



# National Transportation Safety Board Aviation Accident Final Report

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|--------------------------------|-----------------------------------|-------------------------|-------------|
| <b>Location:</b>               | Amarillo, TX                      | <b>Accident Number:</b> | FTW03MA160  |
| <b>Date &amp; Time:</b>        | 05/24/2003, 2136 CDT              | <b>Registration:</b>    | N343SW      |
| <b>Aircraft:</b>               | Boeing 737-300                    | <b>Aircraft Damage:</b> | Substantial |
| <b>Defining Event:</b>         |                                   | <b>Injuries:</b>        | 68 None     |
| <b>Flight Conducted Under:</b> | Part 121: Air Carrier - Scheduled |                         |             |

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## Analysis

The Board's full report is available at: <http://www.nts.gov/publicn/2006/FTW03MA160.pdf>

On May 24, 2003, about 2136 central daylight time, a Boeing 737-300 (737), N343SW, registered to and operated by Southwest Airlines Company (Southwest) as flight 2066, veered off the left side of runway 4 during landing at Amarillo International Airport (AMA), Amarillo, Texas. The flight crew steered the airplane back toward the runway, the nose landing gear collapsed, and the airplane came to a stop on the runway. The 63 passengers and 5 crewmembers were not injured, and the airplane sustained substantial damage. The scheduled domestic air carrier flight was operated under the provisions of 14 Code of Federal Regulations (CFR) Part 121 with an instrument flight rules (IFR) flight plan filed; visual meteorological conditions prevailed with thunderstorms in the vicinity of the airport. The flight originated from McCarran International Airport (LAS), Las Vegas, Nevada, about 1945.

## 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 align the airplane's ground track with the runway centerline before touchdown and the flight crew's failure to maintain directional control of the airplane after touchdown. Contributing to the accident was the flight crew's decision to continue the approach and to land with a thunderstorm (with associated gusty and variable winds) reported at the airport and the heavy rain, which reduced the flight crew's visibility on short final.

## Findings

Occurrence #1: LOSS OF CONTROL - IN FLIGHT

Phase of Operation: APPROACH

### Findings

1. (F) WEATHER CONDITION - THUNDERSTORM
2. (F) WEATHER CONDITION - GUSTS
3. (F) WEATHER CONDITION - VARIABLE WIND
4. (F) WEATHER CONDITION - RAIN
5. (F) FLIGHT INTO KNOWN ADVERSE WEATHER - CONTINUED - FLIGHTCREW
6. (F) VISUAL LOOKOUT - REDUCED - FLIGHTCREW
7. (C) PROPER ALIGNMENT - NOT MAINTAINED - FLIGHTCREW

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Occurrence #2: LOSS OF CONTROL - ON GROUND/WATER

Phase of Operation: LANDING - ROLL

### Findings

8. (C) DIRECTIONAL CONTROL - NOT MAINTAINED - FLIGHTCREW

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Occurrence #3: ON GROUND/WATER COLLISION WITH OBJECT

Phase of Operation: LANDING - ROLL

### Findings

9. OBJECT - RUNWAY LIGHT

## Factual Information

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On May 24, 2003, about 2136 central daylight time (unless otherwise indicated, all times in this report are central daylight time based on a 24-hour clock), a Boeing 737-300 (737), N343SW, registered to and operated by Southwest Airlines Company (Southwest) as flight 2066, veered off the left side of runway 4 during landing at Amarillo International Airport (AMA), Amarillo, Texas. The flight crew steered the airplane back toward the runway, the nose landing gear collapsed, and the airplane came to a stop on the runway. The 63 passengers and 5 crewmembers were not injured, and the airplane sustained substantial damage. The scheduled domestic air carrier flight was operated under the provisions of 14 Code of Federal Regulations (CFR) Part 121 with an instrument flight rules (IFR) flight plan filed; visual meteorological conditions prevailed with thunderstorms in the vicinity of the airport. The flight originated from McCarran International Airport (LAS), Las Vegas, Nevada, about 1945.

