single-Engine Land Rotorcraft – Helicopter
BV-107
Instrument Helicopter
Limitation: English Proficient

MEDICAL CERTIFICATE FIRST CLASS (issued September 15, 2021)
Limitations: Must wear corrective lenses

2.1.3 Captain's Training and Proficiency Check Completed

A summary of the captain's recent training events at Everts Air Cargo was as follows:

Date of hire – Everts Air Cargo[18]	March 6, 2017
Initial proficiency check	July 12, 2014
Most recent recurrent ground training[19]	October 28, 2020
Most recent DC-9 ground requalification training[20]	June 14, 2021
Most recent recurrent training[21]	November 15, 2020
Most recent requalification proficiency check[22]	June 29, 2021
Most recent takeoff and landing currency	August 29, 2021
Most recent experience check[23]	October 11, 2021
Initial operating experience (IOE)	August 14, 2014
Most recent emergency procedures training[24]	October 11, 2021
Most recent emergency evacuation demonstration	November 11, 2019
Most recent extended envelope training	July 14, 2021

2.1.4 Captain's Flight Times

The captain's approximate flight times[25] were based on pilot interviews and Everts Air Cargo provided records:

Previous 24 hours	0:00
Previous 48 hours	0:00

[18] Source: Operational Factors/Human Performance – Attachment 1 – "Flight Crew Interview Transcript," pg. 10. Additionally, the captain stated this was his second time hired at Everts Air Cargo.

[19] Recurrent ground training included general subjects, extended envelope training, security, emergency, hazardous materials, and electronic flight bag curriculum segments. The ground training was completed over a three-day period beginning on October 26, 2020.

[20] Requalification ground training included an aircraft ground curriculum segment.

[21] The captain's pilot proficiency check was conducted under 14 *CFR* Part 121.409 and included 40 satisfactory items including, in part, "Pre-Flight Inspection" and "Rejected Takeoff." Additionally, the form contained a "Remarks" section which included in entirety "Windshear – recurrent, Jammed Stabilizer, Ice accumulation on air frame."

[22] The captain's requalification proficiency check was conducted under 14 *CFR* Part 121.441 and included 35 satisfactory items including, in part, "Pre-Flight Inspection" and "Rejected Takeoff." The result of the check was listed as "Approved."

[23] The captain's recent experience check was conducted under 14 *CFR* Part 121.439; however, did not include "Pre-Flight Inspection" nor "Rejected Takeoff."

[24] Conducted in the simulator during a "Recent Experience" event as required under 14 *CFR* Part 121.439 and was listed as "Satisfactory." Additionally, there was an "Emergency" curriculum segment that was completed during a requalification ground school training event and that was completed on October 27, 2020.

[25] Flight times do **not** include the accident flight nor simulator experience.

Total hours DC-9[26]	4,000
Total flight hours[27]	22,000

2.1.5 Captain's Recent Activities[28]

On Saturday, October 16, 2021, the captain traveled home from Fairbanks, Alaska. He thought he set his alarm for 0515. He walked from the Everts crew quarters to the airport for an 0700 AKDT departure from Fairbanks; he arrived home in Las Vegas, about 1830 PDT. He did not nap during any of his flights and thought he went to bed about 2130 PDT. He was off duty on Sunday, October 17 and thought he woke up between 0600 and 0700 PDT; during the day he did routine personal errands. He thought he went to bed about 2200 PDT. On Monday, October 18, he woke up about 0630 PDT and had a 1000 PDT flight to Houston; he arrived in Houston about 1530. He and the FO went to dinner then back to the hotel to watch the football game; he thought he went to bed about 2230-2245. On Tuesday, October 19, he woke up about 0630, had breakfast and departed the hotel about 0730; he arrived at the airport about 0800. He had no problems falling asleep at night or falling back to sleep after waking twice during the night to use the bathroom. He felt rested the morning of the accident. He had never talked to his doctor about or been diagnosed with a sleep disorder.

He did not take any prescription or nonprescription medications in the 72 hours preceding the accident that might have affected his performance. He did not smoke or use illicit drugs; he did not have any alcoholic beverages in the 72 hours preceding the accident. He had no major changes in his personal life, finances, or health in the previous 12 months.

2.2 First Officer

The first officer was 46 years old and resided in Bruce, South Dakota. He held an airline transport pilot (ATP) certificate with a rating for multiengine land, commercial pilot privileges airplane single-engine land, and type ratings in the CE-500[29], CE-650[30], CL-604[31], DC-9, and RA-4000[32], with limitations of English Proficient. He also held a flight instructor certificate with ratings for airplane single and multiengine. He held an

[26] The captain estimated his total hours in the DC-9 series aircraft during his interview. Source: Operational Factors/Human Performance Attachment 1 - "Flight Crew Interview Transcripts."
[27] The captain estimated his total hours during his interview. Source: Operational Factors/Human Performance Attachment 1 – "Flight Crew Interview Transcripts."
[28] The captain's recent activities were based on information obtained during his interview.
[29] Textron Aviation Inc. 500, 501, 550, S550, 551, 552, 560. Source: FAA Order 8900.1, Figure 5-88, dated July 15, 2019.
[30] Textron Aviation Inc. 650. Source: FAA Order 8900.1, Figure 5-88, dated July 15, 2019.
[31] Bombardier Inc. CL-600-2B16 (CL-604 variant). Source: FAA Order 8900.1, Figure 5-88, dated July 15, 2019.
[32] Textron Aviation Inc. 4000. Source: FAA Order 8900.1, Figure 5-88, dated July 15, 2019.

FAA first-class medical certificate dated August 23, 2021, with a limitation of must have available glasses for near vision. At the time of the accident, he was based at home.

He was the pilot monitoring for the accident flight.

According to the first officer's interview, he was hired by Everts Air Cargo in June of 2019. Prior to working for Everts Air Cargo, he worked oversees for several years flying corporate aircraft, moved back to the U.S., and flew for a company operating Hawker 4000 aircraft.

The most recent trip the first officer operated for Everts Air Cargo concluded on October 10, 2021, when he traveled to his residence. His most recent flight in the MD-80 series was on October 8, 2021.[33]

2.2.1 First Officer's Pilot Certification Record

Private Pilot – Airplane Single Engine Land certificate issued March 23, 1999.

Private Pilot – Airplane Single Engine Land, Instrument Airplane certificate issued July 7, 1999.

Notice of Disapproval – Commercial Airplane Single-Engine Land, Instrument Airplane was issued on September 28, 1999. Unsatisfactory items: Aera of Operation I: Task D, VIII: Task D, and IX: Task C.

Commercial Pilot – Airplane Single Engine Land, Instrument Airport certificate issued October 2, 1999.

Flight Instructor – Airplane Single Engine Land certificate issued January 20, 2000. Reissued: December 14, 2001, January 30, 2004, January 26, 2006, January 14, 2008, January 31, 2010.

Commercial Pilot – Airplane Single and Multiengine Land, Instrument Airplane certificate issued on October 10, 2000.

Airline Transport Pilot – Airplane Multiengine Land; Commercial Privileges – Airplane Single-Engine Land certificate issued on September 28, 2002.

Airline Transport Pilot – Airplane Multiengine Land, CE-500; Commercial Privileges – Airplane Single Engine Land certificate issued on October 30, 2005.

[33] Source: Operational Factors/Human Performance – Attachment 1 – "Flight Crew Interview Transcripts," pg., 64.

Airline Transport Pilot – Airplane Multiengine Land, CE-500, CE-650; Commercial Privileges – Airplane Single Engine Land certificate issued on July 15, 2006.

Flight Instructor – Airplane Single Engine, Airplane Multiengine certificate issued July 22, 2011. Reissued: May 13, 2013, May 22, 2015, July 17, 2017, June 18, 2019, May 9, 2021.

Airline Transport Pilot – Airplane Multiengine Land, CE-500, CE-650, CL-604; Commercial Privileges – Airplane Single Engine Land; Limitations: English Proficient certificate issued on December 12, 2015.

Airline Transport Pilot – Airplane Multiengine Land, CE-500, CE-650, CL-604, RA-4000; Commercial Privileges – Airplane Single Engine Land; Limitations: English Proficient certificate issued on March 17, 2017.

Airline Transport Pilot – Airplane Multiengine Land, CE-500, CE-650, CL-604, RA-4000, DC-9; Commercial Privileges – Airplane Single Engine Land; Limitations: English Proficient certificate issued on July 29, 2019.

Remote Pilot – Small Unmanned Aircraft System certificate issued August 20, 2018.

2.2.2 First Officer's Pilot Certificates and Ratings Held at Time of the Accident

AIRLINE TRANSPORT PILOT (issued July 29, 2019)
Airplane Multiengine Land
CE-500, CE-650, CL-604, RA-4000, DC-9
Commercial Privileges – Airplane Single-Engine Land
Limitation: English Proficient

FLIGHT INSTRUCTOR (reissued May 9, 2021)
Airplane Single Engine, Airplane Multiengine

REMOTE PILOT (issued August 20, 2018)
Small Unmanned Aircraft System

MEDICAL CERTIFICATE FIRST CLASS (issued August 23, 2021)
Limitations: Must have available glasses for near vision.

2.2.3 First Officer's Training and Proficiency Checks Completed

A summary of the first officer's recent training events at Everts Air Cargo was as follows:

Date of hire – Everts Air Cargo[34]	June 2019
Initial proficiency check and type rating	July 28, 2019
Most recent recurrent ground training[35]	January 28, 2021
Most recent proficiency/ qualification check[36]	July 31, 2021
Most recent recurrent training[37]	July 30, 2021
Initial operating experience (IOE)	September 4, 2019
Most recent emergency training	January 26, 2021
Most recent extended envelope training	July 23, 2020

2.2.4 First Officer's Flight Time

The first officer's approximate flight times[38] were based on pilot interviews and Everts Air Cargo provided records:

Previous 24 hours	0:00
Previous 48 hours	0:00
Total hours DC-9[39]	700
Total flight hours[40]	10,000

2.2.5 First Officer's Recent Activities[41]

On Saturday, October 16, 2021, the FO woke up between 0800 and 0900. He did routine housework during the day and thought he went to bed between 2200 and

[34] Source: Operational Factors/Human Performance – Attachment 1 – "Flight Crew Interview Transcript" pg. 128. Additionally, the captain stated this was his second time hired at Everts Air Cargo.
[35] Recurrent ground training included general subjects, extended envelope training, security, emergency, hazardous materials, electronic flight bag, and aircraft ground curriculum segments. The ground training was completed over a three-day period beginning on January 26, 2021.
[36] The first officer's qualification proficiency check was conducted under 14 *CFR* Part 121.441 and included 35 satisfactory or completed items including, in part, "Pre-Flight Inspection" and "Rejected Takeoff." The result of the check was listed as "Approved."
[37] The first officer's pilot proficiency check was conducted under 14 *CFR* Part 121.409 and included 39 satisfactory items including, in part, "Pre-Flight Inspection" and "Rejected Takeoff." Additionally, the form contained a "Remarks" section which included in entirety "Windshear – recurrent, Jammed Stabilizer, Ice accumulation on air frame."
[38] Flight times do **not** include the accident flight nor simulator experience.
[39] The first officer estimated his total hours in the DC-9 series aircraft during his interview. Source: Operational Factors/Human Performance Attachment 1 - "Flight Crew Interview Transcripts."
[40] The first officer estimated his total hours during his interview. Source: Operational Factors/Human Performance Attachment 1 – "Flight Crew Interview Transcripts."
[41] The first officer's recent activities were based on information obtained during his interview.

2300. On Sunday, October 17, he thought he woke up between 0800 and 0900 and again did routine housework; he went to bed about 2200. On Monday, October 18, he woke up about 0530 and left his house about 0600 for an 0800 commercial flight from Sioux Falls to Houston. He arrived in Houston about 1330 and took an Uber to the hotel, arriving 1438. He took about a 45-minute nap while he waited for the captain to arrive. He had dinner with the captain then went back to the hotel to relax and watch TV before going to bed about 2130-2200. On Tuesday, October 19, he thought he woke up about 0700, had breakfast. He would usually fall asleep quickly after watching TV at night and sometimes would toss and turn, but in the days preceding the accident, he characterized his sleep as "pretty decent." He felt rested on the morning of the accident. He had never talked to his doctor about or been diagnosed with a sleep disorder.

He did not take any prescription or nonprescription medications in the 72 hours preceding the accident that might have affected his performance. He used a tobacco product on the morning of the accident; he did not drink alcohol or use illicit drugs. He had no major changes in his personal life, finances, or health in the previous 12 months.

2.3 Crew Medical and Pathological Information

Toxicology testing performed by the FAA's Forensic Services Laboratory on the captain and first officer's blood identified no evidence of impairing drugs.

3.0 Airplane Information

The airplane was a McDonnell Douglas DC-9-87, Serial No. 49404. It was powered by two Pratt & Whitney JT8D-219 engine each capable of produced 21,000 pounds of thrust. The airplane was purchased on November 5, 2015, by 987 Investments, LLC.

The aircraft was configured with 19 passenger seats; see the Survival Factors Factual Report for this investigation.

Photo 1: Accident airplane the morning of the accident
(Source: first officer)

According to the accident captain's interview, the most recent time he operated the airplane was on April 26, 2021[42]. He reported that flight was from Aeropuerto de Cabo San Lucas Internacional (MMSL) Baja California Sur, Mexico, to Laredo International Airport (LRD), Laredo, Texas to TME. According to the contract mechanic for 987 Investments, LLC, that was the last time the airplane had been flown. According to the accident first officer's interview, this was the first time he operated this airplane.

[42] According to automatic dependent surveillance broadcast (ADSB) data, the most recent flight occurred on April 26, 2021.

