



National Transportation Safety Board Aviation Accident Final Report

Location:	LITTLE ROCK, AR	Accident Number:	DCA99MA060
Date & Time:	06/01/1999, 2351 CDT	Registration:	N215AA
Aircraft:	McDonnell Douglas MD-82	Aircraft Damage:	Destroyed
Defining Event:		Injuries:	11 Fatal, 45 Serious, 65 Minor, 24 None
Flight Conducted Under:	Part 121: Air Carrier - Scheduled		

Analysis

The full report (NTSB/AAR-01-02) is available on the NTSB Web site. See <http://www.nts.gov/Publictn/publictn.htm> for details.

On June 1, 1999, at 2350:44 central daylight time,¹ American Airlines flight 1420, a McDonnell Douglas DC-9-82 (MD-82), N215AA, crashed after it overran the end of runway 4R during landing at Little Rock National Airport in Little Rock, Arkansas. Flight 1420 departed from Dallas/Fort Worth International Airport, Texas, about 2240 with 2 flight crewmembers, 4 flight attendants, and 139 passengers aboard and touched down in Little Rock at 2350:20. After departing the end of the runway, the airplane struck several tubes extending outward from the left edge of the instrument landing system (ILS) localizer array, located 411 feet beyond the end of the runway; passed through a chain link security fence and over a rock embankment to a flood plain, located approximately 15 feet below the runway elevation; and collided with the structure supporting the runway 22L approach lighting system. The captain and 10 passengers were killed; the first officer, the flight attendants, and 105 passengers received serious or minor injuries; and 24 passengers were not injured.² The airplane was destroyed by impact forces and a postcrash fire. Flight 1420 was operating under the provisions of 14 Code of Federal Regulations (CFR) Part 121 on an instrument flight rules (IFR) flight plan.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The flight crew's failure to discontinue the approach when severe thunderstorms and their associated hazards to flight operations had moved into the airport area and the crew's failure to ensure that the spoilers had extended after touchdown.

Contributing to the accident were the flight crew's (1) impaired performance resulting from fatigue and the situational stress associated with the intent to land under the circumstances, (2) continuation of the approach to a landing when the company's maximum crosswind

component was exceeded, and (3) use of reverse thrust greater than 1.3 engine pressure ratio after landing.

Findings

Occurrence #1: LOSS OF CONTROL - ON GROUND/WATER

Phase of Operation: LANDING - ROLL

Findings

1. (C) FLIGHT INTO KNOWN ADVERSE WEATHER - CONTINUED - FLIGHTCREW
2. (F) FATIGUE - FLIGHTCREW
3. (C) IMPROPER DECISION - FLIGHTCREW
4. (F) PROCEDURES/DIRECTIVES - NOT COMPLIED WITH - FLIGHTCREW
5. (F) IMPROPER USE OF PROCEDURE - FLIGHTCREW

Occurrence #2: OVERRUN

Phase of Operation: LANDING - ROLL

Findings

6. (C) SPOILER EXTENSION - NOT VERIFIED - FLIGHTCREW
7. (F) REVERSERS - EXCESSIVE - FLIGHTCREW
8. (F) IMPROPER USE OF EQUIPMENT/AIRCRAFT - FLIGHTCREW

Occurrence #3: ON GROUND/WATER COLLISION WITH OBJECT

Phase of Operation: LANDING - ROLL

Findings

9. (F) OBJECT - APPROACH LIGHT/NAVAID

Factual Information

The full report (NTSB/AAR-01-02) is available on the NTSB Web site. See <http://www.ntsbt.gov/Publictn/publictn.htm> for details.