The flight was the second and final leg during the second day of a 3-day trip sequence for the crew, which included the captain, the first officer, and the three flight attendants. The trip sequence began on May 23, 2003, about 1500 when the crew departed Chicago Midway International Airport (MDW), Chicago, Illinois, en route to Phoenix Sky Harbor International Airport (PHX), Phoenix, Arizona. The crew then flew to Portland International Airport (PDX), Portland, Oregon, arrived about 2210, and remained overnight in Portland. The next day, they departed PDX about 1730 for LAS. The flight to AMA was scheduled to depart about 1920 but was delayed because of late connecting passengers.

During post-accident interviews, the captain and the first officer stated that they checked the weather before departure and that they were aware that thunderstorms were expected in the AMA area. Their planned alternate destination was Love Field (DAL), Dallas, Texas.

According to cockpit voice recorder (CVR) information, during the airplane's descent, the captain contacted Southwest operations at AMA about 2125 for weather information. The captain stated, "looking up here on the radar it doesn't look very happy." The operations personnel replied, "we've got frequent, lot of lightning, ah light to moderate rain." About 2127, the Federal Aviation Administration (FAA) air traffic control (ATC) approach controller told the flight crew that winds were "quite variable" between 290° and 010°. The controller also advised the flight crew that automatic terminal information service (ATIS) Kilo was in effect. The flight crewmembers had advised the controller that they had ATIS information Juliet. The controller stated, "ceilings are still at five thousand five hundred five thousand five hundred broken and nine thousand five hundred overcast." ATIS information Juliet included an advisory that stated, "notice to airmen: hazardous weather information available on HIWAS [hazardous in-flight weather advisory service] or from Fort Worth flight service." The controller advised the flight crew to expect a visual approach to runway 4. The captain responded, "okay copy and ah this storm is moving ah?" The controller replied, "south south east." The controller advised the flight crew to "descend at your discretion and maintain six thousand and ah looks like the main cell is southwest of the airport ah just about to pass the final approach for runway four."

At 2128:00, the first officer, who was the pilot flying, began briefing the procedure for the instrument landing system (ILS) approach to runway 4. At 2128:45, the first officer briefed the procedure for the missed approach. He stated, "if we have to do the missed we go to forty one

hundred feet [mean sea level (msl)] then climbing right turn. That kinda looks like that might be where the weather's heading, so we might need something different than that." At 2128:58, the captain responded, "alright if it looks real [expletive deleted] on the way in then I'll ask them what to anticipate on the way out."

At 2130:53, as the flight crew completed the Approach Descent checklist, the captain stated, "radar's aw, well," adding, 9 seconds later, "aw you've seen worse." The first officer responded, "hah. Absolutely." At 2131:22, the captain stated, "man you're gonna be a god out of this whole thing I can tell, a hero," which was followed by the sound of laughter.

At 2132:02, the captain suggested that the airplane descend the airplane to avoid lightning. Seven seconds later, the captain stated, "little bit of distance eh I'll take two thousand feet below it." At 2132:20, the captain stated, "he should be turning us here any minute but, no sense being a lightning rod." At 2132:39, the first officer responded, "oh [expletive deleted] keep my hands off anything metal," which was followed by the sound of laughter.

The approach controller, who was also working the tower controller position, cleared the flight for the ILS runway 4 approach at 2132:45. At 2132:59, the captain told the controller, "we're just skirtin' the very edge of the storm right now." The controller responded, "that's what I'm showin also." The captain replied, "rather be lucky." The sound of laughter was recorded at 2133:08. At 2133:10, the captain said, "holy [expletive deleted], good luck." At 2133:33, the controller stated that the winds were from "two four zero variable to two nine zero at five knots or less" and that "there is a thunderstorm light and light rain at the airport." The captain replied, "alright, so we still got the field in sight but visibility starting to deteriorate we're just getting into rain now." According to airport surveillance radar-8 data, the flight intercepted the runway 4 localizer about 8.8 miles from the runway threshold.