3.1 Airplane Dimensions

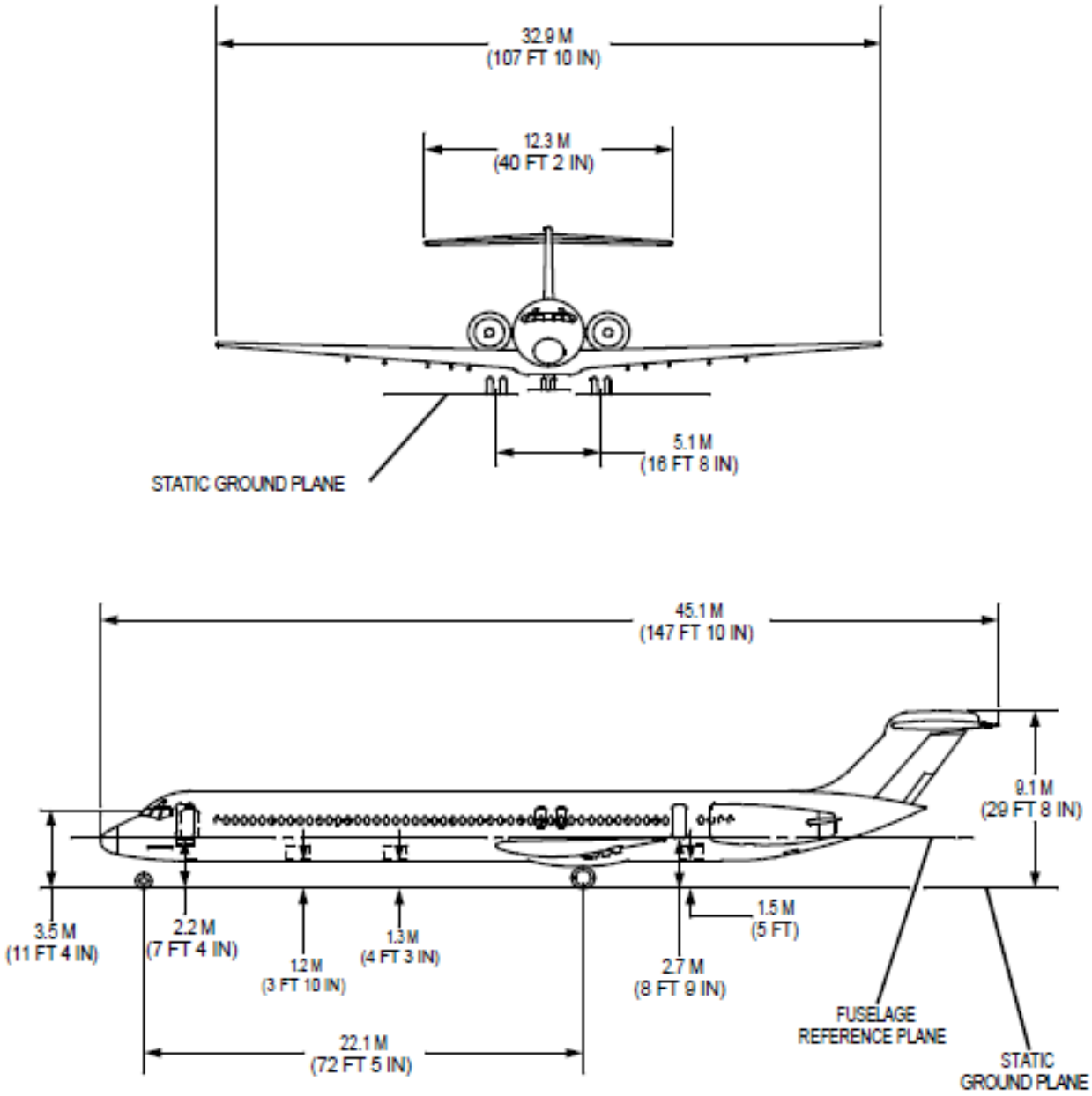


Figure 1: MD-87 dimensions. (Source: The Boeing Company MD-80 Flight Crew Operations Manual, Volume III)

4.0 Weight and Balance

The following information was based on the weight and balance paperwork provided to the accident flight crew by an Everts Air Cargo flight follower. Airplane limitations are indicated in **bold** type. All weights below are in pounds (lbs.).

Basic Operating Weight	80,365

Payload[43]	3,686
Zero Fuel Weight	84,051
Maximum Zero Fuel Weight[44]	**86,300**
Ramp Fuel[45]	28,600
Ramp Weight	112,651
Taxi Fuel[46]	500
Takeoff Fuel	28,100
Maximum Ramp Weight	**150,500**
Takeoff Weight	112,151
Maximum Takeoff Weight	**149,500**
Planned Enroute Fuel Burn	18,465
Projected Landing Weight	93,686
Maximum Landing Weight	**130,000**

4.1 Flight Plan

Flight plan documentation 97576, provided by Everts Air Cargo and signed by the accident captain, showed that it was and IFR Flight Release with a proposed departure time of 1000. The flight plan was computed at 0636 and was due to an "*automatic weight recalculation*." The release showed that the flight was filed for FL370, was a total distance of 1,440 nm, and a calculated flight time of 3:12. The flight also had an alternate airport of Worcester Regional Airport (ORH), Worcester, Massachusetts. The release also showed that it was listed as a "*PART 91*" flight. The filed route of flight was:

KTME...STRYA8…DPATY…DCT…MHZ…DCT…IGB…DCT…GQO…DCT…EMI …DCT…RBV…J42…HFD…GRAYM6…KBED

[43] The payload consisted of 19 passengers at 194 lbs. each. According to interview transcripts no passenger brought any luggage or cargo to put in the cargo hold.

[44] See section 12.6.2 of this report for the modification from the published Boeing Maximum Zero Fuel Weight for MD-87 aircraft of 122,000 lbs.

[45] Weight and balance indicated 27,997 which would have been based on the proposed fuel load; however, during the captain's interview he stated that he rounded up to the next thousand and the above numbers are based on 13,000 kgs multiplied by 2.2 lbs. Of note the crew reported that the airplane's fuel gauge was based on kilogram not lbs. Additionally the calculated numbers below are based on the 13,000 kg fuel load not the proposed fuel load.

[46] Source: Operational Factors/Human Performance – Attachment 5 – Accident Flight Paperwork.

4.2 Fuel Records

Fuel records obtained from the TME airport[47] indicated that the accident airplane was fueled with 2,162 gallons[48] of Jet A with additive fuel on October 18, 2021, and then again on October 19, 20201 with 195 gallons of Jet A with additive fuel.

5.0 Meteorological Information

The TME airport was equipped with an AWOS-III[49] system and issued observations every 20 minutes. The most recent weather observation occurred about five minutes prior to the accident and was:

METAR KTME 191455Z AUTO VRB07KT 8SM CLR 22/16 A3011 RMK AO2=

The METAR[50] information in plain language:

At 0955 CDT, automated, wind variable at 7 knots, visibility 8 statute miles, sky clear below 12,000 ft agl, temperature 22° C, dew point temperature 16° C, altimeter 30.11 inches of mercury. Remarks: automated station with a precipitation discriminator

A review of wind events exceeding 20 kts since April 2021, with more than one observation of windspeed of 20 kts or more, was conducted by an NTSB Meteorologist. The results indicated that there were at least two events with wind gust exceeding 45 kts. The first was on May 18, 2021, with a sustained wind from the southwest of 34 kts and a recorded peak wind of 46 kts. The other occurred September 13th thru 14th and was associated with Tropical Storm Nicholas. During that event, the sustained wind was from the east and northeast at a peak of 32 kts with a recorded wind gust of 45 kts.

For further weather information reference the NTSB Meteorological Specialist Report located in the docket for this accident investigation.

6.0 Airport Information[51]

Houston Executive Airport (TME) was located about 28 miles west of Houston, Texas, had a field elevation of 165.9 feet msl, and was located at a latitude/longitude

[47] Source: Operational Factors/Human Performance – Attachment 7 - Fuel Records.
[48] Jet A weight 6.8 lbs. per U.S. gallon. Source: Pilots Handbook of Aeronautical Knowledge Chapter 10 PHAK Chapter 10 (faa.gov). 2,162 gallons would equate to 14,701.6 lbs. of Jet A fuel.
[49] Automated Weather Observation System. AWOS III measures and reports wind data, e.g., speed, directions, and gusts; temperature; dew point; altimeter; density altitude, visibility, precipitation accumulation and cloud height. Source: AC 150/5220-16E, Automated Weather Observing Systems (AWOS) for Non-Federal Applications (faa.gov).
[50] Meteorological Aerodrome Reports.
[51] Source: FAA Airport Master Records and Reports

of 29°48.18'N/095°53.52W. The airport was privately owned and was serviced by an FAA Contract Air Traffic Control Tower that was in operation from 0600-2200 and was operational at the time of the accident. The airport had a total of 105 fixed wing aircraft based there and of those 18 were jet aircraft. The airport had one paved landing surface designated as 18/36. Runway 18/36 was an asphalt runway and 6,610-foot-long and 100-foot-wide, and had a gross weight limit of 101,000 lbs. The accident flight departed from runway 36.

https://www.airportiq5010.com/5010Web/dashboard/general.

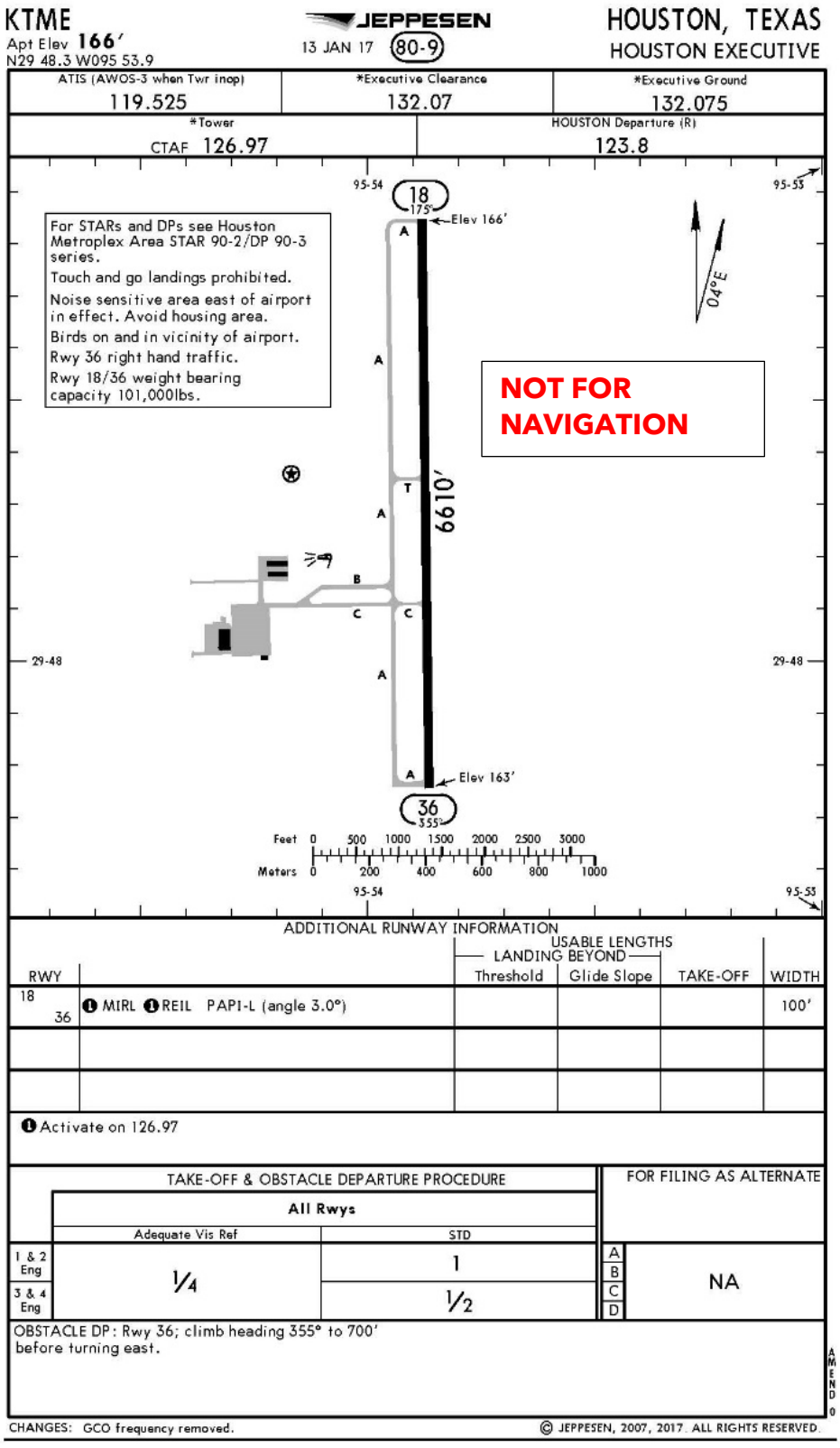


Figure 2: TME Airport Page. (Courtesy of Jeppesen)

7.0 987 Investments, LLC

987 Investments, LLC was a privately held company that contracted with current and qualified pilots to operate the airplane. For the accident flight, a representative of 987 Investments LLC contacted Everts Air Cargo to inform them of an upcoming planned flight. The Everts Air Cargo Director of Operations would look at his list of pilots and see those that would be on their days off and then ask them if they would want to operate the flight. If the pilot would agree, then the director of operations would provide the representative of 987 Investments contact information and the pilots would work with the representative for the logistics.[52] According to the captain's interview transcript, for the accident flight the airplane was equipped with an Everts Air Cargo Quick Reference Handbook (QRH) and Everts Air Cargo checklist.[53]

8.0 Everts Air Cargo Organizational and Management Information

Although the accident flight was operated under 14 *CFR* Part 91 for a private owner and the pilots and flight follower were not required to follow the Everts Air Cargo manuals and policies, the involved personnel were trained on and utilized some of these policies and procedures for the accident flight. Applicable excerpts from the Everts Air Cargo General Operations Manual (GOM) are listed below.

8.1 Captain

The Everts Air Cargo GOM provided the following duties and responsibilities, in part, for the captain:

A. The captain shall report directly to the Chief Pilot. When assigned to a flight, the captain is in full command, without limitations, of the aircraft, crew, cargo and passengers as applicable and is responsible for the following:

B. Primary Duties

1. *The safety of the passengers, crewmembers and aircraft.*
2. *Safe, legal, and efficient conduct of the flight to which he is assigned.*
3. *To determine that his crew is legally proficient and adequately rested. To include, but not limited to, all crewmembers being within the Flight Time Limitation requirements.*
4. *To possess the current airway and airport charts for the route to be flown and verify this prior to departure.*

[52] Source: Operational Factors/Human Performance – Attachment 4 - Everts Personnel Interview Transcripts, pg. 146.
[53] Source: Operational Factors/Human Performance – Attachment 1 – "Flight Crew Interview Transcripts," pg. 71.

5. *To ensure that he is in possession of the necessary aeronautical data for the airports which may be used.*
6. *To have knowledge of and to comply with procedures, limitations and directives of the company, FAA or agency.*
7. *The completion and proper routing of all forms required by the General Operations Manual prior to, during and at the termination of the flight to which assigned.*
8. *For all matters pertaining to proper aircraft maintenance at airports other than the company's principal operating base.*
9. *To ensure that the aircraft to which he is assigned is properly equipped in compliance with the regulations of the FAA pertaining to the equipment required for the type of flight to be undertaken and that the aircraft at least meets the minimum equipment list.*
10. *The captain will ensure that all maintenance checks have been completed and will remain valid throughout the scheduled flight day. The checks to be considered include daily, preflight, and service checks, respectively (depending on aircraft type).*
11. *For correct and sufficient fuel being aboard.*
12. *For proper preflight planning in compliance with 14 CFR Part 121 and the company Operations Specifications.*
13. *Preflight briefings of cockpit and, if applicable, cabin crewmembers.*
14. *Ensure that the altimeters and clocks have been properly set and keeping altimeters adjusted to proper settings en route.*
15. *Making all normal radio contacts and position reports when he/she is the pilot monitoring.*
16. *Check all radio equipment.*
17. *Responsible for proper use of checklists.*
18. *Observing currently effective local airport regulations.*
19. *Following directions and instructions issued by Air Traffic Controlling facilities.*
20. *Assignment of proper duties to other crewmembers assigned to the flight.*
21. *Briefing of crewmembers of instrument approach procedures and minimums.*
22. *If applicable, advising the flight attendant of any information necessary for the safety of passengers or the safe performance of his and/or her duties.*
23. *The pilot-in-command shall supervise, evaluate, and provide guidance to the second-in-command in the performance of the SIC duties.*

24. *The pilot-in-command is responsible to ensure that a cargo aircraft is loaded in accordance with the EAC Cargo Manual and that the cargo is secured in the approved manner. When no qualified load master is available, the pilot-in-command shall be responsible for the conduct of the load master's duties.*

25. *Ensure that prior to flight all provisos of MEL/CDLs are accounted for and complied with, and the appropriate logbook entry is made where a maintenance action (M) is required…*

Note: In summation, safety of flight, adherence to regulations, policies and procedures will remain the responsibility of the pilot-in-command. No policies or procedures contained in any company manual shall be construed to relieve the PIC of this responsibility. The PIC cannot delegate the responsibility for safe flight.

