
Taxi through drainage ditch, Boeing 727-2Q8, August 8, 1998

Micro-summary: This Boeing 727-2Q8 taxied through a drainage ditch.

Event Date: 1998-08-08 at 0012 PDT

Investigative Body: National Transportation Safety Board (NTSB), USA

Investigative Body's Web Site: <http://www.nts.gov/>

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		NTSB ID: LAX98IA261		Aircraft Registration Number: N831L	
		Occurrence Date: 08/08/1998		Most Critical Injury: None	
		Occurrence Type: Incident		Investigated By: NTSB	
Location/Time					
Nearest City/Place LAS VEGAS		State NV	Zip Code 89111	Local Time 0012	Time Zone PDT
Airport Proximity: On Airport		Distance From Landing Facility:		Direction From Airport:	
Aircraft Information Summary					
Aircraft Manufacturer Boeing		Model/Series 727-2Q8		Type of Aircraft Airplane	
Sightseeing Flight: No			Air Medical Transport Flight: No		
Narrative					
Brief narrative statement of facts, conditions and circumstances pertinent to the accident/incident:					
<p>HISTORY OF FLIGHT</p> <p>On August 8, 1998, about 0012 hours Pacific daylight time, a Boeing 727-2Q8, N831L, operated by Delta Air Lines, Inc., as Flight 190, sustained minor damage when the crew taxied through a drainage ditch en route to runway 7L at the McCarran International Airport (LAS), Las Vegas, Nevada. The 3 flight crewmembers, 3 flight attendants, and 149 passengers were not injured. The flight reported they were unaware of any damage, continued to taxi, and departed. The flight was conducted under 14 CFR Part 121 as a nonstop regularly scheduled domestic passenger flight destined for Covington/Cincinnati/Northern Kentucky International Airport (CVG), near Cincinnati, Ohio. An IFR flight plan was filed.</p> <p>According to statements from the flight crew, the flight to CVG was normal and landed without incident at the destination. The oncoming flight crew at CVG discovered the damage to the airplane during a preflight walk around. The airplane received scrapes to the No. 1 slat, No. 8 slat, right wing outboard flap track canoe, and, the left and right wing tips. Additional damage included a 5-by 1-inch tear in the right wing skin, scrapes to the trailing edge flaps, and the nosewheel taxi light. Foreign object damage was also noted to the No. 3 engine C1 and C2 fans and the C1 stator and fan exit cases.</p> <p>On August 12 and 13, 1998, Safety Board investigators and Federal Aviation Administration (FAA) Airworthiness Inspectors from the Las Vegas Flight Standards District Office (FSDO) inspected the ramp area at LAS and the drainage ditch where the incident occurred. Measurements of the 800-foot-long ditch revealed it to be approximately 97 feet wide at the middle of the ditch and 4 feet deep at the deepest point near the middle. Tire marks consistent with the Boeing 727 airplane were found, which entered the ditch at approximately a 45-degree angle to the longitudinal axis of the ditch and exited out the other side. The slope of the ditch sides at the point where the tracks entered was measured at 15 degrees. Impressions and scrape marks dimensionally consistent with the size and shape of the airplane's wing tips were noted on the edges of the ditch and were measured at 102 feet apart. The distance from the left scrape mark to the left tire tracks was 44 feet, and the measurement from the right scrape mark to the right tire tracks was 43 feet. A diagram of the Boeing 727-200 series airplane was located and indicated that the principal dimensions for wingtip to wingtip measurements was 108 feet.</p> <p>The Safety Board Operations Group interviewed the flight deck crewmembers, the three flight attendants and the chief pilot of Delta in Cincinnati on August 24 and 25th, 1998.</p> <p>The captain of the flight stated that he was on the last day of a 4-day sequence in Salt Lake City, Utah. He arrived for duty at 2200. He said that the initial outbound airplane had an engine problem and that they substituted airplanes due to a mechanical problem. He stated that he and the first officer checked the paperwork, including a Notice to Airmen (NOTAM) which stated, "Caution</p>					
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new terminal has a ditch located directly from center of terminal that is not easily visible." The captain said the crew discussed the NOTAM and he stated he thought the ditch was two circle shaped areas off the end of Concourse D. None of the flight crew recalled seeing any additional information regarding the ditch other than the NOTAM. The captain said he gave a crew briefing in Salt Lake City, which included instructions to be aware of the poorly marked taxiways in LAS.