At 2134:13, the captain said to the first officer, "why don't you fly this one [the approach and landing]," and the first officer acknowledged the captain's statement. Two seconds later, the captain stated, "glideslope's alive." (The glideslope provides vertical guidance on the ILS approach.) At 2134:26, the captain stated, "gear down. Wow. This is really gonna be gusty." Twenty seconds later, the controller stated the winds were "switching southwest now it's two two zero at niner." The flight crew continued the approach, lowered the flaps, and completed the Final Descent checklist. At 2135:35, the captain stated, "okay checklist complete I think it's a good call," followed by a sound similar to trim wheel movement. The captain stated, "holy [expletive deleted]" at 2135:40, "wow" 5 seconds later, and then "okay airport in sight." At 2135:48, the captain asked the controller to "keep the lights up for southwest ah twenty sixty six." (The tower controller stated, during a postaccident interview, that the approach lights were turned up to the highest setting and that the runway lights were turned to the second-highest setting.) The controller replied, "winds right now one niner zero now at eight."

At 2135:55, the first officer stated, "approaching minimums," and the captain responded, "going outside." At 2136:02, the first officer called for windshield wipers, and a sound similar to windshield wiper operation was recorded 2 seconds later. At 2136:05, the captain stated, "keep it comin'" and "landing" 4 seconds later. At 2136:11, the CVR recorded the sound of the autopilot disconnect warning tone, and, 3 seconds later, the captain stated, "do it you can do it." Seven seconds later, the captain stated, "ten feet, put her down." At 2136:27, a sound similar to touchdown was recorded on the CVR.

According to the flight data recorder (FDR), thrust reversers were deployed at 2136:30. (Thrust

reversers redirect engine exhaust to help slow the airplane.) At 2136:31, the controller began a 4-second transmission, stating that the wind direction had changed (190° to 230°) and that the wind velocity was gusting to 18 knots. At 2136:33, the captain stated, "I'm on with you." The sound of rumbling began 1 second later, followed by an expletive by the captain. At the same time, the first officer stated, "you got it." FDR data indicated that maximum reverse thrust was reached at this time, the right rudder pedal position was 12.9° airplane nose right, and the control wheel input was 29.2° right wing down. A series of sharp crashing sounds was recorded by the CVR at 2136:35. Two seconds later, the left rudder pedal position was 13.1° airplane nose left, and, 1 second later, the control wheel input was 29.2° left wing down. Also at 2136:37, the CVR recorded an expletive by the captain, followed by the sound of rumbling. The CVR recording ended at 2136:43. The airplane came to a stop on runway 4 about 4,272 feet beyond the threshold.

### Pilot Information

|                                  |                                                                                                                        |                                          |                            |
|----------------------------------|------------------------------------------------------------------------------------------------------------------------|------------------------------------------|----------------------------|
| <b>Certificate:</b>              | Airline Transport; Flight Engineer                                                                                     | <b>Age:</b>                              | 50, Male                   |
| <b>Airplane Rating(s):</b>       | Multi-engine Land; Single-engine Land; Single-engine Sea                                                               | <b>Seat Occupied:</b>                    | Left                       |
| <b>Other Aircraft Rating(s):</b> | Glider                                                                                                                 | <b>Restraint Used:</b>                   | Seatbelt, Shoulder harness |
| <b>Instrument Rating(s):</b>     | Airplane                                                                                                               | <b>Second Pilot Present:</b>             | Yes                        |
| <b>Instructor Rating(s):</b>     | None                                                                                                                   | <b>Toxicology Performed:</b>             | No                         |
| <b>Medical Certification:</b>    | Class 1 Valid Medical--no waivers/lim.                                                                                 | <b>Last Medical Exam:</b>                | 05/07/2003                 |
| <b>Occupational Pilot:</b>       |                                                                                                                        | <b>Last Flight Review or Equivalent:</b> | 07/20/2002                 |
| <b>Flight Time:</b>              | 9500 hours (Total, all aircraft), 5900 hours (Total, this make and model), 3100 hours (Pilot In Command, all aircraft) |                                          |                            |