8.2 First Officer

The Everts Air Cargo GOM provided the following duties and responsibilities for the first officer:

A. The first officer is administratively responsible to the Chief Pilot. However, he is functionally responsible to the captain of the flight to which he is assigned.

B. The first officer shall be familiar with and follow instructions contained in this manual, flight procedures, letters of instructions, operations bulletins and other instructions pertinent to his duties.

C. The first officer will be responsible for the following:

1. *Upon assignment of the flight, ensure that he is legally proficient and adequately rested. To include but not limited to being within the Flight Time Limitation requirements.*
2. *To possess the current airway and airport charts for the route to be flown and verify this prior to departure.*
3. *Aiding the captain in the preflight preparation as necessary.*
4. *Making a visual inspection of the airplane prior to departure.*
5. *Aiding the captain on all checklists.*
6. *Making all normal radio contacts and position reports when he/she is the pilot monitoring.*
7. *Assuming secondarily all responsibilities of the captain.*
8. *Performing such other duties as directed by the captain.*
9. *For passenger operations, assist the flight attendant in escort, enplaning and deplaning of passengers as necessary.*

10. *FUEL servicing must be monitored and supervised by the first officer, Everts Air Cargo mechanic, or other authorized person.*
11. *Cargo loading must be supervised by the first officer or other authorized person.*
    a. *Items to be monitored are proper securing of the cargo, evidence of damage to cargo loading system or aircraft structure.*
    b. *When loading and securing are accomplished by qualified personnel, the first officer will, to the extent possible, verify that the load is consistent with the load schedule and properly secured.*
    c. *The first officer will assist in securing cargo using a sufficient number of straps, no less than two for each direction secured at four independent points.*
    d. *When loading (or unloading) is performed by other than EAC personnel, the first officer will observe and assist in order to ensure that cargo loaded is conforming to the load plan, that the cargo is properly secured, and that neither the aircraft or the cargo is damaged during handling. The captain may assume these duties when directing the first officer to conduct other duties.*
12. *Audits trip envelope at the completion of a flight or series of flights, and ensures all required documents are therein, and initial as required on the envelope checklist.*

8.3 Flight Follower

The Everts Air Cargo GOM provided the following duties and responsibilities for the flight follower:

A. *All individuals serving in the position of flight follower shall have successfully completed company ground school training and on-the-job training for this position. All individuals given the authority by the Director of Operations to perform the duties of a flight follower shall be listed in the company's GOM or by issue of a Director of Operations Memorandum until incorporated into the GOM. Flight Followers are administratively responsible to the Flight Control Manager and operationally responsible to the Director of Operations.*
B. *Flight Followers duties and responsibilities are:*
    1. *Be able to determine the operational status and capability of the airplane, which includes:*
        a. *Weight and Balance procedures as outlined in that particular chapter of the Airplane Operating Manual.*

b. *Runway analysis review as contained in that section of the Airport Analysis Manual (Vol. VII).*

c. *Aircraft performance information as described in that particular chapter of the Airplane Operating Manual.*

d. *Airworthiness release procedures, Chapter 8 of the General Operations Manual.*

2. *They are responsible for flightcrew member selection, scheduling, and notification.*
3. *They must have a complete understanding of the company procedures, limitations and directives applicable to the rules of 14 CFR Part 121.*
4. *Exercise the authority of Operational Control, as delegated by the Director of Operations, over all company aircraft operations.*
5. *They must understand the Flight Control procedures contained in Chapter 8 of the General Operations Manual.*
6. *Duties as required by the Emergency Response Plan Manual.*

9.0 Relevant Systems

According to The Boeing Company MD-80 Flight Crew Operations Manual, Volume III – Airplane General – Description and Operation, the following information was provided about the flight controls:

> *Primary flight controls consist of conventional aileron, rudder and elevator control surfaces. Secondary flight controls consist of lift augmenting leading-edge slats, spoilers (lateral control/speedbrake and ground spoilers), inboard and outboard flaps, and horizontal stabilizer. The primary flight controls are cable connected to the control surfaces and are aerodynamically actuated via control tabs. When the secondary flight controls are hydraulically actuated, both the left and right hydraulic systems supply operating power. During powered rudder operation rudder hydraulic power is supplied by the right hydraulic system. When elevator boost is required, hydraulic power is supplied by the left hydraulic system.*

Stall warning and maximum speed warning systems were also provided. Conventional slotted flaps were used. The flight spoilers may be armed to extend automatically at touchdown as an aid for wheel braking. A takeoff warning system was provided. When the throttles were advanced for takeoff and the flaps, spoilers, or stabilizer were not in the correct position, a warning horn would sound intermittently.

Viscous dampers, two on each aileron and two on the rudder, along with the rudder power cylinder and resilient aileron stops, protected the structure and surfaces

from ground gusts. One viscous damper and augmentor cylinder on each elevator surface protected the elevator from ground gusts.

9.1 Tail Section

According to The Boeing Company MD-80 Flight Crew Operations Manual, Volume III – Systems Description, dated July 15, 2003, the following information was provided about the tail section of the aircraft:

> *The tail group consists of a vertical stabilizer, a horizontal stabilizer, two elevators, and a rudder. The vertical stabilizer is mounted on the aft fuselage, and the horizontal stabilizer is mounted on the top of the vertical stabilizer. The rudder and elevators are mounted on the vertical and horizontal stabilizers, respectively.*
>
> *The vertical stabilizer is fully cantilevered and sweptback. A coop for cooling the air conditioning systems is located on the lower leading edge section and is heated as required for anti-icing.*
>
> *The longitudinal trim control system is an electrically actuated system that controls the movement of the horizontal stabilizer to provide longitudinal trim. The system is controlled electrically from the cockpit. The longitudinal trim control system consists of a primary system and an alternate system. The leading edge of the horizontal stabilizer is heated as required for de-icing.*
>
> *The elevators are aerodynamically positioned by mechanically controlled tabs, to control the airplane longitudinally during normal flight. In addition, a power boost system (hydraulic augmentation) is provided to position the elevators to the down position only if 10 degrees or more of up-tab is required. An anti-float tab is installed on each elevator to provide improved longitudinal trim in the landing configuration.*
>
> *An elevator load feel system is installed to improve longitudinal control. The system provides a variable force consistent with longitudinal trim movement.*
>
> *The rudder is operated hydraulically; however, if hydraulic pressure drops below operating pressure, the rudder system will automatically revert to manual operation. Manual operation of the rudder can also be selected by placing the hydraulic power shut-off valve control elver in the off position. The rudder is tab driven during manual operation.*

9.2 Hydraulic System

The Boeing Company MD-80 Flight Crew Operations Manual, Volume III-Hydraulics – Description and Operation provided, in part, the following information about the hydraulic system:

The airplane has two independent hydraulic systems utilizing fire-resistant hydraulic fluid. Each system has a reservoir and is pressurized by a single engine-driven pump. Ground service provisions for each system are located in the main gear wheel wells. These include a ground service connection panel, a hand pump for building pressure for ground maintenance operations, and a spoiler shutoff and system depressurization valve.

Hydraulic Reservoirs

The left and right hydraulic system reservoirs are located in left and right main gear wheel wells, respectively.

Each reservoir exclusively supplies fluid to its own system. A manifold on the bottom of the reservoir ports fluid to supply lines for the engine-driven hydraulic pump, the electrically driven auxiliary hydraulic pump, and a ground service hydraulic hand pump. Internally, the reservoir uses a system pressure of 3,000 psi or 1,500 psi to maintain a pressure head of approximately 30 psi or 15 psi. The pressure head ensures positive transfer of fluid to the pumps. The reservoir is protected against over-pressurization by a relief valve set for 47 psi.

When the hydraulic fluid temperature is above normal, a temperature pickup in the reservoir causes the applicable L/R HYD TEMP HIGH annunciation to be displayed.

An instruction plate indicates filling instructions and direct fluid levels for both system pressurized and unpressurized conditions. A fluid quantity transmitter, located at each reservoir, transmits fluid quantity information to the applicable hydraulic quantity indicator on the First Officer's instrument panel.

Hydraulic Pumps

The left hydraulic system is pressurized by a system pump mounted on the left engine. A system pump mounted on the right engine powers the right system. Each pump is capable of providing pressure up to 3,000 psi during all flight modes; 1,500 psi can be selected for cruise flight operation.

An auxiliary pump in the right system provides hydraulic pressure for landing gear operation, flight backup, preflight operations, and maintenance operations.

The pump is electrically powered and is designed for continuous operation at 3,000 psi.

A power transfer unit mechanically connects left and right hydraulic systems and enables hydraulic pressure to be transferred from the highest to the lowest side (the high pressure side operates as a motor and the low pressure side operates as a pump). The unit is controlled by a single motor operating two shutoff valves, one in each hydraulic system. Operation is controlled by the TRANS HYD PUMPS switch on the First Officer's instrument panel. The shutoff valves automatically close if either system reservoir quantity falls below a safe level.

Airplane systems that normally receive pressure from both hydraulic systems operate at a reduced rate if one system is inoperative. Complete fluid supply to a system can be stopped by pulling the ENG FIRE handle on the upper instrument panel (appropriate engine). Pump operation is controlled by the L/R ENG HYD PUMPS switch on the First Officer's instrument panel.

L/R HYD PRESS LOW annunciation will be displayed when respective system pressure is low.

A hand pump in the main gear well is installed on each main hydraulic system to supplement standard power sources for ground actuation of the various subsystems. The quick disconnect fittings in the inlet suction line of each hand pump and/or auxiliary pump connect to a ground source of hydraulic fluid to manually fill the reservoirs. The hand pumps make the hydraulic systems completely self-sufficient. Hydraulic ground connections are provided in the forward end of each main gear well for servicing and testing each main hydraulic system.

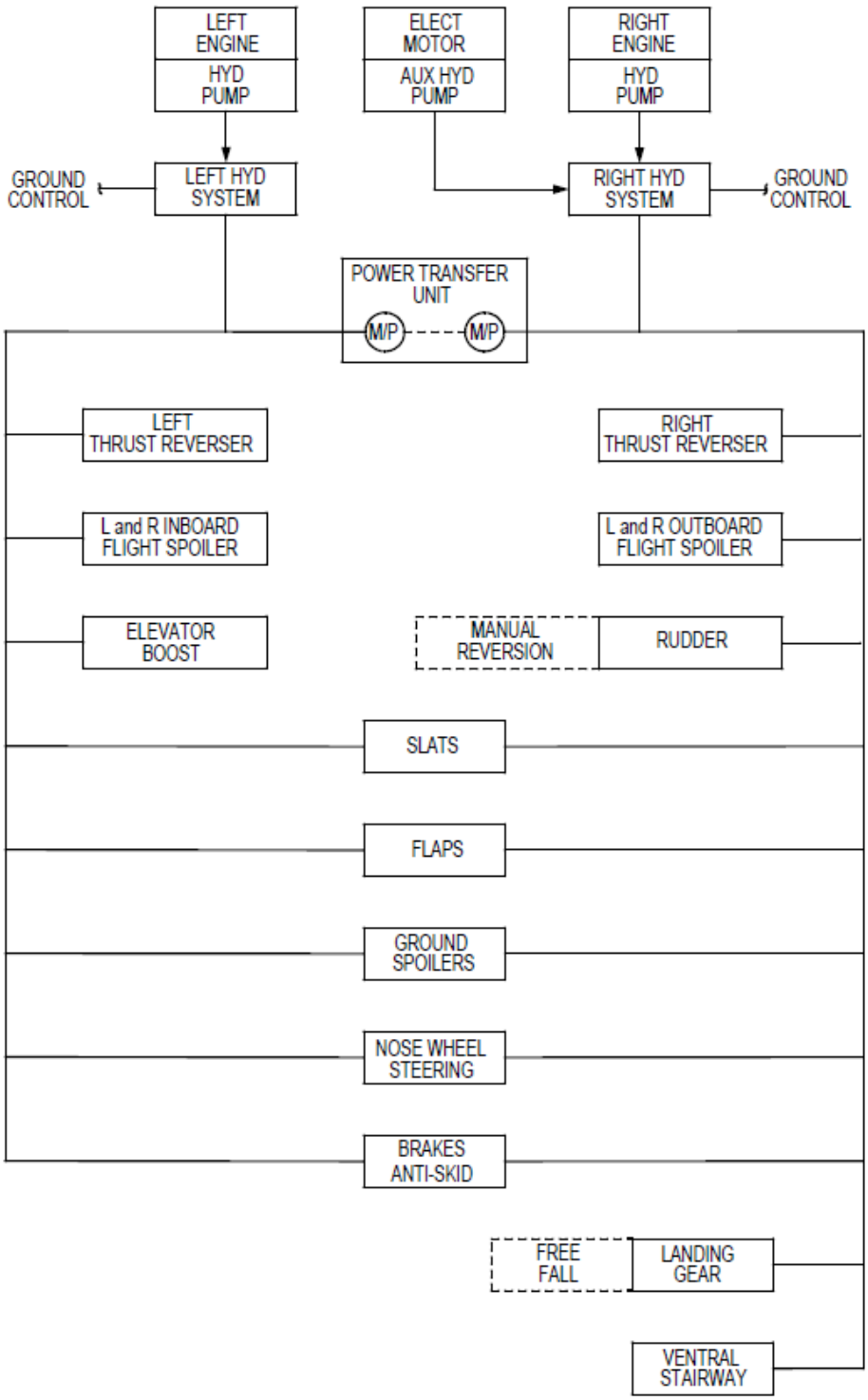


Figure 3: Hydraulic Block Diagram. (Source: Boeing MD-80 Flight Crew Operations Manual)

9.3 Longitudinal Control (Elevators)

According to The Boeing Company MD-80 Flight Crew Operations Manual, Volume III – Flight Controls – Description and Operation, the following information was provided, in part, about the elevators:

The longitudinal control system is a pair of elevators attached to the horizontal stabilizer. Elevator control is, for all normal flying, an aerodynamic boost system that operates a single control tab on each elevator. Each control tab is driven by an independent two-way cable system from the corresponding control column in the cockpit. The only interconnection between the two control systems is a bus torque tube that connects the control columns. Movement of the control column moves the control tab, and aerodynamic force generated by the tab moves the elevator. As each elevator moves, an additional tab, geared to elevator movement, moves to assist the control tab. Full elevator control tab travel is obtained with less than full column travel in either airplane nose up (ANU) or airplane nose down (AND) direction. Further column movement beyond the tab stops to the column stops requires greater pilot effort. In the case of a static elevator rollout check in the column aft direction, further aft movement to the column stop requires substantial physical effort as the pilot is now lifting the elevator surfaces trailing edge up. An anti-float tab, geared to horizontal stabilizer movement, is installed on each elevator outboard of the geared tab to improve longitudinal trim in a forward center-of-gravity (beyond ten degrees airplane nose up) landing configuration.

Engine strakes on the engine nacelles enhance longitudinal control for post stall recovery.