History of Flight

On June 1, 1999, about 2350:44 central daylight time, American Airlines flight 1420, a McDonnell Douglas DC-9-82 (MD-82), N215AA, crashed after it overran the end of runway 4R during landing at Little Rock National Airport in Little Rock, Arkansas. Flight 1420 departed from Dallas/Fort Worth International Airport, Texas, about 2240 with 2 flight crewmembers, 4 flight attendants, and 139 passengers aboard and touched down in Little Rock about 2350:20. After departing the end of the runway, the airplane struck several tubes extending outward from the left edge of the instrument landing system (ILS) localizer array, located 411 feet beyond the end of the runway; passed through a chain link security fence; went down a rock embankment to a flood plain, located approximately 15 feet below the runway elevation; and collided with the structure supporting the runway 22L approach lighting system. The captain and 10 passengers were killed; the first officer, the flight attendants, and 105 passengers received serious or minor injuries; and 24 passengers were not injured. The airplane was destroyed by impact forces and a postcrash fire. Flight 1420 was operating under the provisions of 14 Code of Federal Regulations (CFR) Part 121 on an instrument flight rules (IFR) flight plan.

Flight 1420 was the third and final leg of the first day of a 3-day sequence for the flight crew. The flight sequence began at O'Hare International Airport, Chicago, Illinois. According to American Airlines company records, the captain checked in for the flight at 1038, and the first officer checked in at 1018. Flight 1226, from Chicago to Salt Lake City International Airport, Utah, departed about 1143 and arrived about 1458 (1358 mountain daylight time). Flight 2080, from Salt Lake City to Dallas/Fort Worth, departed about 1647 (1547 mountain daylight time) and arrived about 2010, 39 minutes later than scheduled because of an airborne hold during the approach resulting from adverse weather in the airport area. The captain was the flying pilot for flight 1226, and the first officer was the flying pilot for flight 2080.

Flight 1420, from Dallas/Fort Worth to Little Rock, was scheduled to depart at 2028 and arrive at 2141. However, before its arrival at Dallas/Fort Worth, the flight crew received an aircraft communication addressing and reporting system (ACARS) message indicating a delayed departure time of 2100 for flight 1420. After deplaning from flight 2080, the flight crew proceeded to the departure gate for flight 1420. The flight crew then received trip paperwork for the flight, which included an American Airlines weather advisory for a widely scattered area of thunderstorms along the planned route and two National Weather Service (NWS) in-flight weather advisories for an area of severe thunderstorms along the planned route.

The airplane originally intended to be used for the flight was delayed in its arrival to Dallas/Fort Worth because of the adverse weather in the area. After 2100, the first officer notified gate agents that flight 1420 would need to depart by 2316 because of American's company duty time limitation. The first officer then telephoned the flight dispatcher to suggest that he get another airplane for the flight or cancel it. Afterward, the accident airplane, N215AA, was substituted for flight 1420. The flight's 2240 departure time was 2 hours 12 minutes later than the scheduled departure time. The captain was the flying pilot, and the first officer was the nonflying pilot.

About 2254, the flight dispatcher sent the flight crew an ACARS message indicating that the weather around Little Rock might be a factor during the arrival. The dispatcher suggested that the flight crew expedite the arrival to beat the thunderstorms if possible, and the flight crew acknowledged this message. The first officer indicated, in a postaccident interview, that "there was no discussion of delaying or diverting the landing" because of the weather. According to the predeparture trip paperwork, two alternate airports-Nashville International Airport, Tennessee, and Dallas/Fort Worth-were specified as options in case a diversion was needed.

Beginning about 2258, flight 1420 was handled by controllers from the Fort Worth Air Route Traffic Control Center (ARTCC). About 2304, the Fort Worth center broadcast NWS Convective SIGMET [significant meteorological information] weather advisory 15C for an area of severe thunderstorms that included the Little Rock airport area. The cockpit voice recorder (CVR) indicated that the flight crew had discussed the weather and the need to expedite the approach. About 2325:47, the captain stated, "we got to get over there quick." About 5 seconds later, the first officer said, "I don't like that that's lightning," to which the captain replied, "sure is." The CVR also indicated that the flight crew had the city of Little Rock and the airport area in sight by about 2326:59.