The captain stated that they performed a preflight check of the aircraft and pushed back from the gate in Salt Lake City at 2257. The flight from SLC was uneventful and they arrived at LAS at 2314. The captain said they were about 1 hour late out of Salt Lake City, and that they arrived in Las Vegas late. He stated that they were on the ground in Las Vegas "about 45 minutes," and pushed back from the gate about midnight. The captain and the first officer reviewed a complete new set of flight departure paperwork in LAS, which included the NOTAM about the ditch.

The flight was pushed back from the gate at Concourse D. The crew started engine numbers 1 and 2 because the aircraft weighed about 186,000 pounds and the temperature was 97 degrees Fahrenheit. This weight was near the maximum airplane gross weight of 190,000 pounds. The captain said that they accomplished the after-start checklist, then they got taxi clearance to spot 4 from ramp control. Spot 4 was located north of taxiway Charlie (C) between taxiway Charlie 4 (C-4) and taxiway Charlie 3 (C-3). Spot 4 was not depicted on the pilot's airport diagram chart (Jeppesen chart 10-9) or on the McCarran International Airport's airport diagram chart, but was shown on the Delta Airlines Jeppesen chart 10-0B. The captain said he acknowledged to the first officer that he heard the taxi clearance and taxied to spot 4, where he stopped the airplane and the first officer requested taxi clearance from LAS ground control.

The captain said that they originally planned to depart via runway 25R but once they determined that the winds were unfavorable, they asked for a runway change to runway 7L because it was longer and had a greater margin of safety for takeoff. He said that they extended the flaps to the takeoff setting after the first two engines were started and that the after-start checklist was accomplished during taxi and prior to reaching spot 4.

The captain stated that during taxi they had the taxi lights on. During the interview, he was asked if the taxi lights were positioned properly to illuminate the area in front of the airplane, and the captain said that the taxi light was pointing up "slightly." He stated that he didn't think it was important enough to write up for maintenance. The captain said he did not recall seeing any markings or lights on taxiway C. Taxiway C had a painted double yellow line parallel and adjacent to the ditch and a yellow centerline. Taxiway C did not have any centerline lighting or blue taxiway edge lights.

According to the captain, while they were sitting at spot 4, the first officer requested runway 7L.

He said that the ground control instructions were to "turn right on Charlie (taxiway C), left on Charlie 5 (taxiway C-5), right on Bravo (taxiway Bravo), and hold short of 19L (runway 19L)." He said that they switched to the airport diagram, (Jeppesen page 10-9), and started to taxi forward to gain momentum for the turn. As he was getting ready to turn the airplane, the ground controller called and stated, "let me make things easier on you . . . after the America West crosses from right to left, turn right on taxiway Bravo (B) and hold short of runway 19L." The captain stopped taxiing the airplane and waited for the America West airplane that was taxiing westbound on taxiway B.

As the captain looked down at the taxiway diagram, he was thinking of spot 4 and confused it with taxiway C4, and proceeded as instructed by ground control to make the right turn on taxiway Bravo. He was asked if he discussed this clearance with anyone else, and he replied, "No." The captain taxied the airplane forward across taxiway C, through the ditch, and made a right turn onto taxiway B. (The distance from spot 4 to the edge of the ditch was subsequently measured at 86 feet.)

The captain said that as he started to taxi ahead and went into the ditch, it felt like a slight

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depression in the taxiway. He said he felt the bump and started down the ditch, which allowed the taxi light to illuminate the far side of the ditch. He said all of a sudden, he saw a white surface that he thought was concrete. He thought that it was safer to continue across the depression rather than stomping on the brakes at this point. He indicated that he had been on taxiways rougher than what he had just experienced. He said that he did not know it was a ditch when he entered it and thought it was a drainage depression.

After turning onto taxiway Bravo, the captain said, "What was that? We were at C4." He then stated we were at spot 4 not taxiway "C4." He said we must have crossed right here and pointed to an area between C4 and C3 on the airport taxiway diagram. He indicated that there was a group discussion among the pilots and the consensus was that nobody heard anything, felt anything, or saw any unusual lights.

After the airplane turned onto taxiway Bravo, the A-line flight attendant, who was seated on the forward jumpseat, received an interphone call from a flight attendant in the aft section who asked, "what was that?" The A-line flight attendant then tried to call the cockpit, but did not receive a response. The aft flight attendant called the cockpit and informed the pilots that the passengers were concerned and asked the pilots what had happened. She was told by the flight engineer that they had gone through "a dip in the taxiway" and that they would make an announcement. The second officer made the announcement and said that they had just gone over a dip in the taxiway and that there was nothing to be concerned about.