A 3000 psi hydraulic power augmentor provides elevator control for additional nose down capability in extreme, high angle-of-attack flight conditions. Supplied by the left hydraulic system, the power augmentor activated during an extreme stall condition, after elevator control tabs have been displaced approximately 10 degrees airplane nose down with respect to the elevator surface. The augmentor action restores positive column elevator control.

The ELEVATOR POWER ON advisory light illumination on the annunciator panel indicated hydraulic augmentation pressure is used to drive the elevator.

Aerodynamic load feel forces are supplemented by a variable load feel system consisting of a mechanical ration changer attached between the First Officer's control column and the elevator load feel and centering spring. The variable load feel mechanism is connect by cables to the longitudinal trim system. Control column force varies with stabilizer movement and decreased with forward center-of-gravity conditions…

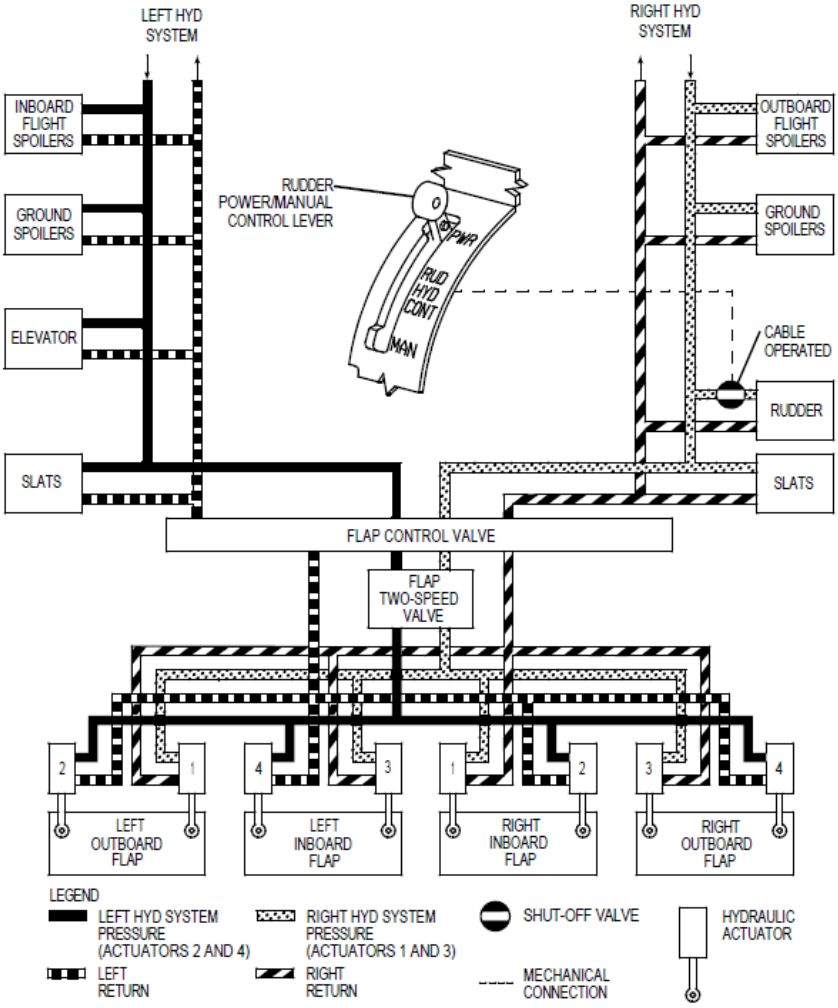
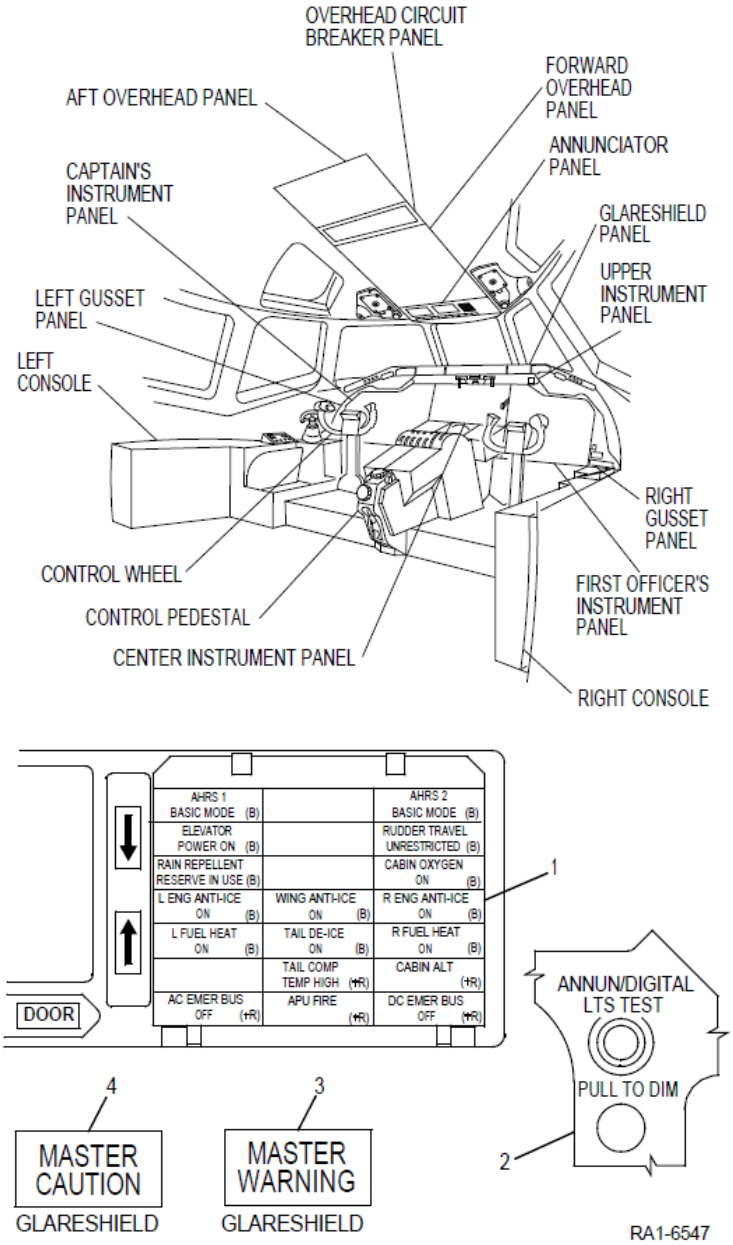


Figure 4: Flight Control System Block Diagram. (Source: Boeing Flight Crew Operations Manual)

9.4 ELEVATOR POWER ON

The Boeing Company MD-80 Flight Crew Operations Manual, Volume III – Airplane General – Controls and Indicators, provided the following information about the ELEVATOR POWER ON advisory light, which was located near the overhead annunciator panel:



1. **Warning and Advisory Lights Panel**

   \+ - Indicates illumination with MASTER WARNING light.

   (R) - Red light - Indicates a warning. This is a condition that requires immediate action.

   (B) - Blue light - Indicates an advisory. This is a normal condition.

   Warning lights will stay illuminated until emergency or malfunction is corrected. Blue lights stay illuminated until corresponding system is off or condition no longer exists.

Figure 5: Overhead Annunciator Panel (Source: The Boeing Company MD-80 Flight Crew Operations Manual, Volume III – Airplane General – Controls and Indicators)

9.5 Braking System

The Boeing Company MD-80 Flight Crew Operations Manual, Volume III-Landing Gear – Description and Operation provided, in part, the following information about the brake system:

Airplane wheel brakes may be applied by depressing the brake pedals. When either set of brake pedals are depressed, hydraulic pressure from both the left and right hydraulic brake system will be applied to the main gear wheel brakes. A fully automatic brake pressure modulating anti-skid system is installed. The anti-skid system will reduce applied wheel brake pressure to the individual brakes when needed, so as to prevent tire skidding, and it will modulate brake pressure in order to provide maximum braking capability for the existing runway conditions.

Touchdown locked wheel protection is provided by the anti-skid system to prevent brake pressure application to the inboard wheel brakes until wheel spin-up is sensed, or until 3 seconds after nose gear strut compression. It is possible to apply pressure to the outboard brakes immediately upon touchdown, but pressure to those wheels will be released as soon as the inboard wheels spin-up.

When landing on extremely slippery surface, it may be possible that both the inboard and outboard main gear tires will not spin up within 3 seconds after nose strut compression. In such a case it is possible to apply brake pressure to all main gear wheel brakes. This could cause the tires to be locked resulting in a reduction of directional control and stopping capability. If wheel brakes are not released, the tires could blow when they come in contact with surfaces with a higher coefficient of friction further degrading stopping capability and directional control. Brake application should be judiciously applied if hydroplaning is suspected, or if the landing was initially made on icy surfaces.

The anti-skid system is deactivated when any of the following conditions exist: the landing gear handle is not in the DOWN detent, the parking brakes are set, the ANTI-SKID switch is OFF, or airplane is at low taxi speeds. When the system is deactivated, pilot brake pedal input controls braking action.

Each main gear wheel is equipped with disc type power brakes actuated by two independent sets of pistons (4 in each set); each set is powered by one of the hydraulic systems. In addition, each system has an accumulator that will supply reserve brake pressure in the event of normal hydraulic pressure failure. A brake pressure (BRAKE PRESS) gage provides visual indication of hydraulic pressure in each system.

A brake temperature (BRAKE TEMP) gage and an overheat (OVHT) light provide visual indications of brake temperature. If the wheels become too hot, fuse plugs in the wheel will melt releasing the tire pressure. Each brake assembly is equipped with wear indicators so that visual checks can be made of brake wear.

The parking brakes are set by depressing the brake pedals, pulling up on the parking brake (PARK BRAKE) control knob (located in the center of the nose gear steering wheel), and releasing the brake pedals. This mechanically opens the brake control valves and closes the anti-skid return lines in both hydraulic systems, trapping pressure in the wheel brake system. When the PARK BRAKE knob is raised, it actuates a switch and the PARKING BRAKES ON annunciation is displayed on the EOAP. If throttles are advanced to a takeoff setting with the parking brake set, the aural/vocal warning system will be activated.

Automatic Brake System (ABS)

When armed, ABS automatically applies brakes during landing and takeoff modes of flight. The ABS landing mode is armed prior to landing, after the landing gear handle is down, by selecting MIN, MED, or MAX on the AUTO BRAKE selector and placing the AUTO BRAKE ARM/DISARM switch to ARM. The anti-skid system must be armed and operational as a condition for ABS operation. ABS landing mode is activated when spoilers are deployed either automatically or manually with throttles retarded and brake pedals released. Automatic braking is delayed after spoiler deployment for approximately 1 second in MAX position and approximately 3 seconds in MIN or MED positions to allow for normal nosewheel touchdown. ABS landing mode is inhibited if throttles are not retarded below 22 degrees. Disarm can be initiated at anytime by manually placing the AUTO BRAKE ARM/DISARM switch into the DISARM position or by depressing either or both brake pedals, after spoiler deployment, by approximately 25 percent of full travel. ABS automatically disarms (during landing or takeoff) when either or both throttles are advanced beyond +22 degrees. When the system is disarmed, the ABS disarm lights located on the glareshield will illuminate. During landing, the ABS will also disarm and the ABS disarm lights will illuminate if flaps are raised to less than 26 degrees with airplane speed above 70 knots. Stowing the ground spoilers will release brake pressure without disarming
the ABS. The ABS disarm lights will remain extinguished and automatic braking will again be available if spoilers are re-deployed.

The ABS takeoff mode is armed by selecting T.O. on the AUTO BRAKE selector switch and placing the AUTO BRAKE ARM/DISARM switch in the ARM position. The spoiler/speedbrake lever must be retracted and flaps must be selected to less than 26 degrees. The takeoff aural warning will sound if either spoilers or

ABS is armed and the other system is disarmed. The ABS takeoff mode is activated during a rejected takeoff upon deployment of ground spoilers.

NOTE: If spoilers fail to deploy automatically, manual spoiler deployment will activate ABS.

If a rejected takeoff is initiated below 70 knots, the ABS reverts to landing mode operation and MIN braking is provided. At speeds greater than 70 knots, maximum dual-system automatic braking is applied immediately without any time delay. Disarm can be initiated by advancing either throttle beyond +22 degrees of travel or by depressing either or both brake pedals, after spoiler deployment, by approximately 25 percent of full travel. Either condition will cause the ABS to disarm, the AUTO BRAKE ARM/DISARM switch will revert to the DISARM position and the ABS disarm lights will illuminate.

An ABS malfunction will cause the system to automatically disarm. The AUTO BRAKE ARM/DISARM switch will revert to the DISARM position, AUTO BRAKE FAIL annunciation will be displayed on the EOAP, and the ABS and MASTER CAUTION lights will illuminate. To rearm the ABS system after it has automatically disarmed, the AUTO BRAKE selector must be placed to the OFF position and then back to the appropriate setting and the AUTO BRAKE ARM/DISARM switch must be placed to the ARM position. If the fault has cleared, the system will rearm.

9.6 Thrust Reversers

The Boeing Company MD-80 Flight Crew Operations Manual, Volume III-Engines – Description and Operation provided, in part, the following information about the thrust reverser system:

The thrust reversers are used on the ground only. The reversers are hydraulically powered, target type, and actuation time is about 2 seconds.

The thrust reverser on each engine consists of two doors (deflectors), which form the aft nacelle fairing when stowed. The door linkage system overcenters to provide positive locking in the stowed position. When extended, the doors direct exhaust gases over and under the nacelle. To prevent accidental extension, separate hydraulically actuated latches prevent the reversers from moving out of the stowed position until the thrust reversers lever is moved towered the reverse thrust position.

As the thrust reverser unlatches, a latch switch causes an amber REVERSE UNLOCK light on the center instrument panel to illuminate. When the reversers are extended, a reverse extended switch causes a blue REVERSE THRUST light on the center instrument panel to illuminate.

Aft movement of the L/R thrust reverser levers on the throttles actuates deployment of the thrust reverser on each engine. During thrust reverser deployment, an idle reverse thrust interlock stops movement of the levers, allowing the thrust reversers to unlatch (amber REVERSE UNLOCK lights illuminate) and fully extend (blue REVERSE THRUST lights illuminate) to the idle reverse thrust position. Following full extension of the thrust reversers, reverse thrust EPR may be increased. An intermediate reverse thrust detent, if installed, assists the pilot in identifying reverse thrust at approximately 1.3 EPR.

Following reverser extension, movement of the reverser levers controls the amount of reverse thrust EPR available. Up and aft movement of the levers increases reverse thrust EPR. Forward and down movement of the levers decreases reverse thrust EPR. With the levers held at idle reverse thrust (a detent is felt on the levers) the engines are allowed to decelerate (EPR decreases) prior to selection of forward thrust. Movement of the levers full forward and down selects forward idle and deactivates reverse thrust. Reversers will stow (blue REVERSE THRUST lights extinguish) and latch (amber REVERSE UNLOCK lights extinguish).