About 2327, the Fort Worth center cleared the flight to descend to 10,000 feet mean sea level (msl) and provided an altimeter setting of 29.86 inches of mercury (Hg). The flight was transferred about 2328 to the Memphis ARTCC, which provided the same altimeter setting.

According to the CVR, the flight crew contacted the Little Rock Air Traffic Control Tower (ATCT) about 2334:05. The controller advised the flight crew that a thunderstorm located northwest of the airport was moving through the area and that the wind was 280 degrees at 28 knots gusting to 44 knots. The first officer told the controller that he and the captain could see the lightning. The controller told the flight crew to expect an ILS approach to runway 22L. The first officer indicated in a postaccident interview that, during the descent into the terminal area, the weather appeared to be about 15 miles away from the airport and that he and the captain thought that there was "some time" to make the approach.

The CVR indicated that, between about 2336:04 and about 2336:13, the captain and first officer discussed American Airlines' crosswind limitation for landing. The captain indicated that 30 knots was the crosswind limitation but realized that he had provided the limitation for a dry runway. The captain then stated that the wet runway crosswind limitation was 20 knots, but the first officer stated that the limitation was 25 knots. In testimony at the Safety Board's public hearing on this accident, the first officer stated that neither he nor the captain checked the actual crosswind limitation in American's flight manual. The first officer testified that he had taken the manual out but that the captain had signaled him to put the manual away because the captain was confident that the crosswind limitation was 20 knots.

About 2339:00, the controller cleared the flight to descend to an altitude of 3,000 feet msl. The controller then asked the flight crew about the weather conditions along the runway 22L final approach course, stating his belief that the airplane's weather radar was "a lot better" than the weather radar depiction available in the tower. About 2339:12, the first officer stated, "okay, we can see the airport from here. We can barely make it out but we should be able to make [runway] two two that storm is moving this way like your radar says but it is a little bit farther off than you thought." The controller then offered flight 1420 a visual approach to the runway,

but the first officer indicated, "at this point, we really can't make it out. We're gonna have to stay with you as long as possible."

About 2339:45, the controller notified flight 1420 of a windshear alert, reporting that the centerfield wind was 340 degrees at 10 knots, the north boundary wind was 330 degrees at 25 knots, and the northwest boundary wind was 010 degrees at 15 knots. The flight crew then requested runway 4R so that there would be a headwind, rather than a tailwind, during landing. About 2340:20, the controller instructed the flight crew to fly a heading of 250 degrees for vectors to the runway 4R ILS final approach course. After reaching the assigned heading, the airplane was turned away from the airport and clear of the thunderstorm that had previously been reported by the controller. The CVR indicated that, between 2340:46 and 2341:31, the first officer stated the localizer frequency and course, the decision altitude, the minimum safe altitude, and a portion of the missed approach procedure for runway 4R.

Between about 2342:19 and 2342:24, the CVR indicated that the captain asked the first officer, "do you have the airport? Is that it right there? I don't see a runway." About 2342:27, the controller told the flight crew that the second part of the thunderstorm was apparently moving through the area and that the winds were 340 degrees at 16 knots gusting to 34 knots. About 2342:40, the first officer asked the captain whether he wanted to accept "a short approach" and "keep it in tight." The captain answered, "yeah, if you see the runway 'cause I don't quite see it." The first officer stated, "yeah, it's right here, see it?" The captain replied, "you just point me in the right direction and I'll start slowing down here." About 2342:55, the first officer said, "it's going right over the field." About 2342:59, the first officer told the controller, "well we got the airport. We're going between clouds. I think it's right off my, uh, three o'clock low, about four miles." The controller then offered a visual approach for runway 4R, and the first officer accepted. About 2343:11, the controller cleared flight 1420 for a visual approach to runway 4R and indicated "if you lose it, need some help, let me know please."