The captain stated that the number 3 engine was started just before takeoff and the engine start was normal. He reported that the approach and landing in Cincinnati was normal and that all shutdown checklists were performed.

The first officer said he called the ramp tower and was cleared to taxi to spot 4. He stated they held at spot 4 and then called ground control and told them that they were at spot 4. He said that after discussing the winds with the other crewmembers they decided to ask for runway 7L. Ground control said, "Turn right on Charlie, left on Charlie 5, right on Bravo, and hold short of 19L." Just as the captain started to taxi, the ground controller said, "Tell you what. Let me make it easy on you. There is an America West from right to left on Bravo, after he passes turn right on Bravo, hold short of 19L." He said he started to look outside and then rechecked his chart, as did the captain, because it was confusing.

The first officer said they only had the nose taxi lights on. He said he was unsure if he saw any taxiway markings, and that blue edge lights would have helped, but there were none. He saw no double yellow lines, but remembered spot 4 taxi lines. He thought there were taxi lines on taxiway Charlie. After the captain started moving the airplane, the next thing we noticed was the nose dipping and the taxi light had illuminated the ditch. He said, "We all knew it was a ditch. It looked like concrete." He described it as a pretty gentle slope and at the bottom of the ditch he felt something. He said that the sequence of the motion of the airplane was "left went down first then right as we came up." He was asked if the transition was rough and he said, "yes, it felt like a pothole, but it was not terribly bad, rougher than normal." He stated he heard nothing, had no sensation that they struck anything, and didn't feel the wingtips make contact. He said he commented that "Oh, here's the ditch." He stated that once they were out of the ditch they discussed having gone through it. He said that everything appeared ok.

PERSONNEL INFORMATION

The captain held an airline transport certificate with airplane multiengine land and instrument ratings. His date of hire with Delta Airlines was August 15, 1986, and he was type rated in the Boeing 727 and 737 aircraft. He stated he had approximately 8,000 hours of total flight time; 4,000 hours of pilot-in-command, 2,500 hours of second-in-command, and 1,500 hours of flight engineer time. In the preceding 24 hours and 30 days, the captain estimated he had accrued flight

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time of 13 and 38 hours, respectively.

The captain completed his last recurrent ground training and simulator check in June 1998. He held a first-class medical certificate issued on April 24, 1998, with no limitations or waivers.

The first officer held an airline transport certificate with airplane multiengine land and instrument ratings. His date of hire with Delta Airlines was May 14, 1997. He was type rated in the Lockheed Electra L-188 and a British Aerospace Jetstream 3100. He stated that he had approximately 3,800 hours of total flight time; 1,700 hours of pilot-in-command, 1,800 hours of second-in-command, and 300 hours of flight engineer time. In the preceding 24 hours and 30 days, the first officer estimated he had accrued flight time of 13 and 39 hours, respectively.

The first officer completed his initial check ride with the company on October 24, 1997. He held a first-class medical certificate issued on December 12, 1997, with no limitations or waivers.

The flight engineer held an airline transport certificate with airplane multiengine land and instrument ratings. His date of hire with Delta Airlines was December 31, 1997. He was type rated in the Brazilia EMB-120. He stated that he had approximately 7,500 hours of total flight time; 2,500 hours of pilot-in-command, and 200 hours of flight engineer time. He estimated that he had accumulated 13 hours in the proceeding 24 hours and 43 hours of flight time in the preceding 30 days.

He completed his initial check ride with the company in March 1998. The flight engineer held a first-class medical certificate issued on December 12, 1997, with no limitations or waivers.

AIR TRAFFIC CONTROL

Transcripts of the recorded air-to-ground communications at the Las Vegas Air Traffic Control Tower were reviewed. At 0008, Delta Flight 190 (referred to in the FAA transcript of conversation as DAL 190) called ground control east and said they were at spot 4 with "whiskey," (Automatic Terminal Information Service) ready to taxi. The ground controller instructed DAL 190 to taxi to runway 25 right. DAL 190 asked for the wind and was told that it was 130 degrees at 5 knots. DAL 190 told the controller that was too much of a tail wind and the ground controller asked them for their request.

At 0011, DAL 190 requested runway 7 left for departure due to the winds and their takeoff weight. A review of the ATC tape revealed that ground control cleared DAL 190 to "Runway 7 Left via Charlie, turn left at Charlie 5 to Bravo, Bravo hold short of Runway 19 Left." Shortly thereafter, ground control called DAL 190 and advised "DAL hold there and wait for America West to go right to left. Make a right turn on Bravo . . . it will make it easier." DAL 190 acknowledged the instructions and said, "ok, that sounds good. We'll wait for them and make a right turn on Bravo and hold short of 19L."