9.7 Spoilers

The Boeing Company MD-80 Flight Crew Operations Manual, Volume III- Flight Controls – Description and Operation provided, in part, the following information about the spoilers:

Each wing has two flight spoilers that are operational during all phases of flight and a ground spoiler that is operable on the ground only. The spoiler system provides the following operational modes:

- *Lateral control augmentation in all modes of flight spoiler operation.*
- *Automatic ground and flight spoiler extension upon touchdown main wheel spinup to spoil lift, thereby increasing braking efficiency.*
- *Manual extension of ground and flight spoilers during landing or a rejected takeoff.*
- *Selectable extension of flight spoilers to serve as speed brakes.*

Ground Spoilers

After landing, all spoilers (flight and ground) may be extended to a maximum of 60 degrees to serve as ground spoilers.

The system may be armed for automatic operation by pulling up on the speed brake/spoiler lever until a red armed placard is exposed and the lever latches in the up position.

When the system is armed and throttles are at idle, the spoilers automatically extend after wheel spin-up on ground contact, or after nosegear oleo actuates ground shift. The spoilers will retract and the speed brake/spoiler lever will be disarmed if left throttle is advanced for a go-around.

The SPOILER DEPLOYED annunciation is displayed to indicate either ground spoiler extended in flight or any spoiler is deployed more than 10 ± 2 degrees on the ground with spoiler/speedbrake lever stowed.

10.0 Relevant Procedures

10.1 Exterior Inspection Procedure

The Everts Air Cargo MD-80 Operating Manual Book 1 provided a checklist for conducting an exterior preflight inspection. The following excerpt was provided to flight crews in reference to the exterior preflight of the tail section of an airplane:

Tail Cone . . . . . CHECKED
Tail Compartment Access Door . . . . . CLOSED, LATCHED
Oil or Fuel Leakage Bottom of Tail . . . . . CHECKED
Tail Cone Static Dischargers (1) . . . . . .CONDITION GOOD
Rudder and Tab . . . . . .CONDITION GOOD
Horizontal Stabilizer . . . . . CONDITION GOOD, FAIRINGS IN PLACE
Elevator and Tabs . . . . . .CONDITION GOOD
Elevator System Oil Leaks . . . . . CHECKED
Static Dischargers (7) . . . . . CONDITION GOOD
Tail Cone External Release . . . . . .STOWED
Left Heat Exchanger Cooling Air Outlet . . . . . .CLEAR
Left Engine Exhaust Cover . . . . . REMOVED
Left Aft Fuel Shroud Drain Mast. . . . . CLEAR, NO DRIPS
Reverser Bypass Door. . . . . .CLOSED, LATCHED
Tail Compartment Temperature Vent . . . . . .CLEAR

10.1.1 Exterior Inspection Pictorial

Everts Air Cargo provided flightcrews with a walk around pictorial describing and showing the location of emergency equipment, location of the manuals on board, and an exterior inspection of Everts Air Cargo MD-82/83 aircraft. The 172-slide pictorial included 150 slides detailing the exterior preflight of the airplane. The exterior preflight began at the left front strake and would continue around the nose of the

aircraft in a clockwise direction and end at the main cabin door. The pictorial included a slide informing flight crews that if an airplane had been exposed to high and sustained winds, or wind gust, greater than 65 knots that the airplane may be susceptible to elevator damage. (See Figure 6).

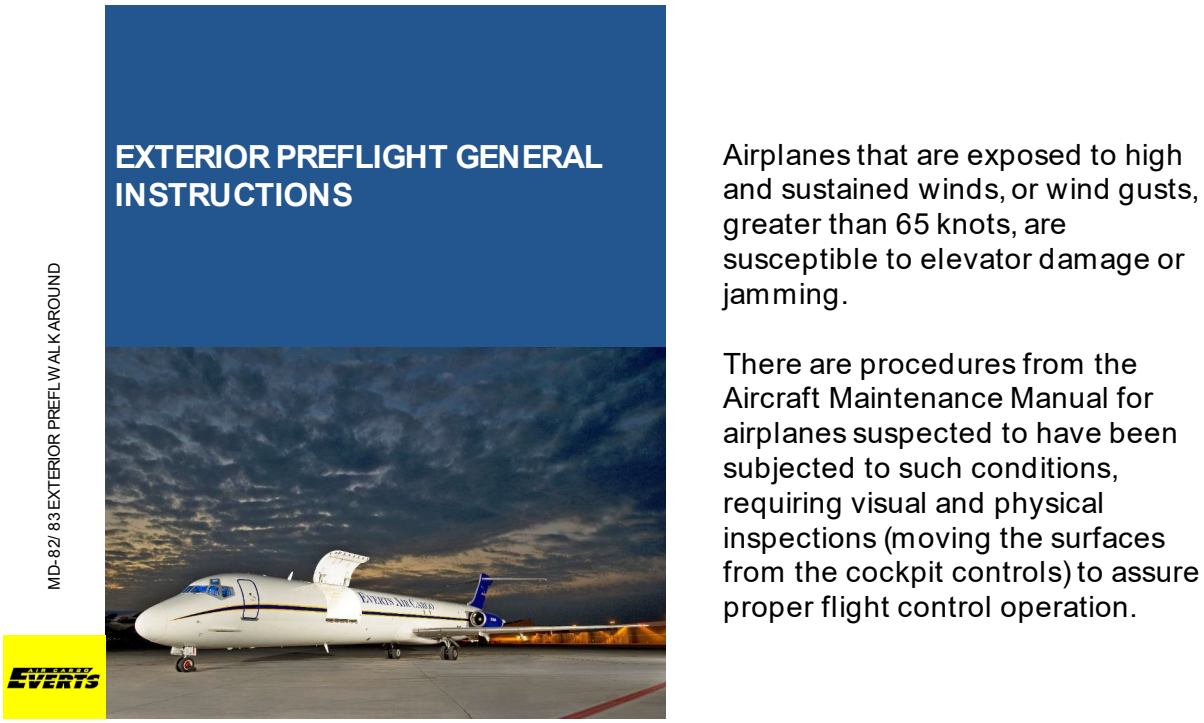


Figure 6: Everts Air Cargo General Preflight Instructions. (Source: Everts Air Cargo Training Walkaround)

The guidance went on to provide details textual and pictorial of each step in performing an exterior preflight inspection, including five slides detailing what the flightcrew should look for when conducting the preflight on the elevator. The details included observing the leading edge of the horizontal and vertical stabilizer, observing that the Ram Air Inlet is unobstructed, the six static wicks on the tips of the elevator, the two static wicks on the tailcone, and the other static wick on the top of the vertical stabilizer aft fairing. Additionally, it described to view the elevator and rudder attach points and that they were not obstructed. (See Figure 7).

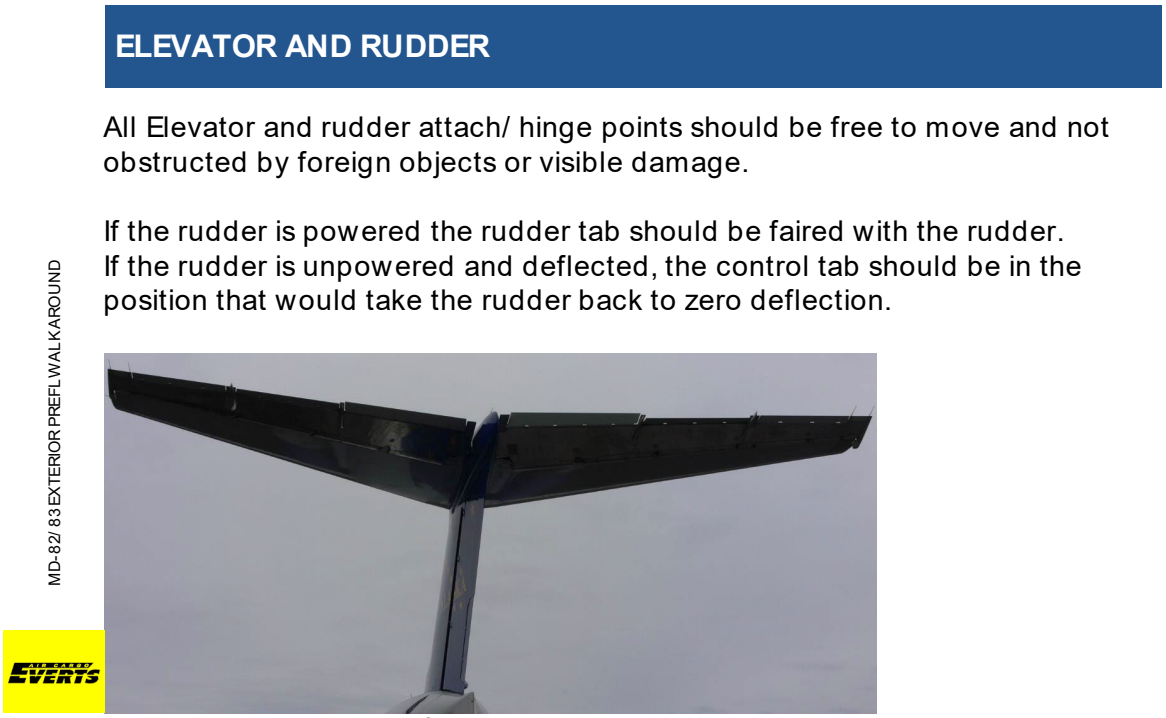


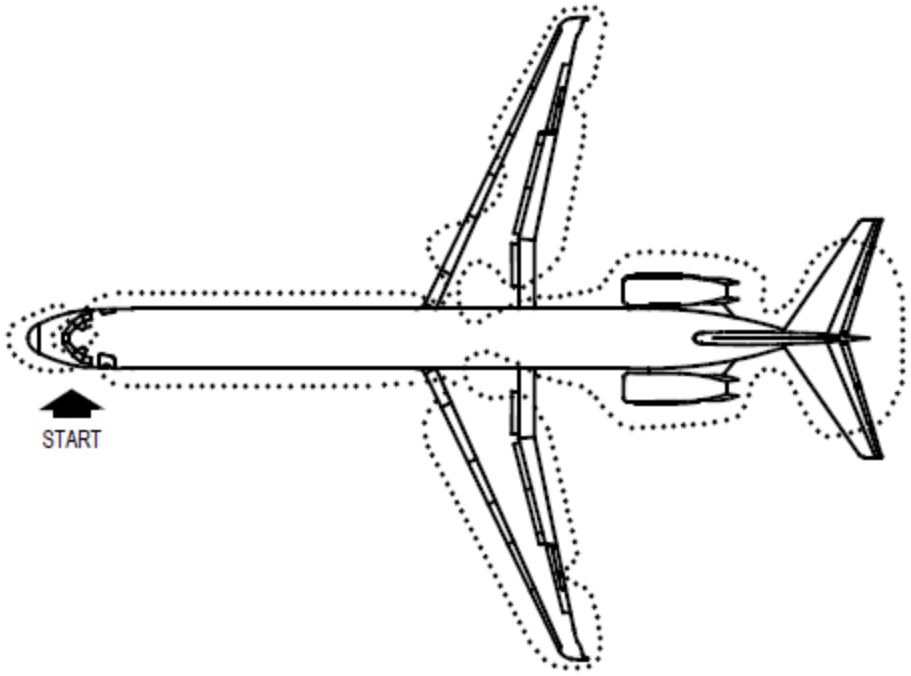
Figure 7: Elevator and Rudder Preflight Inspection. (Source: Everts Air Cargo Training Walkaround)

10.1.2 Boeing Exterior Inspection Checklist

The Boeing MD-80 Flight Crew Operations Manual, Chapter "Chkl," dated May 15, 2020, provided an exterior inspection procedure which included the walkaround pattern. However, the checklist also provided the following caution message:

EXTERIOR INSPECTION PROCEDURE

Walkaround Pattern



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WARNING: ***Prior to every flight, elevator surfaces must be confirmed as not jammed in the Trailing Edge Down (TED) position. If both elevators are faired with or above the stabilizer surface, confirmation is complete.***

CAUTION: Airplanes that are exposed to high-sustained winds, or wind gusts, greater than 55 knots are susceptible to elevator damage and/or jamming. Airplanes suspected to have been subjected to these conditions must be inspected per the Aircraft Maintenance Manual prior to flight

Figure 8. Exterior Inspection Procedure (Source: Boeing MD-80 Flight Crew Operations Manual Temporary Revision 80-2-153)

10.2 After Start Checklist

The Everts Air Cargo, MD-80 Operating Manual Book 1, Section 4.2 "Normal Checklist" provided, in part, the following "After Start" checklist:

**Fuel Levers .....DETENT.....C*
**Ignition.....ST POS.....C*
**Electrical System .....CKD, SET.....C*
**Air Cond Supply Switches..... AUTO.....C*
**Engine Anti-Ice.....ST POS.....C*
**Annunciator Panel .....CKD.....C*
**Hydraulic System.....HI, ON, CKD.....C*
**Pneu X-Feeds.....ST POS.....C*
Ground Equipment.....REMOVED.....B
APU Master Switch .....ST POS.....C
Transponder/ADS-B .....ON, VTS, CKD.....C

10.3 Taxi Checklist

The Everts Air Cargo, MD-80 Operating Manual Book 1, Section 4.2 "Normal Checklist" provided, in part, the following "Taxi" checklist:

Flaps/Slats..... , , T.O.....B
Flight Controls.....CKD.....B
 # Auto Brake, Spoiler.....T.O., ARM, ARM.....C
T.O. Data, TRI, Airspeed Bugs.....CKD, SET.....B
Flight Guidance/Radios ..... SET.....B
APU Air, Master Switch .....OFF, AS REQ.....C
Pneu X-Feed Levers.....CLOSED..... F
Fuel Heat..... AS REQ.....C
Shoulder Harness .....ON.....B
Takeoff Briefing..... COMPLETE.....PF
TAXI CHECK COMPLETE

10.4 Before Takeoff Checklist

The Everts Air Cargo, MD-80 Operating Manual Book 1, Section 4.2 "Normal Checklist" provided, in part, the following "Before Takeoff Check":

Runway/Entry Point .....RUNWAY , ENTRY POINT .....B
FMA.....ALT, T.O., T.O. .....B
PMS CLB ..... SET.....F
Ignition.....CONT/A OR B C

Annunciator Panel .....CKD .....F
Flaps, Slats..... , , T.O. .....B
Brake Temperature.....CKD .....F
Radar/TAWS.....ON .....B
Transponder .....TA/RA.....F
Compass Indicating .....RWY HDG .....B
Landing Lights.....ON C
BEFORE TAKEOFF CHECKLIST COMPLETE

10.5 Takeoff Flap Setting

The Everts Air Cargo, MD-80 Operating Manual Book 1, Chapter 1 "Limitations," provided the following flaps limit speeds for the MD-81, MD-82, MD-87, MD-88:

0 to 13 degrees – 280 KIAS or .57 Mach
15 to 20 degrees – 240 KIAS or .57 Mach
21 to 25 degrees – 220 KIAS or .57 Mach
26 to 30 degrees – 200 KIAS or .57 Mach
31 to 40 degrees – 195 KIAS or .57 Mach
Do not use flap settings between 13 and 15 degrees.

10.6 Normal Takeoff Procedures

The Everts Air Cargo, MD-80 Operating Manual Book 1, Section 5 "Standard Operating Methods" provided, in part, the following "Normal Takeoff/Distant Community NADP Description":

A. When clearance is received onto a runway for the purpose of taking off, the first officer will restate to the captain, the clearance and runway i.e. "Cleared for takeoff, runway 1L." Both pilots will visually confirm the correct runway by means of runway signage or markings before taxiing onto the runway.