About 2343:35, the first officer stated, "...you're comin' in. There's the airport." Three seconds later, the captain stated, "uh I lost it," to which the first officer replied, "...see it's right there." The captain then stated, "I still don't see it...just vector me. I don't know." About 2343:59, the controller cleared flight 1420 to land and indicated that the winds were 330 degrees at 21 knots. About 2344:19, the captain stated, "see we're losing it. I don't think we can maintain visual." About 2344:30, the first officer informed the controller that visual contact with the airport had been lost because of a cloud between the airplane and the airport. The controller then cleared the airplane to fly a heading of 220 degrees for radar vectors for the ILS approach to runway 4R and directed the flight to descend to and maintain 2,300 feet msl. About 2345:47, the first officer told the controller "...we're getting pretty close to this storm, we'll keep it tight if we have to." The controller indicated to the flight crew that, "when you join the final, you're going to be right at just a little bit outside the marker if that's gonna be okay for ya." The captain stated, "that's great," and the first officer told the controller, "that's great with us." About 2346:39, the controller advised the flight crew that the airplane was 3 miles from the outer marker.

About 2346:52, the captain stated, "aw, we're goin' right into this." At the same time, the controller reported that there was heavy rain at the airport, the automatic terminal information service (ATIS) information in effect at the time was no longer current, the visibility was less than 1 mile, and the runway visual range (RVR) for runway 4R was 3,000 feet. The first officer acknowledged this information. About 2347:08, the controller again cleared flight 1420 to land

and indicated that the wind was 350 degrees at 30 knots gusting to 45 knots. The first officer then read back the wind information as 030 degrees at 45 knots. About 2347:22, the captain stated, "three thousand RVR. We can't land on that." Four seconds later, the first officer indicated that the RVR for runway 4R was 2,400 feet, and the captain then said, "okay, fine."

About 2347:44, the captain stated, "landing gear down," and the CVR recorded a sound consistent with the landing gear being operated. About 5 seconds later, the captain stated, "and lights please." About 2347:53, the controller issued a second windshear alert for the airport, reporting that the centerfield wind was 350 degrees at 32 knots gusting to 45 knots, the north boundary wind was 310 degrees at 29 knots, and the northeast boundary wind was 320 degrees at 32 knots. This transmission was not acknowledged by the flight crew. About 2348:10, the captain stated, "add twenty [knots]," to which the first officer replied, "right."

About 2348:12, the controller reported that the runway 4R RVR was now 1,600 feet. About 2348:18, the captain indicated that the flight was established on final approach; 6 seconds later, the first officer informed the controller that the flight was established on the inbound portion of the ILS. The controller repeated the clearance to land; stated that the wind was 340 degrees at 31 knots, the north boundary wind was 300 degrees at 26 knots, and the northeast boundary wind was 320 degrees at 25 knots; and repeated the RVR. About 2348:41, the first officer acknowledged this information. The controller did not receive any further transmissions from flight 1420. About 2349:02, the first officer asked the captain, "want 40 flaps?" The captain indicated that he thought he had already called for the landing flaps, after which the first officer stated, "forty now." About 2349:10, the controller informed the flight crew that the wind was 330 degrees at 28 knots. Two seconds later, the captain stated, "this is a can of worms."

According to the CVR, the first officer stated, "there's the runway off to your right, got it?" about 2349:24. The captain replied, "no," to which the first officer stated, "I got the runway in sight. You're right on course. Stay where you're at." The captain then stated, "I got it. I got it." About 2349:32, the controller reported the wind to be 330 degrees at 25 knots. About 2349:37, an unidentified voice in the cockpit stated, "wipers," and the CVR then recorded a sound consistent with windshield wiper motion. (This sound continued throughout the rest of the flight.) About 2349:53, the controller reported the wind to be 320 degrees at 23 knots.