### Co-Pilot Information

|                                  |                                                                                                                                                                                                                                               |                                          |                            |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|----------------------------|
| <b>Certificate:</b>              | Airline Transport; Flight Instructor                                                                                                                                                                                                          | <b>Age:</b>                              | 44, Male                   |
| <b>Airplane Rating(s):</b>       | Multi-engine Land; Single-engine Land                                                                                                                                                                                                         | <b>Seat Occupied:</b>                    | Right                      |
| <b>Other Aircraft Rating(s):</b> | None                                                                                                                                                                                                                                          | <b>Restraint Used:</b>                   | Seatbelt, Shoulder harness |
| <b>Instrument Rating(s):</b>     | Airplane                                                                                                                                                                                                                                      | <b>Second Pilot Present:</b>             | Yes                        |
| <b>Instructor Rating(s):</b>     | Airplane Multi-engine; Airplane Single-engine                                                                                                                                                                                                 | <b>Toxicology Performed:</b>             | No                         |
| <b>Medical Certification:</b>    | Class 1 Valid Medical--no waivers/lim.                                                                                                                                                                                                        | <b>Last Medical Exam:</b>                | 05/15/2003                 |
| <b>Occupational Pilot:</b>       |                                                                                                                                                                                                                                               | <b>Last Flight Review or Equivalent:</b> | 07/16/2002                 |
| <b>Flight Time:</b>              | 10038 hours (Total, all aircraft), 1200 hours (Total, this make and model), 4238 hours (Pilot In Command, all aircraft), 253 hours (Last 90 days, all aircraft), 94 hours (Last 30 days, all aircraft), 5 hours (Last 24 hours, all aircraft) |                                          |                            |

## Aircraft and Owner/Operator Information

|                                      |                                      |                                           |                    |
|--------------------------------------|--------------------------------------|-------------------------------------------|--------------------|
| <b>Aircraft Manufacturer:</b>        | Boeing                               | <b>Registration:</b>                      | N343SW             |
| <b>Model/Series:</b>                 | 737-300                              | <b>Aircraft Category:</b>                 | Airplane           |
| <b>Year of Manufacture:</b>          |                                      | <b>Amateur Built:</b>                     | No                 |
| <b>Airworthiness Certificate:</b>    | Transport                            | <b>Serial Number:</b>                     | 24151              |
| <b>Landing Gear Type:</b>            | Retractable - Tricycle               | <b>Seats:</b>                             | 145                |
| <b>Date/Type of Last Inspection:</b> | 05/13/2003, Continuous Airworthiness | <b>Certified Max Gross Wt.:</b>           | 138500 lbs         |
| <b>Time Since Last Inspection:</b>   | 95 Hours                             | <b>Engines:</b>                           | 2 Turbo Fan        |
| <b>Airframe Total Time:</b>          | 47995 Hours                          | <b>Engine Manufacturer:</b>               | General Electric   |
| <b>ELT:</b>                          | Not installed                        | <b>Engine Model/Series:</b>               | CFM-56             |
| <b>Registered Owner:</b>             | Southwest Airlines Company           | <b>Rated Power:</b>                       | 20000 lbs          |
| <b>Operator:</b>                     | Southwest Airlines Company           | <b>Air Carrier Operating Certificate:</b> | Flag carrier (121) |
| <b>Operator Does Business As:</b>    |                                      | <b>Operator Designator Code:</b>          | SWAA               |