1. The captain will scan the engine instruments and annunciator panel, turn the FLOOD LTS to ON, WING/NACL lights ON, NOSE LTS to DIM and select WNG LDG LTS to EXT OFF. After completion of the before takeoff checklist, or in the case of line up and wait and the takeoff clearance has been obtained, the captain will turn WNG LDG LTS to EXT ON, NOSE LTS to BRT.
a. Auto-throttles:
(1) PF advances the throttles to 1.4 EPR.
(2) PF calls "AUTO-THROTTLES ON, SET TAKEOFF THRUST."
(3) PM moves AUTO THROT switch to ON, verifies proper takeoff thrust, no abnormal engine indications, trims takeoff EPR.

b. Manual throttles:
(1) PF advances throttles to 1.4 EPR, allows engines to stabilize (bleeds to close), then smoothly advances throttles to takeoff EPR.
(2) PM verifies proper takeoff thrust, no abnormal engine indications, trims takeoff EPR.

2. PM calls "THRUST SET, ENGINE INSTRUMENTS NORMAL" by 60 knots.
a. PM observes "CLMP" on FMA if auto-throttles ON.

3. PM calls "80 KNOTS" at 80 knots.
a. PM cross references airspeed indicators.
b. PF responds "CHECK" as they verify they have approximately 80 knots on their airspeed indicator or the discrepancy.

4. PM calls "VEE ONE" at V1 - 5 knots. PIC removes hand from throttles. The 'Vee 1' callout is initiated at approximately 5 knots before V1 and completed by V1. The captain's right hand is removed from the throttles at this beginning of this call.

5. PM calls "ROTATE" at VR speed.
a. PF verifies airspeed and smoothly rotates to initial takeoff attitude (maximum 20° pitch). Rotation rate should be approximately 2 1/2 seconds to liftoff (8° pitch) and 2 1/2 seconds from liftoff to takeoff attitude in one smooth, continuous pitch change.

CAUTION: Tailstrike may occur at 10.5° Nose Up attitude.

6. PM calls "V2".

7. PM calls "POSITIVE RATE" with a positive rate of climb indicated on the altimeter and VSI.

8. PF Calls "POSITIVE RATE GEAR UP."
a. PM selects gear handle to UP, check that the red landing gear UNSAFE lights and the amber GEAR DOOR OPEN light extinguishes.
b. Captain will disarm the spoilers.

9. PF maintains V2 to V2 + 10, accepting airspeed greater than V2 when it occurs, and limits maximum pitch to 20° nose up.

10. PF calls 'HEADING SELECT" or "NAV/VOR SELECT" at 400 feet AGL as appropriate.

11. *PF calls "AUTOPILOT ON" (if desired) at or above 500 AGL if autopilot is desired.*
    a. *PM moves autopilot switch to AP ON and verifies AP 1 or 2 blue light is illuminated on FMA.*

12. *PM calls '1000 Feet'.*

13. *PF calls "IAS 250" upon reaching 1000 feet AGL.*
    a. *PM pushes IAS on the Glareshield Control Panel (GCP) Pitch Mode Select Button, and sets 250 into the pitch window by rolling the pitch trim wheel.*
    b. *PF ensures pitch follows Flight Director command bar for acceleration.*

14. *PF calls "Flaps up, climb thrust" upon reaching flap retract speed.*
    a. *PM moves flap/slat handle to flap zero position and calls "FLAPS UP" when flaps are fully retracted.*
    b. *PM pushes CL button on the TRI.*
    c. *PM verifies throttles automatically adjust to climb EPR (Autothrottles) or PM manually sets throttles to climb EPR (Manual throttles).*

15. *PF calls "Slats retract" upon reaching slat retract speed.*
    a. *PM moves flaps/slat handle to slat retract position and calls "SLATS RETRACTED" when slats are fully retracted.*

16. *PF calls "Bank 25," upon reaching clean maneuvering speed.*

When passing minimum maneuvering speed, select the bank angle for maneuvering under existing conditions. At heavier gross weights, minimum maneuvering speed may be higher than 250 knots. This may require a flap/slat configuration should a speed restriction apply.

Limit bank angle to 15° until minimum maneuvering speed for existing flap/slat configuration. With less than minimum maneuvering speed for next configuration, delay clean-up if bank angle greater than 15° is a priority or conversely limit bank angle to 15° if acceleration is a priority. If flaps/slats are to remain extended after achieving the required retract speed, bank angle may be increased up to 30°.

B. Proceed to and accomplish a departure profile as described in this section. Refer to ***NORMAL TAKEOFF FOOTNOTES*** *below for additional Takeoff Considerations.*

NORMAL TAKEOFF FOOTNOTES:

1. *When the first officer is making the takeoff, the captain assumes control of the throttles after initial thrust application to facilitate R.T.O. if necessary. While Pratt & Whitney has established time limits for acceleration from 1.4 EPR to 95% of takeoff thrust, there is no time limit set for acceleration of engines from ground idle to 1.4 EPR. Differential engine acceleration times between two engines from idle to 1.4 EPR should only be cause for concern based on aircraft handling. Establish 1.4 EPR prior to engaging autothrottles or smoothly advancing throttles by hand to takeoff thrust setting.*
2. *Exercise caution before bringing throttles beyond approximately vertical or 1.4 EPR to ensure proper spoolup. The EPR rise that occurs above takeoff thrust setting during takeoff roll must be trimmed out by 60 KIAS, as this rise is not acceptable. No EPR penalty is required for takeoffs when using ENGINE ANTI-ICE.*
3. *After initial alignment, the captain will release the nose wheel steering and the PF will revert to rudder pedal steering. Apply forward column pressure as necessary to retain good steering and a smooth riding nose wheel. Do not "walk" the rudder during the takeoff roll.*
4. *During takeoff, on wet or slushy runways, the forward column pressure should be reduced to minimum by approximately 70 KIAS (start of tire hydroplaning). This will decrease the possibility of water ingestion and compressor stall.*
5. *The captain will make the decision to abort, if necessary. Except in the event of captain incapacitation, the captain will accomplish all rejected takeoffs. The "Vee 1" callout is initiated at approximately 5 knots before V1 and completed by V1. The captain's right hand is removed from the throttles at the beginning of this call.*
6. *Unless required for operational purposes (such as ATC request, clearance or a published departure procedure) no turns are to be made below 400' AGL. Comply with special departure procedures for engine out departures.*

CAUTION: The autothrottle system (ATS) CLMP mode engages on takeoff when the CADC senses 60 knots airspeed and power is removed from the ATS servo. If a rolling takeoff is made, and/or if the takeoff is made into a significant headwind, 60 knots may be achieved before the ATS can properly set takeoff EPR. Selecting a thrust rating mode other than T.O. or T.O./FLEX will disengage CLMP mode.

10.6.1 Clamp Mode

The Boeing Company MD-80 Flight Crew Operations Manual, Volume III-Automatic Flight – Description and Operation provided, in part, the following information about the Clamp (CLMP) Mode:

The CLMP mode is engaged (power removed from throttle servo motor and CLMP annunciation displayed on the FMA) when the following conditions exist:

* *The airplane is on the ground for more than 20 seconds with autothrottle in SPD SEL or MACH SEL mode or autothrottle retard (RETD) mode logic exists.*
* *The airplane is on the ground for more than 20 seconds with autothrottle in EPR mode and airspeed is greater than 60 KIAS.*
* *In flight, the autothrottle is in SPD SEL or MACH SEL mode and the flight director/autopilot is in IAS or MACH mode. Also, the CLMP mode is engaged if TO or TO FLX is selected on the TRP.*

10.7 Rejected Takeoff

The Everts Air Cargo, MD-80 Flight Operations Manual, Procedures & Techniques – Takeoff provided the following guidance for executing a rejected takeoff:

The Captain has the sole responsibility for the decision to reject the takeoff. The rejected takeoff maneuver must be initiated no later than V1. The takeoff should be rejected for any of the following events:

- *Captain considers the airplane unsafe or unable to fly.*
- *Fire or fire warning.*
- *Master Caution light illuminates.*
- *Master Warning light illuminates.*
- *Engine failure.*
- *Predictive windshear warning.*

Rejecting the takeoff after V1 is not recommended unless the Captain judges the airplane to be incapable of flight.

Prior to 80 knots, the takeoff should be rejected for a takeoff configuration warning or any other condition that the Captain deems abnormal, or which creates uncertainty as to the safe condition of the airplane. Rejected takeoffs at speeds below 80 knots present low risk, and are preferred to continuing a takeoff with an abnormal or uncertain airplane condition.

> ***CAUTION: The proper braking technique for "maximum manual anti-skid braking" during a rejected takeoff is to apply full brake pedal force and maintain full brake pedal force until airplane comes to a complete stop.***

1. *Pilot In Command (PIC) commands "REJECT."*

2. *Pilot Flying (PF) disconnects autothrottle and retards throttles to idle and simultaneously applies maximum manual anti-skid braking, ground spoilers, and reverse thrust as required. Pilot Not Flying (PNF) calls "SPOILERS DEPLOYED" or "NO SPOILERS," as appropriate.*

PNF observes blue REVERSE THRUST lights illuminate and calls "REVERSE THRUST AVAILABLE." If one or both reversers fail to deploy, PNF calls "NO REVERSE ENGINE(S) ___."

CAUTION: After retarding throttles to idle, if they are released, they will attempt to advance to takeoff thrust unless rejected takeoff was initiated above 60 KIAS (CLMP mode annunciated), or reversers have been deployed, or autothrottle disconnect button was used to disengage autothrottles.

3. *PNF confirms both engines are at idle (spooled down) or in reverse. If an engine remains at high forward thrust it must be shut down with the fuel control lever.*

4. *PF maintains directional control with rudder pedals and applies slight forward pressure on control column.*

5. *PNF advises tower of rejected takeoff and any assistance required.*

CAUTION: If difficulty in maintaining directional control is experienced during reverse operation, reduce reverse thrust to reverse idle (or forward idle thrust if required), regain directional control and reapply reverse thrust as necessary. Do not attempt to maintain directional control using asymmetric thrust.

[END]

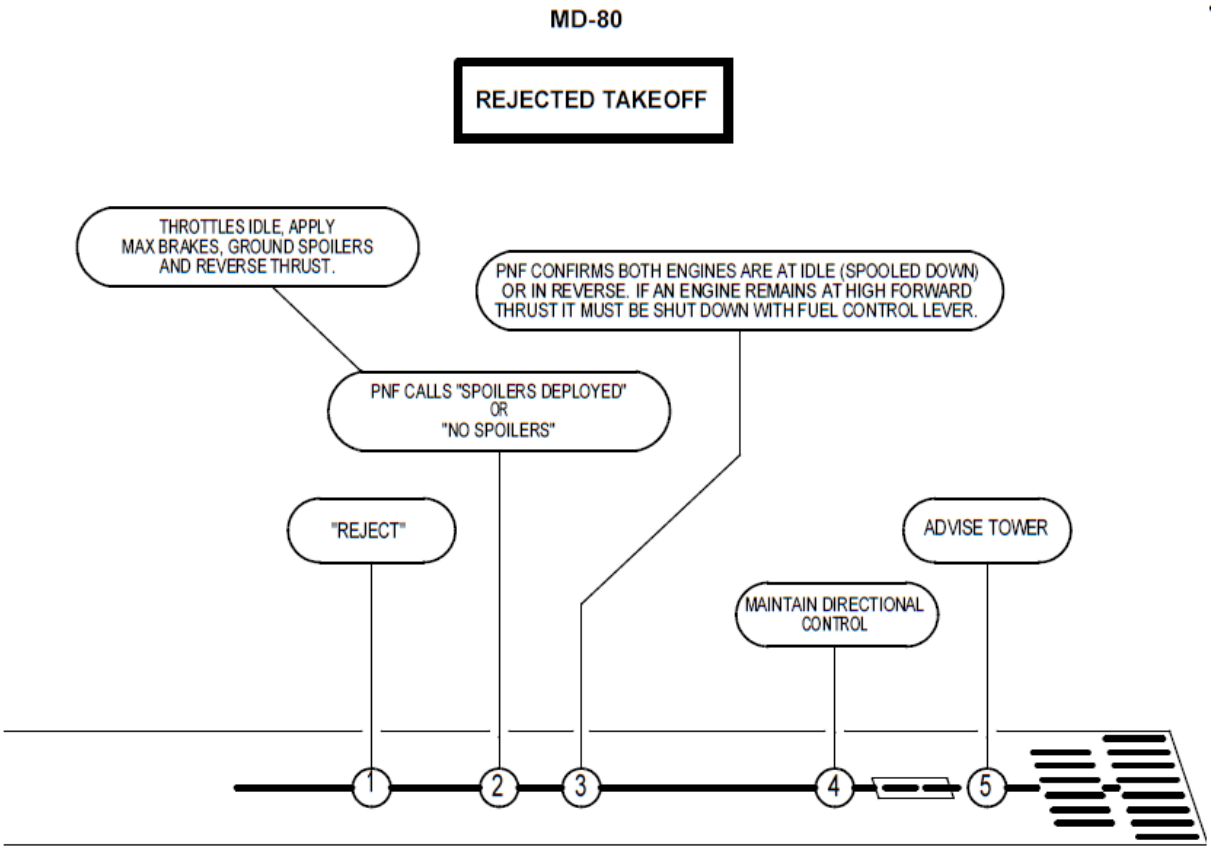

Figure 9: Rejected Takeoff Profile. (Source: Everts Air Cargo MD-80 Flight Crew Operations Manual)

10.8 Aborted Takeoff

The Everts Air Cargo GOM Section 6.8.5 provided the following excerpt about an aborted takeoff:

A. *An aborted takeoff occurs anytime the throttles are advanced and the brakes released on the runway for takeoff. During a 'rolling takeoff', it will be considered an aborted takeoff once the airplane enters the runway with power being advanced for takeoff.*

B. *If a flightcrew member detects any malfunction during the takeoff run, call out the type of malfunction. The captain makes the decision, declares, and initiates the abort.*

10.9 Reduced Thrust Takeoff

The Everts Air Cargo, MD-80 Operating Manual Book 1, provided the following guidance on reduced thrust takeoffs:

B. Reduced Thrust Takeoff:

1. Read down the appropriate wind column to a weight equal to or greater than the actual takeoff weight. Use the corresponding takeoff speeds and flap setting.

Note: A plus (+) sign immediately preceding the maximum takeoff weight indicates that at least one of the V speeds for the actual temperature is than the minimum control speeds and therefore should not be used for reduced thrust settings. Proceed up the column until reaching the last weight without a plus sign and use these V speeds for reduced thrust settings.

2. A reduced thrust takeoff is not permitted:

a. With the ART switch in AUTO.

b. When the runway is wet or contaminated by water, ice, slush or snow.

c. When the MAX AMB value is "N/A."

d. When the actual OAT is hotter than the MAX AMB value.

3. At the actual takeoff weight, note the value in the temperature column. This temperature is the assumed temperature.

4. To set reduced thrust:

a. Place ART switch OFF.

b. Dial the assumed temperature on the ASSUMED TEMP selector in degrees Centigrade.

c. Press the T.O. FLEX button on the TRI. The TRI display should agree with the PEPR MAX at the assumed temperature.

Note: If ART becomes inoperative, P&W allows the flight crew to set the maximum EPR setting for takeoff for one day of operation. A reduced thrust takeoff is allowed if the above conditions are satisfied.