The CVR indicated that, at 2349:57, an unidentified voice in the cockpit stated, "aw we're off course" and that, 1 second later, an unintelligible comment was made by an unidentified voice in the cockpit. In a postaccident interview, the first officer stated that he thought the approach was stabilized until about 400 feet above field level (afl), at which point the airplane drifted to the right. The first officer also stated that he said "go around" about that time but not in a very strong voice. The first officer indicated that he had looked at the captain to see if he had heard him but that the captain was intent on flying and was doing "a good job."

The CVR indicated that, at 2350:00, the first officer said, "we're way off." Flight data recorder (FDR) information indicated that the localizer deviation value was about one dot to the right at that point. About 1 second later, the captain stated, "I can't see it." About 3 seconds afterward, the first officer asked, "got it?" to which the captain replied, "yeah, I got it." About 2350:13 and :14, the CVR recorded the sound of the ground proximity warning system (GPWS) radio altitude callout "sink rate." Calculations based on FDR data indicated that the airplane was descending through an altitude of about 70 feet afl at the time of the first sink rate warning and about 50 feet afl at the time of the second warning. FDR and CVR data indicated that the

airplane touched down on the runway about 2350:20. About 2350:22, the first officer stated "we're down;" about 2 seconds later, he stated, "we're sliding." FDR data also indicated that, over a 7-second period after touchdown, both thrust reversers were deployed and the left and right engines' engine pressure ratios (EPR) reached settings of 1.89 and 1.67, respectively. The thrust reversers were subsequently moved to the unlocked status (neither deployed nor stowed). According to the FDR, the flight spoilers did not deploy symmetrically at touchdown, but a momentary 8° deflection of the left outboard flight spoiler concurrent with a left aileron deflection was recorded.

FDR data indicated that the right and left brake pedals began to move about 2350:25 and :30, respectively, and both pedals reached full travel about 2350:31. About the time the brakes were applied, the thrust reversers were deployed again. About 2350:32, the CVR recorded an unidentified voice in the cockpit stating "on the brakes." The left engine reached a maximum setting of 1.98 reverse EPR, and the right engine reached a setting of 1.64 reverse EPR. The left brake pedal was relaxed at 2350:34 before returning to its full position 2 seconds later. About the time that the left brake pedal was relaxed, the reversers were returned to the unlocked status. As the right thrust reverser was being moved to the unlocked status, the right engine reached a maximum setting of 1.74 reverse EPR.

About 2350:36, FDR data indicated a full 60 degrees deployment of the right inboard flight spoiler, concurrent with a full aileron deflection. About 2350:40, the left thrust reverser was moved back to the deployed position, but the right reverser moved briefly to the deployed position and then moved to the stowed position. According to FDR data, the left thrust reverser remained deployed, and the right thrust reverser remained stowed, for the remainder of the flight. About 1 second later, the CVR recorded expletives stated by an unidentified voice in the cockpit, which were followed by the sounds of initial impact about 2350:44 and several additional impacts beginning about 2350:47. The CVR stopped recording about 2350:48. The airplane came to rest about 800 feet from the departure end of runway 4R, 34 degrees 44.18 minutes north latitude and 92 degrees 11.97 minutes west longitude. The accident occurred during the hours of darkness.

Pilot Information

Certificate:	Airline Transport	Age:	48, Male
Airplane Rating(s):	Multi-engine Land	Seat Occupied:	Left
Other Aircraft Rating(s):		Restraint Used:	
Instrument Rating(s):		Second Pilot Present:	Yes
Instructor Rating(s):		Toxicology Performed:	
Medical Certification:	Class 1 Valid Medical--no waivers/lim.	Last FAA Medical Exam:	02/09/1999
Occupational Pilot:		Last Flight Review or Equivalent:	
Flight Time:	10234 hours (Total, all aircraft), 7384 hours (Pilot In Command, all aircraft), 54 hours (Last 90 days, all aircraft), 14 hours (Last 30 days, all aircraft)		