## Meteorological Information and Flight Plan

|                                         |                         |                                      |             |
|-----------------------------------------|-------------------------|--------------------------------------|-------------|
| <b>Conditions at Accident Site:</b>     | Instrument Conditions   | <b>Condition of Light:</b>           | Night/Dark  |
| <b>Observation Facility, Elevation:</b> | AMA, 3605 ft msl        | <b>Observation Time:</b>             | 2140 CDT    |
| <b>Distance from Accident Site:</b>     | 0 Nautical Miles        | <b>Direction from Accident Site:</b> | 0°          |
| <b>Lowest Cloud Condition:</b>          | Few / 400 ft agl        | <b>Temperature/Dew Point:</b>        | 17°C / 15°C |
| <b>Lowest Ceiling:</b>                  | Broken / 1700 ft agl    | <b>Visibility</b>                    | 1 Miles     |
| <b>Wind Speed/Gusts, Direction:</b>     | 7 knots/ 18 knots, 110° | <b>Visibility (RVR):</b>             |             |
| <b>Altimeter Setting:</b>               | 30.05 inches Hg         | <b>Visibility (RVV):</b>             |             |
| <b>Precipitation and Obscuration:</b>   |                         |                                      |             |
| <b>Departure Point:</b>                 | Las Vegas, NV (LAS)     | <b>Type of Flight Plan Filed:</b>    | IFR         |
| <b>Destination:</b>                     | Amarillo, TX (AMA)      | <b>Type of Clearance:</b>            | IFR         |
| <b>Departure Time:</b>                  | 1945 CDT                | <b>Type of Airspace:</b>             | Class C     |

## Airport Information

|                             |                                      |                                  |           |
|-----------------------------|--------------------------------------|----------------------------------|-----------|
| <b>Airport:</b>             | Amarillo International Airport (AMA) | <b>Runway Surface Type:</b>      | Concrete  |
| <b>Airport Elevation:</b>   | 3607 ft                              | <b>Runway Surface Condition:</b> | Wet       |
| <b>Runway Used:</b>         | 4                                    | <b>IFR Approach:</b>             | ILS       |
| <b>Runway Length/Width:</b> | 13502 ft / 300 ft                    | <b>VFR Approach/Landing:</b>     | Full Stop |

## Wreckage and Impact Information

|                            |         |                             |                        |
|----------------------------|---------|-----------------------------|------------------------|
| <b>Crew Injuries:</b>      | 5 None  | <b>Aircraft Damage:</b>     | Substantial            |
| <b>Passenger Injuries:</b> | 63 None | <b>Aircraft Fire:</b>       | None                   |
| <b>Ground Injuries:</b>    | N/A     | <b>Aircraft Explosion:</b>  | None                   |
| <b>Total Injuries:</b>     | 68 None | <b>Latitude, Longitude:</b> | 35.221111, -101.710000 |

## Administrative Information

|                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                    |                      |            |
|------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|------------|
| <b>Investigator In Charge (IIC):</b>     | Aaron M Sauer                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>Adopted Date:</b> | 03/31/2006 |
| <b>Additional Participating Persons:</b> | Steven E Miller; Federal Aviation Administration, SW13; Lubbock, TX<br>Timothy J Logan; Southwest Airlines Co.; Dallas, TX<br>Jeff Hefner; Southwest Airlines Pilots' Association; Dallas, TX<br>Dennis Rodrigues; Boeing Commercial Airplane Group; Seattle, WA<br>William E Shea; National Air Traffic Controllers Association; Hurst, TX<br>Richard E McCollum; Amarillo International Airport - City of Amarillo; Amarillo, TX |                      |            |
| <b>Publish Date:</b>                     |                                                                                                                                                                                                                                                                                                                                                                                                                                    |                      |            |
| <b>Investigation Docket:</b>             | 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 <a href="mailto:pubinquiry@ntsb.gov">pubinquiry@ntsb.gov</a> , or at 800-877-6799. Dockets released after this date are available at <a href="http://dms.nts.gov/pubdms/">http://dms.nts.gov/pubdms/</a> .   |                      |            |

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.