Note: When the actual takeoff weight is less than the lightest weight shown in the wind column, use the takeoff flap setting and takeoff speeds for the lightest weight shown.

10.10 Elevator Controls Jammed or Restricted

The Everts Air Cargo MD-80 Quick Reference Handbook, Section 10 "Flight Controls" provided the following guidance:

<u>WARNING:</u> Do not attempt troubleshooting to free jammed flight controls beyond the scope of this procedure, unless the airplane cannot be safely landed in the existing condition.

NOTE: If freezing water is the cause of the condition, descending into warmer air may free the restriction. If pitch control is not considered adequate for flight conditions, it may be possible to regain partial pitch authority by application of force on both control columns until the free column can be determined.

If pitch control remains jammed or restricted, or if pitch control is inadequate, prior to applying additional force to the control column, perform the following actions:

Seat Belts Switch . . . . . ON
Autopilot . . . . . .DISCONNECT
Maximum Airspeed . . . . . 270 KIAS / .76 M
Autothrottle. . . . . DISCONNECT
Control Columns . . . . . APPLY FORCE AS NECESSARY

The amount of force necessary to achieve partial elevator control will depend upon the location of the elevator control jam and the "stretch" available in the control linkage on the jammed side.

If the pitch response is inadequate through application of force to the unjammed control column, stabilizer trim will be the primary means of controlling pitch. In this condition, a long, straight-in approach should be planned and flown. A stable approach speed should be established and the flight path controlled, primarily by small thrust corrections.
[END]

10.11 Emergency Evacuation

The Everts Air Cargo MD-80 Quick Reference Handbook, "Airplane General" provided the following guidance for "Cockpit Preparation for Passenger Evacuation":

Cabin Attendants . . . . . ALERT
If time permits, alert ATC and ground crew.

Phase Of Flight

In flight

Just prior to landing,
Pressurization System . . . . . DEPRESSURIZE

On ground

After stopping,

EMER LTS Switch . . . . . ON

Parking Brakes. . . . . SET

SPD BRK Lever . . . . . RET

FLAP/SLAT Handle 28/LAND

NOTE: Flap position is for unobstructed egress from airplane. If airplane is at gate and ramp is congested with service vehicles, use good judgment to ensure maximum safety of passengers.

EMER PWR Switch (For VHF-1 Communications and PA). . . . . ON

FUEL Levers . . . . . OFF

ENG FIRE Handles . . . . . PULL

NOTE: If required, discharge fire agent.

Evacuation Command . . . . . INITIATE

Evacuation . . . . . .COMPLETE

All passengers and crew confirmed evacuated.

Time and conditions permitting,

BATT Switch . . . . . OFF

[END]

11.0 Boeing Guidance

11.1 MyBoeingFleet

MyBoeingFleet was a website that Boeing offered to airplane owners and operators. It was offered to maintenance, repair, and overhaul centers as well and provided online access to Boeing products and services. Some of the products offered included maintenance documents, engineering drawings, and flight operations manuals. Additionally, it had an application for electronic discussion groups to facilitate collaboration with other operators and owners. According to Aeromagazine No. 18 dated April 2002[54] it offered the following:

1. *Digital documentation.*
2. *Technology-aided collaboration.*
3. *Integrated information.*

[54] https://www.boeing.com/commercial/aeromagazine/aero_18/myboeingfleet.pdf.

4. *Self-service environment.*
5. *Enhanced customer processes.*
6. *Customized views.*
7. *Hosted customer content.*
8. *Robust infrastructure*

It went on to describe each of the offerings and described those, in part, as:

Digital documentation

...an electronic library of technical documentation, including engineering drawings and maintenance manuals for Boeing commercial airplanes. This digital library benefits operators in several ways.

Operators' technical publication departments can migrate from paper-based documents to a digital environment where they can simplify storage, maintenance, and distribution processes.

Users can be sure that they are viewing the latest information because information on MyBoeingFleet always it up to date. For example, FLEET TEAM™ Digest provides current status on more than 2,000 in-service issues, with approximately 20 new or revised documents being published each workday Operators can use MyBoeingFleet search mechanisms to quickly find the documents they need and locate resources of which they may not have been aware.

Technology-Aided Collaboration

With applications such as electronic discussion groups, MyBoeingFleet encourages collaboration in ways never before possible. … For each airplane model, a committee of representatives from Boeing and the airlines reviews posted comments and determines which items require immediate resolution. Airlines communicate solutions to Boeing that are acceptable in terms of operator cost and schedules...

Boeing uses the FLEET TEAM™ Emerging Issues bulletin board to quickly canvass customers worldwide about potential airworthiness concerns and then provides the U.S. Federal Aviation Administration with an action plan and an industrywide recommendation based on increased airline participation.

INTEGRATED INFORMATION

MyBoeingFleet integrates information so that users can readily navigate from one area of the site to another, thereby saving time and helping to ensure that transactions are accurate. For example, if a user searches Boeing service bulletins and then wants parts purchasing information, an automated linkage helps the user identify relevant parts, obtain part information (e.g., part descriptions, inventory, and interchangeability), and order the parts (fig. 4).

4. SELF-SERVICE ENVIRONMENT

MyBoeingFleet provides users with a number of self-service tools that enable them to use the site to do business directly with Boeing. For instance, customers can use the Repair and Exchange Services product to find Boeing service centers, where Boeing avionics and components can be sent for repair (fig. 5). Users also can search the Repair Capability database by entering the part number or partial part number of the component to be repaired. In addition, users can inquire about parts not currently listed in the database and find information on component exchange programs, customized training, and consulting services.

The Technical Media Tracking application (fig. 5) allows operators to view their distribution plan and revision schedules for Boeing commercial airplane technical documentation. Operators can view a list of the documents they receive, including the delivery format (e.g., paper, microfilm, digital, online), and determine quantities being sent to a particular shipping address. Technical Media Tracking also allows operators to check and update shipping information, track shipments, and update addresses on line. In addition, it allows them to list all online maintenance and repair products that are available over the Internet through MyBoeingFleet.

The Data and Services Catalog (fig. 5) is another self-service tool available through MyBoeingFleet. Customers can view, search, and order available Boeing materials, services, and other items that apply to the operation, maintenance, and repair of Boeing airplanes. Boeing technical media, flight operations materials, maintenance and repair documents, provisioning software, service bulletins, and videotapes also are available for online ordering or purchasing.

5. ENHANCED CUSTOMER PROCESSES

Operators can use MyBoeingFleet to streamline traditional processes, which saves time and improves accuracy. For instance, customers can use the warranty claims application (fig. 6) to submit online warranty claims for airplanes and purchased, Boeing-designed spare parts. Online filing minimizes the chances for error and can reduce the typical seven-day processing cycle by as many as two days. Users also can generate reports, track the status of claims, and identify their warranty contact through an online look-up function.

6. CUSTOMER VIEWS

The MyBoeingFleet home page can be customized for individuals and groups of users. For example, a user can request to be notified when specific service bulletins and updates are released. MyBoeingFleet searches the site for documents that meet these criteria and lists them on the user's MyBoeingFleet home page under the heading "Notices" (fig. 1).

7. HOSTED CUSTOMER CONTENT

Customers can house their customized manuals, revisions, and documents alongside Boeing data on MyBoeingFleet. They then can deliver that information electronically to select individuals or groups at their company through the MyBoeingFleet infrastructure. MyBoeingFleet features—such as searching, document management, customizable views, usage metrics, e-mail notification, and 24-hour support—also apply to hosted customer content.

Boeing also can help operators convert paper documents and other legacy data into industry-standard digital document formats, which then can be hosted on MyBoeingFleet.

8. ROBUST INFRASTRUCTURE

Access to content hosted on MyBoeingFleet is ensured through a geographically dispersed computing infrastructure that provides multiple points of entry to the Boeing knowledge base. To ensure availability and security, Boeing monitors infrastructure performance, conducts security audits, and applies proven technology and operational management processes. Boeing also uses a network of service providers to extend monitoring capability, improve problem identification, and expedite problem resolution.

In 2017 MyBoeingFleet was modified to include, in part:

Based on your input and feedback, we have introduced an enhanced user experience to MyBoeingFleet. The new modern and intelligent user interface will facilitate greater ease of search and navigation across data and services. This is a major step to provide you with the ability to personalize and customize your experience.

Everything you do today will continue to be supported with the addition of features that will improve usability and reduce overall time spent to complete tasks. One new feature you will see is Service Request integration on the MyBoeingFleet home page. Now, your four most recent unresolved service

requests will be displayed with status directly on the homepage for quick reference.

11.2 Operations Bulletin 80-2-017

Boeing published Operations Bulletin 80-2-017, "ELEVATORS NOT JAMMED VERIFICATION" on July 30, 2020. The bulletin was published on the MyBoeingFleet website and was located under the "FCOM-QRH" product tab and located in the subsection "MD80." Additionally, a Boeing representative explained that the MyBoeingFleet system would have also sent an email to the focal at operators, listed within the system, of any new bulletins published for their specific fleet. However, it should be noted that on the MyBoeingFleet system under the FCOM tab the product number, in this case 80-2-017 was listed but under the description it stated "*TNC, V2, Simple PDF"* and listed a date under the date column, no other description or title was provided until "*view"* was selected. 987 Investments LLC was listed as an owner, but MyBoeingFleet had not been accessed by any representative of the LLC. Additionally, Everts Air Cargo was listed as an operator and had first accessed the bulletin on October 23, 2021. The operations bulletin provided operators of MD-80 aircraft with methods to comply with the warning statement in the Temporary Revision 80-2-153, which was developed after two events. That operations bulletin required confirmation prior to each flight that the elevators were not jammed in the trailing edge down position. This bulletin was the second bulletin produced by Boeing about a flight control jam. The first bulletin was issued on June 25, 2001, and was applicable to all DC-9, C9, MD-80, MD-90, and B-717 aircraft. For the MD-80 series of aircraft the bulletin was numbered MD-80-01-02[55]. Operations Bulletin 80-2-017 provided operators and pilots the following information:

> ***Background***
> *There have been two in-service MD-80 events in which one elevator was jammed Trailing Edge Down (TED), and the airplane could not be rotated during takeoff. Both events resulted in the pilots rejecting the takeoff at very high speed. In one event, the airplane was stopped safely on the runway. The other event resulted in a runway overrun.*
>
> *In both cases, while parked prior to the events, the airplanes were exposed to high winds and gusts. Damage resulted to the elevator control system that caused one elevator to be jammed full Trailing Edge Down (TED). In these cases, the control column was free to move normally during the TAXI checklist control rollout. Although the control column feel and travel were normal, the jammed elevator did not respond to pilot pitch input during attempted rotation.*

[55] Source: Operational Factors/Human Performance - Attachment 11 - Boeing Flight Operations Bulletin MD-80-01-02.

Consequently, it has been determined that a visual confirmation that elevator surfaces are not jammed TED is required before flight.

General

The FCOM contains the following CAUTION statement at the beginning of the EXTERIOR INSPECTION PROCEDURE:

CAUTION: Airplanes that are exposed to high-sustained winds, or wind gusts, greater than 55 knots are susceptible to elevator damage and/or jamming. Airplanes suspected to have been subjected to these conditions must be inspected per the Aircraft maintenance manual prior to flight.

The FCOM has been revised per TR 80-2-153 to include a new WARNING at the beginning of the EXTERIOR INSPECTION PROCEDURE requiring elevator TED jam evaluation prior to every flight:

WARNING: Prior to every flight, elevator surfaces must be confirmed as not jammed in the Trailing Edge Down (TED) position. If both elevators are faired with, or above the stabilizer surface, confirmation is complete.

The limitations section of both the FCOM and AFM have been revised to require this elevator preflight evaluation.

Elevator Visual Inspection

During the EXTERIOR INSPECTION PROCEDURE, if the Trailing Edges of both elevators are faired with or above the trailing edge of the stabilizer, the elevators are confirmed to be not jammed TED. If the above conditions are not met, further action is required.

Elevator TED Jam Verification

An elevator that is not faired with or above the trailing edge of the stabilizer can be verified not jammed TED by moving the control column to the full aft stop and confirming that the elevator moved in the Trailing Edge Up (TEU) direction. Movement of the column aft to a position less than full travel (approximately 95%) moves the elevator control tab to the control tab stop. Additional column movement of approximately 5%, to the control column aft stop, will cause the elevator to move towards TEU. Because this last column motion lifts the elevator, substantial physical effort is required. While the column is pulled to its aft stop, if movement of the elevator in the TEU direction is seen by an external observer, the elevator is confirmed not jammed TED. If no TEU movement is observed, inspection of the elevators per the Aircraft Maintenance Manual is required before flight.

Means of Confirmation Summary

The following are satisfactory methods for a flight crew to confirm elevators are not jammed TED. Other methods may be developed by an operator. If a flight crew cannot confirm elevators are not jammed TED, inspection of the elevators per the Aircraft Maintenance Manual is required before flight:

- *Observe whether both elevator trailing edges are faired with or above the trailing edge of the stabilizer. If one or both elevators are not faired with or above the trailing edge of the stabilizer, a flight crew may:*
  - *Contact ground personnel prior to pressurizing the hydraulic system, as procedurally required while accomplishing the BEFORE START checklist, and perform a coordinated check of elevator freedom of movement between the flight crew and ground personnel. Move either control column full forward until the ELEVATOR PWR ON light illuminates (elevators TED) and then check for any upward movement of the elevators as the control column is moved fully aft.*

OR

- *Pull a control column to the full aft stop prior to leaving the cockpit to conduct the preflight external inspection. The elevators may remain displaced and allow the pilot to confirm the elevators are aligned with, or above, the trailing edge of the stabilizer during the exterior inspection.*

OR

- *Perform an approved coordinated procedure between the captain and first officer, one pulling the column while the other observes movement of any elevator that is not faired or above the trailing edge of the stabilizer.*

12.0 FAA Guidance

The FAA provided documentation of 987 Investments LLC communication with the Houston Flight Standards District Office (FSDO) and the Dallas, Texas Certificate Management Office (CMO). Beginning in September 2017 an email request from Everts Air Cargo to the Houston FSDO to operate the accident airplane under 14 *CFR* Part 91 with Everts' Air pilots, specifically pilot in command qualified.