METEOROLOGICAL INFORMATION

The 2356 METAR reported in part: 1,300 feet broken; 10 statute miles visibility; scattered clouds at 20,000 feet; temperature 92 degrees Fahrenheit; dew point 55 degrees Fahrenheit; altimeter 29.85 inHg; and winds 180 degrees at 11 knots.

DISPATCH RELEASE INFORMATION

The original dispatch release for DAL 190 was obtained and reviewed. The only reference to the ditch area that the aircraft taxied through was a caution note which read, "new terminal has a ditch located directly from center of terminal that is not easily visible."

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The captain stated during his interview with Safety Board investigators that he received completely new paperwork in Salt Lake City. He stated that he read the notice about the ditch in the NOTAMS and that the crew discussed them prior to their flight. He said at the time he thought the ditch was the two circle shaped dirt areas of the end of the two wings of the "D" concourse. He mentioned that he had flown into LAS the week before. He stated that the ditch was discussed during the approach briefing into Las Vegas. He mentioned that he had pointed out the two ditches on the taxi chart located directly out from the concourses on the "D" terminal which he thought were referenced in the NOTAM.

The first officer stated that he had also reviewed the NOTAM paperwork and had seen the information regarding the ditch at Las Vegas. He said that he was trying to locate the ditch during the taxi into the gate after they arrived in Las Vegas. He stated that during the briefing in Salt Lake City, the captain had briefed the crew about how bad the taxiway markings were in Las Vegas and had requested that the crew back him up.

The second officer stated that he had made sure that all the correct paperwork was present for the flight. He said he was aware of the NOTAM, which made reference to a ditch across from the terminal.

AIRPORT INFORMATION

According to the manager of airport operations, the new "D" terminal had been open since June 23, 1998. The new layout of the terminal, ramp area, and Jeppesen approach charts were made available to the signature carriers at McCarran airport. According to staff at airport operations, there was a ATA operations subcommittee meeting held in late May 1998, where the airport went through the procedures of how to transition from ramp control to tower control.

At the time of the incident, the infield area was not lit or marked by other means to help illuminate the ditch areas between the taxiway and runway areas.

ADDITIONAL INFORMATION

On July 10, 1998, a Midwest Express Airline also taxied through the ditch in the same area as the Delta Airlines airplane. The Director of Safety and Regulatory Compliance with Midwest Express stated that there was inadequate lighting of the drainage area between taxiway "C" and "B". He stated that at night, the drainage area appears to be the continuation of the dark pavement. According to the Las Vegas FSDO, the DC-9 sustained minor aircraft damage. The airplane taxied south from gate D-14, crossed taxiway Charlie, and entered into the ditch.

Since these two incidents, plastic reflective delineator's have been placed around the edge of the drainage ditch. The airport placed 4-foot-high conduit with the reflective tape along the edge of the pavement to distinguish between the paved and nonpaved areas. Airside operations staff informed Safety Board investigators that the reflective delineators were installed during the month of August 1998. Sketches of the area where the reflectors were installed, as well as actual photographs of the area as provided by McCarran International Airport Airside Operations are appended to this report.

The Safety Board did not elect to take custody of the airplane.

		NTSB ID: LAX981A261			
		Occurrence Date: 08/08/1998			
		Occurrence Type: Incident			
Landing Facility/Approach Information					
Airport Name	Airport ID:	Airport Elevation	Runway Used	Runway Length	Runway Width
MCCARRAN INTERNATIONAL	KLAS	2179 Ft. MSL	7L	14505	150
Runway Surface Type: Asphalt					
Runway Surface Condition: Dry					
Type Instrument Approach: NONE					
VFR Approach/Landing: None					
Aircraft Information					
Aircraft Manufacturer		Model/Series		Serial Number	
Boeing		727-2Q8		21826	
Airworthiness Certificate(s): Transport					
Landing Gear Type: Retractable - Tricycle					
Homebuilt Aircraft? No	Number of Seats: 152	Certified Max Gross Wt.	184200 LBS	Number of Engines: 3	
Engine Type:	Engine Manufacturer:	Model/Series:	Rated Power:		
Turbo Fan	P&W	JT8D-15A	15500 LBS		
- Aircraft Inspection Information					
Type of Last Inspection	Date of Last Inspection	Time Since Last Inspection	Airframe Total Time		
Continuous Airworthiness	08/1998	16 Hours	57314 Hours		
- Emergency Locator Transmitter (ELT) Information					
ELT Installed?	ELT Operated?	ELT Aided in Locating Accident Site?			
Owner/Operator Information					
Registered Aircraft Owner		Street Address			
IAI-I INC.		3655 TORRANCE BLVD.			
		City	State	Zip Code	
		TORRANCE	CA	90503	
Operator of Aircraft		Street Address			
DELTA AIRLINES INC.		1020 DELTA BLVD.			
		City	State	Zip Code	
		ATLANTA	GA	30320	
Operator Does Business As: DELTA AIRLINES INC.			Operator Designator Code: DALA		
- Type of U.S. Certificate(s) Held:					
Air Carrier Operating Certificate(s): Flag Carrier/Domestic					
Operating Certificate:			Operator Certificate:		
Regulation Flight Conducted Under: Part 121: Air Carrier					
Type of Flight Operation Conducted: Scheduled; Domestic; Passenger Only					
FACTUAL REPORT - AVIATION					