Co-Pilot Information

Certificate:	Airline Transport	Age:	35, Male
Airplane Rating(s):	Multi-engine Land	Seat Occupied:	Right
Other Aircraft Rating(s):		Restraint Used:	
Instrument Rating(s):		Second Pilot Present:	Yes
Instructor Rating(s):		Toxicology Performed:	
Medical Certification:	Class 1 Valid Medical--no waivers/lim.	Last FAA Medical Exam:	02/22/1999
Occupational Pilot:		Last Flight Review or Equivalent:	
Flight Time:	4292 hours (Total, all aircraft), 182 hours (Total, this make and model), 176 hours (Last 90 days, all aircraft), 65 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	McDonnell Douglas	Registration:	N215AA
Model/Series:	MD-82 MD-82	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	No
Airworthiness Certificate:	Transport	Serial Number:	49163
Landing Gear Type:	Retractable - Tricycle	Seats:	139
Date/Type of Last Inspection:	05/31/1999, Unknown	Certified Max Gross Wt.:	
Time Since Last Inspection:		Engines:	2 Turbo Fan
Airframe Total Time:	449136 Hours at time of accident	Engine Manufacturer:	P&W
ELT:	Not installed	Engine Model/Series:	JT8D-217C
Registered Owner:	AMERICAN AIRLINES INC	Rated Power:	
Operator:	AMERICAN AIRLINES INC	Operating Certificate(s) Held:	Flag carrier (121)
Operator Does Business As:		Operator Designator Code:	AALA

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument Conditions	Condition of Light:	Night
Observation Facility, Elevation:	, 0 ft msl	Distance from Accident Site:	0 Nautical Miles
Observation Time:	2350 CDT	Direction from Accident Site:	0°
Lowest Cloud Condition:	Few / 3700 ft agl	Visibility	1 Miles
Lowest Ceiling:	Overcast / 5000 ft agl	Visibility (RVR):	0 ft
Wind Speed/Gusts:	18 knots / 26 knots	Turbulence Type Forecast/Actual:	/
Wind Direction:	280°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	29.9 inches Hg	Temperature/Dew Point:	19° C / 17° C
Precipitation and Obscuration:			
Departure Point:	DFW, TX	Type of Flight Plan Filed:	Unknown
Destination:	LITTLE ROCK, AR	Type of Clearance:	IFR
Departure Time:	2240 CDT	Type of Airspace:	

Airport Information

Airport:	ADAMS FIELD (LIT)	Runway Surface Type:	Concrete
Airport Elevation:	260 ft	Runway Surface Condition:	Wet
Runway Used:	4R	IFR Approach:	ILS
Runway Length/Width:	7200 ft / 150 ft	VFR Approach/Landing:	

Wreckage and Impact Information

Crew Injuries:	1 Fatal, 4 Serious, 1 Minor	Aircraft Damage:	Destroyed
Passenger Injuries:	10 Fatal, 41 Serious, 64 Minor, 24 None	Aircraft Fire:	On-Ground
Ground Injuries:	N/A	Aircraft Explosion:	
Total Injuries:	11 Fatal, 45 Serious, 65 Minor, 24 None	Latitude, Longitude:	

Administrative Information

Investigator In Charge (IIC):	GREGEORY FEITH	Report Date:	05/28/2002
Additional Participating Persons:	TONY JAMES		
Publish Date:			
Investigation Docket:	NTSB accident and incident dockets serve as permanent archival information for the NTSB's investigations. Dockets released prior to June 1, 2009 are publicly available from the NTSB's Record Management Division at pubinq@ntsb.gov , or at 800-877-6799. Dockets released after this date are available at http://dms.nts.gov/pubdms/ .		

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

The Independent Safety Board Act, as codified at 49 U.S.C. Section 1154(b), precludes the admission into evidence or use of any part of an NTSB report related to an incident or accident in a civil action for damages resulting from a matter mentioned in the report. A factual report that may be admissible under 49 U.S.C. § 1154(b) is available [here](#).