Then in July 2018 there were several emails from 987 Investments LLC submitting an application package for a Letter of Deviation Authority (LODA) for the two MD-87 aircraft to operate a "full blown" part 125 operation as they would like to contract the aircraft to six other companies. In September 2018 Everts Air submitted an email stating that the responsible person was no longer "*in a position*" to ensure all

condition under the letter of authorization (LOA) with the FAA were able to be complied with, specifically RVSM and MEL LOAs. In December 2018, the LOAs were issued by the Houston FSDO to 987 Investment LLC with the responsible person[56] of the RVSM and MEL program being listed as the Everts Air Cargo Director of Operations. In April 2019 the FAA emailed the representative of 987 Investments LLC, and in May of 2019, after receiving no response from the representative, the FAA inspector assigned to 987 Investments LLC informed the representative that the project was terminated and that 987 Investments LLC "*will have to resubmit when ready.*"

12.1 14 *CFR* 91.3 – Responsibility and authority of the pilot in command

FAA regulations provided the following guidance for the responsibility and the authority of the pilot in command of a flight operated under 14 *CFR* Part 91:

> *(a) The pilot in command of an aircraft is directly responsible for, and is the final authority as to, the operation of that aircraft.*
>
> *(b) In an in-flight emergency requiring immediate action, the pilot in command may deviate from any rule of this part to the extent required to meet that emergency.*
>
> *(c) Each pilot in command who deviates from a rule under paragraph (b) of this section shall, upon the request of the Administrator, send a written report of that deviation to the Administrator.*

12.2 14 *CFR* 91.5 - Pilot in Command of Aircraft Requiring More than One Pilot

FAA regulations provided the following guidance for the pilot in command of an aircraft that required more than one pilot to operate under 14 *CFR* Part 91:

> *No person may operate an aircraft that is type certificated for more than one required pilot flight crewmember unless the pilot in command meets the requirements of § 61.58 of this chapter.*

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[56] FAA 8900-1 "Flight Standards Information Management System" Volume 3 "General Technical Administration" Chapter 2 "Exemptions, Deviations, Waivers, and Authorizations", Section 2 "Responsibility for Part 91 Letters of Authorizations (LOA), Certificates of Waiver (CoW), and Letters of Deviation Authority (LODA), Section 3-2-2-5 "Part 91 LOA Issuance Process", section F defined responsible person as "*The Responsible Person for flight operations is the person who has legal authority to sign the LOA on behalf of the operator. Such a person should have ongoing knowledge of the operations of the aircraft. The Responsible Person may be the individual who acts as operator, or, if the operator is a legal entity, an officer, employee, or person duly designated to act on behalf of the operator. The person assumes responsibility for ensuring the operator complies with all applicable regulations, requirements, limitations, and provisions. If the Responsible Person relinquishes responsibility, the LOA is no longer valid. Some LOAs do not contain Responsible Person information; in which case the Responsible Person information contained in LOA A001 applies to those authorizing documents.*" Source: https://fsims.faa.gov/PICDetail.aspx?docId=8900.1,Vol.3,Ch2,Sec2.

12.2.1 14 *CFR* 61.58 - Pilot-in-command Proficiency Check

FAA regulations provided the following guidance, in part, for the required pilot in command proficiency check for operation of an aircraft under 14 *CFR* Part 91 that requires more than one pilot flight crewmember or is turbojet-powered:

(a) Except as otherwise provided in this section, to serve as pilot in command of an aircraft that is type certificated for more than one required pilot flight crewmember or is turbojet-powered, a person must –

(1) Within the preceding 12 calendar months, complete a pilot-in-command proficiency check in an aircraft that is type certificated for more than one required pilot flight crewmember or is turbojet-powered; and

(2) Within the preceding 24 calendar months, complete a pilot-in-command proficiency check in the particular type of aircraft in which that person will serve as pilot in command, that is type certificated for more than one required pilot flight crewmember or is turbojet-powered…

(c) The pilot-in-command proficiency check given in accordance with the provisions of subpart K of part 91, part 121, 125, or 135 of this chapter may be used to satisfy the requirements of this section.

(d) The pilot-in-command proficiency check required by paragraph (a) of this section may be accomplished by satisfactory completion of one of the following:

(1) A pilot-in-command proficiency check conducted by a person authorized by the Administrator, consisting of the aeronautical knowledge areas, areas of operations, and tasks required for a type rating, in an aircraft that is type certificated for more than one pilot flight crewmember or is turbojet-powered; …

(iii) Current qualification under an Advanced Qualification Program (AQP) under subpart Y of part 121 of this chapter;
(iv) Any proficiency check conducted under subpart K of part 91, part 121, or part 135 of this chapter within the prior 12 months if conducted in a turbojet-powered aircraft; or
(v) Any other § 61.58 proficiency check conducted within the prior 12 months if conducted in a turbojet-powered aircraft...

(g) *A check or test described in paragraphs (d)(1) through (5) of this section may be accomplished in a flight simulator under part 142 of this chapter....*

12.3 14 *CFR* 91.403 - General

FAA regulations provided the following guidance for owners and operators of airplane's operated under 14 *CFR* Part 91 on the responsibility of maintaining an aircraft:

(a) The owner or operator of an aircraft is primarily responsible for maintaining that aircraft in an airworthy condition, including compliance with part 39 of this chapter.

(b) No person may perform maintenance, preventive maintenance, or alterations on an aircraft other than as prescribed in this subpart and other applicable regulations, including part 43 of this chapter.

(c) No person may operate an aircraft for which a manufacturer's maintenance manual or instructions for continued airworthiness has been issued that contains an airworthiness limitations section unless the mandatory replacement times, inspection intervals, and related procedures specified in that section or alternative inspection intervals and related procedures set forth in an operations specification approved by the Administrator under part 121 or 135 of this chapter or in accordance with an inspection program approved under § 91.409(e) have been complied with.

(d) A person must not alter an aircraft based on a supplemental type certificate unless the owner or operator of the aircraft is the holder of the supplemental type certificate, or has written permission from the holder.

12.4 14 *CFR* 91.405 – Maintenance Required

FAA regulations provided the following guidance for owners and operators of airplane's operated under 14 *CFR* Part 91 on the required maintenance of an aircraft:

Each owner or operator of an aircraft -

(a) Shall have that aircraft inspected as prescribed in subpart E of this part and shall between required inspections, except as provided in paragraph (c) of this section, have discrepancies repaired as prescribed in part 43 of this chapter;

(b) Shall ensure that maintenance personnel make appropriate entries in the aircraft maintenance records indicating the aircraft has been approved for return to service;

(c) Shall have any inoperative instrument or item of equipment, permitted to be inoperative by § 91.213(d)(2) of this part, repaired, replaced, removed, or inspected at the next required inspection; and

(d) When listed discrepancies include inoperative instruments or equipment, shall ensure that a placard has been installed as required by § 43.11 of this chapter.

12.5 14 *CFR* 91.519 - Passenger Briefing

FAA regulations provided, in part, the following requirements for what a pilot in command should provide to passengers regarding a safety briefing when operating under 14 *CFR* Part 91 (excluding subpart K):

(a) *Before each takeoff the pilot in command of an airplane carrying passengers shall ensure that all passengers have been orally briefed on -*

(1) ***Smoking.*** *Each passenger shall be briefed on when, where, and under what conditions smoking is prohibited. This briefing shall include a statement, as appropriate, that the Federal Aviation Regulations require passenger compliance with lighted passenger information signs and no smoking placards, prohibit smoking in lavatories, and require compliance with crewmember instructions with regard to these items;*

(2) ***Use of safety belts and shoulder harnesses.*** *Each passenger shall be briefed on when, where, and under what conditions it is necessary to have his or her safety belt and, if installed, his or her shoulder harness fastened about him or her. This briefing shall include a statement, as appropriate, that Federal Aviation Regulations require passenger compliance with the lighted passenger sign and/or crewmember instructions with regard to these items;*

(3) *Location and means for opening the passenger entry door and emergency exits;*

(4) *Location of survival equipment;*

(5) *Ditching procedures and the use of flotation equipment required under § 91.509 for a flight over water; and*

(6) *The normal and emergency use of oxygen equipment installed on the airplane.*

(b) *The oral briefing required by paragraph (a) of this section shall be given by the pilot in command or a member of the crew, but need not be given when the pilot in command determines that the passengers are familiar with the contents of the briefing. It may be supplemented by printed cards for the use of each passenger containing -*

(1) *A diagram of, and methods of operating, the emergency exits; and*

(2) *Other instructions necessary for use of emergency equipment.*

(c) *Each card used under paragraph (b) must be carried in convenient locations on the airplane for the use of each passenger and must contain information that is pertinent only to the type and model airplane on which it is used.*

12.6 14 *CFR* Part 125 - Certification of Operations

FAA regulations provide guidance for owners and operators on airplane's that meet a specific requirement for not being able to operate under 14 *CFR* Part 91. 14 *CFR* Part 125.1 defines airplane criteria that if met must operate under Part 125. The guidance is as follows:

§ 125.1 Applicability.

(a) *Except as provided in paragraphs (b), (c) and (d) of this section, this part prescribes rules governing the operations of U.S.-registered civil airplanes which have a seating configuration of 20 or more passengers or a maximum payload capacity of 6,000 pounds or more when common carriage is not involved.*

(b) *The rules of this part do not apply to the operations of airplanes specified in paragraph (a) of this section, when -*

(1) *They are required to be operated under part 121, 129, 135, or 137 of this chapter;*

(2) *They have been issued restricted, limited, or provisional airworthiness certificates, special flight permits, or experimental certificates;*

(3) *They are being operated by a part 125 certificate holder without carrying passengers or cargo under part 91 for training, ferrying, positioning, or maintenance purposes;*

(4) *They are being operated under part 91 by an operator certificated to operate those airplanes under the rules of parts 121, 135, or 137 of this chapter, they are being operated under the applicable rules of part 121 or part 135 of this chapter by an applicant for a certificate under part 119 of this chapter or they are being operated by a foreign air carrier or a foreign person engaged in common carriage solely outside the United States under part 91 of this chapter;*

(5) *They are being operated under a deviation authority issued under § 125.3;*

(6) *They are being operated under part 91, subpart K by a fractional owner as defined in § 91.1001 of this chapter; or*

(7) *They are being operated by a fractional ownership program manager as defined in § 91.1001 of this chapter, for training, ferrying, positioning, maintenance, or demonstration purposes under part 91 of this chapter and without carrying passengers or cargo for compensation or hire except as permitted for demonstration flights under § 91.501(b)(3) of this chapter.*

(c) *The rules of this part, except § 125.247, do not apply to the operation of airplanes specified in paragraph (a) when they are operated outside the United States by a person who is not a citizen of the United States.*

(d) *The provisions of this part apply to each person on board an aircraft being operated under this part, unless otherwise specified.*

(e) *This part also establishes requirements for operators to take actions to support the continued airworthiness of each airplane.*

12.6.1 14 *CFR* 110.1 - Maximum Payload Capacity

14 *CFR* Part 110.1 defines the term "maximum payload capacity" as:

(1) *For an aircraft for which a maximum zero fuel weight is prescribed in FAA technical specifications, the maximum zero fuel weight, less empty weight, less all justifiable aircraft equipment, and less the operating load (consisting of minimum flightcrew, foods and beverages, and supplies and equipment related to foods and beverages, but not including disposable fuel or oil).*

(2) *For all other aircraft, the maximum certificated takeoff weight of an aircraft, less the empty weight, less all justifiable aircraft equipment, and less the operating load (consisting of minimum fuel load, oil, and flightcrew). The allowance for the weight of the crew, oil, and fuel is as follows:*

(i) *Crew - for each crewmember required by the Federal Aviation Regulations-*

(A) *For male flightcrew members - 180 pounds.*

(B) *For female flightcrew members - 140 pounds.*

(C) *For male flight attendants - 180 pounds.*

(D) *For female flight attendants - 130 pounds.*

(E) *For flight attendants not identified by gender - 140 pounds.*

(ii) *Oil - 350 pounds or the oil capacity as specified on the Type Certificate Data Sheet.*

(iii) *Fuel - the minimum weight of fuel required by the applicable Federal Aviation Regulations for a flight between domestic points 174 nautical miles apart under VFR weather conditions that does not involve extended overwater operations.*

Furthermore, a representative of Boeing provided the following information, in part, from the "Boeing's Weights Group"[57]

The amount of payload that can be carried on any given aircraft is a function of its maximum operating weights (MZFW, MTOW, etc.), Center of Gravity (CG) limits, empty weight and CG, fuel capacity/range, main deck passenger layout, and structural capability.

In the Weight and Balance Manual (WBM), the term "Payload" is defined as the weight of the passengers, cargo, and baggage. These may be revenue and/or nonrevenue. Further, the term "Maximum Payload" is defined as the amount of payload calculated by subtracting the airplane empty weight from Maximum Zero Fuel Weight (MZFW). This amount of payload can be further limited by the fwd/aft CG limits.

Different airplanes will have different payload capabilities since they will have different empty weights and CGs, different weight limitations, or different range requirements, so (as noted in earlier emails below) "payload" is not a limitation but the result of other limitations, some of which are structural (how much can the airplane hold) while others are practical/operational (how far does the airplane need to go for this specific flight).

For the MD-87, the maximum cargo capability that can be carried is 15,950 lb and a maximum passenger capacity of 139 people.

12.6.2 Maximum Zero Fuel Weight

Documentation in the form of an undated "Record Summary" provided a maximum zero fuel weight for the accident aircraft of 86,300 lbs. According to FAA interpretation, that record summary and the revised MD-87 Airplane Flight Manual provided an acceptable modification to the limitation. That modification reduced the payload to under 6,000 lbs.

13.0 Aviation Safety Reporting System (ASRS) Reports

In a review of the NASA ASRS database, there were four reports filed for TME airport; however, none of those reports involved a runway excursion nor the runway surface.

[57] Source: Email dated November 3, 2021.

A review of the NASA ASRS database over the 20 years preceding the accident, there were 20 reports of a rejected takeoff in the MD-80 series aircraft. One of those reports[58] with a date of April 2015, completed by the captain of that flight, stated "*On the takeoff roll, all calls and checks were uneventful. Approximately 110 knots to 120 knots, first officer (Pilot Flying) noticed nose coming up. First officer pushed nose forward. No change in the inputs when full forward pressure was applied from the yoke. I called for abort and verbally called for "my controls*." The report further went on to provide that after the airplane was towed to the gate, maintenance checked the setting on the center of gravity, flaps and slats and were in alignment. The mechanics then "*did a control check on the empennage and the mechanics informed us that the left elevator was stuck in the up position*."

F. LIST OF ATTACHMENTS

Attachment 1 – Flight Crew Interview Transcripts

Attachment 2 – Flight Mechanic Interview Transcript

Attachment 3 – N987AK Owner Interview Transcript

Attachment 4 – Everts Personnel Interview Transcript

Attachment 5 – Accident Flight Paperwork

Attachment 6 – Flight Crew Training Records [Excerpts]

Attachment 7 – Accident Flight Fuel Record

Attachment 8 – Boeing MD-80 Quick Reference Handbook [Excerpt]

Attachment 9 – Boeing MD-80 Flight Crew Operations Manual [Excerpt]

Attachment 10 – Boeing Operations Bulletin 80-2-017

Attachment 11 – Previous Boeing Flight Operations Bulletin MD-80-01-02

Attachment 12 – Boeing Reduced Payload Record of Summary for N987AK

Attachment 13 – Audit on Everts Air Cargo MyBoeingFleet Download for Flight Ops

Attachment 14 – Everts Air Cargo General Operations Manual [Excerpt]

Attachment 15 – Everts Air Cargo MD-80 Operating Manual Book 1 [Excerpt]

Attachment 16 – Everts Air Cargo Pictorial of Preflight [Excerpt]

Attachment 17 - FAA Letter of Authorization for 987 Investments LLC

Attachment 18 – NASA ASRS for MD-80 Rejected Takeoff

[58] Source: Operational Factors/Human Performance – Attachment 18 – "NASA ASRS for MD-80 Rejected Takeoff," ACN 1331398.

Attachment 19 – MyBoeingFleet Article

Attachment 20 – Airplane Photo Taken by FO During Preflight

Attachment 21 – Group Party Form

Attachment 22 – Boeing Email on Payload

Attachment 23 – Elevator Check Evaluation

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