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First Pilot Information

Name On File	City On File	State On File	Date of Birth On File	Age 43
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Sex: M	Seat Occupied: Left	Principal Profession: Civilian Pilot	Certificate Number: On File
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Certificate(s): Airline Transport

Airplane Rating(s): Multi-engine Land

Rotorcraft/Glider/LTA: None

Instrument Rating(s): Airplane

Instructor Rating(s): None

Type Rating/Endorsement for Accident/Incident Aircraft? Yes	Current Biennial Flight Review?
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Medical Cert.: Class 1	Medical Cert. Status: Valid Medical--no waivers/lim.	Date of Last Medical Exam: 04/1998
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- Flight Time Matrix	All A/C	This Make and Model	Airplane Single Engine	Airplane Multi-Engine	Night	Instrument		Rotorcraft	Glider	Lighter Than Air
						Actual	Simulated			
Total Time	8100	6000								
Pilot In Command(PIC)	4000									
Instructor										
Last 90 Days	58	58								
Last 30 Days	38	38								
Last 24 Hours	13	13								

Seatbelt Used? Yes	Shoulder Harness Used? Yes	Toxicology Performed? Yes	Second Pilot? Yes
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Flight Plan/Itinerary

Type of Flight Plan Filed: IFR

Departure Point Same as Accident/Incident Location	State	Airport Identifier	Departure Time 0012	Time Zone PDT
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Destination CINCINNATI	State OH	Airport Identifier CVG	
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Type of Clearance: IFR

Type of Airspace: Class B

Weather Information

Source of Briefing:
Company

Method of Briefing:

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Weather Information

WOF ID	Observation Time	Time Zone	WOF Elevation	WOF Distance From Accident Site	Direction From Accident Site
LAS	0056	PDT	2179 Ft. MSL	1 NM	360 Deg. Mag.

Sky/Lowest Cloud Condition: Clear 0 Ft. AGL Condition of Light: Night/Dark

Lowest Ceiling: Broken 12000 Ft. AGL Visibility: 10 SM Altimeter: 29.00 "Hg

Temperature: 33 °C Dew Point: 13 °C Wind Direction: 180 Density Altitude: Ft.

Wind Speed: 11 Gusts: Weather Conditions at Accident Site: Visual Conditions

Visibility (RVR): 0 Ft. Visibility (RVV) 0 SM Intensity of Precipitation: Unknown

Restrictions to Visibility: None

Type of Precipitation: None

Accident Information

Aircraft Damage: Minor Aircraft Fire: None Aircraft Explosion: None

Classification: U.S. Registered/U.S. Soil

- Injury Summary Matrix	Fatal	Serious	Minor	None	TOTAL
First Pilot				1	1
Second Pilot				1	1
Student Pilot					
Flight Instructor					
Check Pilot					
Flight Engineer				1	1
Cabin Attendants				3	3
Other Crew					
Passengers				149	149
- TOTAL ABOARD -				155	155
Other Ground	0	0	0		0
- GRAND TOTAL -	0	0	0	155	155

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Administrative Information

Investigator-In-Charge (IIC)

DEBORAH L. CHILDRESS

Additional Persons Participating in This Accident/Incident Investigation:

WILLIAM P DANIELS
WP-LAS-FSDO
LAS VEGAS, NV 89119

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DELTA AIR LINES
CINCINNATI, OH 45275

JIM SHAW
AIR LINE PILOTS ASSOC
OMAHA, NE 68135