



National Transportation Safety Board Aviation Accident Final Report

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|-------------------------|----------------------|-------------------------|------------------|
| Location: | Minneapolis, MN | Accident Number: | CHI01FA129 |
| Date & Time: | 05/01/2001, 1437 CDT | Registration: | N9333 |
| Aircraft: | Douglas DC-9-31 | Aircraft Damage: | Substantial |
| Defining Event: | | Injuries: | 2 Minor, 42 None |

Flight Conducted Under: Part 121: Air Carrier - Scheduled

Analysis

The airplane was substantially damaged when it was struck by an aircraft tug during passenger boarding. The aircraft was parked and was being prepared for departure. The driver of the tug was moving the vehicle into position in order to connect the aircraft tow bar in preparation for pushback. He said that when he placed the tug into gear, it lurched forward into the parked aircraft. He said that pieces of the aircraft protruded through the windshield of the vehicle and pinned him into his seat. He said that he was unable to shift the vehicle into reverse and his leg was pinned on the accelerator pedal. Other ground workers in the area attempted to shut off the tug's engine. The driver said that the vehicle continued to drive forward until the engine was finally shut off. During the event, the pilot of the aircraft had applied the brakes when he noticed the unplanned movement of the airplane. The aircraft was pushed backward about 30 feet causing damage to the nose section of the fuselage. Subsequent to the accident, the tug was placed on jacks and a check performed. During the check it was found that the normal engine shutoff switch would not shut the engine off if the engine was operated at high throttle settings. It was further discovered that at high throttle settings, the brake system was not able to stop the rotation of the drive wheels. No anomalies were found during this test that would explain the lurching described by the tug driver. The tug had been involved in a previous incident where an aircraft was damaged. A report of the previous incident showed that the tug lurched when the driver was attempting to move the tug into position to connect to the aircraft. The tug manufacturer does not have records of operational problems associated with that model tug. The manufacturer also said that they were not aware of a history of lurching problems concerning the model tug in question. It was found that the distance from the cab of the tug to the nose of a DC-9 aircraft when the tow bar is attached is 4 feet 2 inches.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The partial failure of the aircraft tug for undetermined reasons.

Findings

Occurrence #1: ON GROUND/WATER COLLISION WITH OBJECT
Phase of Operation: STANDING - ENGINE(S) NOT OPERATING

Findings

1. (C) AIRPORT EQUIPMENT, GROUND SUPPORT - FAILURE, PARTIAL
2. (C) REASON FOR OCCURRENCE UNDETERMINED

Factual Information

On May 01, 2001, at 1437 central daylight time, a Douglas DC-9-31, N9333, operated by Northwest Airlines, Inc. as flight 682, was substantially damaged when it was struck by an aircraft tug during passenger boarding. The 14 CFR Part 121 flight was parked at gate D3 at the Minneapolis-St. Paul International/Wold-Chamberlain Airport, Minneapolis, Minnesota and was bound for the Philadelphia International Airport, Philadelphia, Pennsylvania. No injuries were reported by the 4 crewmembers or 38 passengers that had boarded the aircraft. The driver of the tug and a food service worker received minor injuries.

The aircraft was parked and was being prepared for departure by various ground workers including the tug driver and workers restocking the aircraft food supply. The driver of the tug said that he was moving the vehicle into position in order to connect the aircraft tow bar in preparation for pushback. He said that when he placed the tug into gear, it lurched forward into the parked aircraft. He said that pieces of the aircraft protruded through the windshield of the vehicle and pinned him into his seat. He said that he was unable to shift the vehicle into reverse and his leg was pinned on the accelerator pedal. Other ground workers in the area attempted to shut off the tug's engine. The driver said that the vehicle continued to drive forward until the engine was finally shut off. During the event, the pilot of the aircraft had applied the brakes when he noticed the unplanned movement of the airplane. The aircraft was pushed backward about 30 feet causing damage to the nose section of the fuselage. A food service worker was injured when he jumped from his vehicle which was parked next to the aircraft.

Subsequent to the accident, the tug was placed on jacks and a check performed. During the check it was found that the normal engine shutoff switch would not shut the engine off if the engine was operated at high throttle settings. It was further discovered that at high throttle settings, the brake system was not able to stop the rotation of the drive wheels. No anomalies were found during this test that would explain the lurching described by the tug driver. Subsequent to the testing, the throttle system of the tug was replaced as a precautionary measure by the airline.

During the course of the investigation, it was found that the tug had been involved in a previous incident where an aircraft was damaged. A report of the previous incident was obtained. The driver of the tug during the previous incident reported that the tug lurched when he was attempting to move the tug into position to connect to the aircraft.

The manufacturer of the tug said, during a telephone interview, that they do not have records of operational problems associated with that model tug. He also stated that he was not aware of a history of lurching problems concerning the model tug in question.

It was found that the distance from the cab of the tug to the nose of a DC-9 aircraft when the tow bar is attached is 4 feet 2 inches.

Pilot Information

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| Certificate: | Airline Transport; Commercial | Age: | 46, Male |
| Airplane Rating(s): | Multi-engine Land; Single-engine Land | Seat Occupied: | Left |
| Other Aircraft Rating(s): | None | Restraint Used: | |
| Instrument Rating(s): | Airplane | Second Pilot Present: | Yes |
| Instructor Rating(s): | Airplane Multi-engine; Airplane Single-engine; Instrument Airplane | Toxicology Performed: | No |
| Medical Certification: | Class 1 Unknown | Last Medical Exam: | |
| Occupational Pilot: | | Last Flight Review or Equivalent: | 09/22/2000 |
| Flight Time: | 9174 hours (Total, all aircraft), 6759 hours (Total, this make and model) | | |

Aircraft and Owner/Operator Information

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|--------------------------------------|------------------------|---|--------------------|
| Aircraft Manufacturer: | Douglas | Registration: | N9333 |
| Model/Series: | DC-9-31 | Aircraft Category: | Airplane |
| Year of Manufacture: | | Amateur Built: | No |
| Airworthiness Certificate: | Transport | Serial Number: | 47246 |
| Landing Gear Type: | Retractable - Tricycle | Seats: | 105 |
| Date/Type of Last Inspection: | AAIP | Certified Max Gross Wt.: | 108000 lbs |
| Time Since Last Inspection: | | Engines: | 2 Turbo Jet |
| Airframe Total Time: | | Engine Manufacturer: | Pratt & Whitney |
| ELT: | Not installed | Engine Model/Series: | JT8-9A |
| Registered Owner: | NORTHWEST AIRLINES INC | Rated Power: | 14000 lbs |
| Operator: | NORTHWEST AIRLINES INC | Air Carrier Operating Certificate: | Flag carrier (121) |
| Operator Does Business As: | | Operator Designator Code: | NWAA |

Meteorological Information and Flight Plan

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|----------------------------------|-------------------------|-------------------------------|-------------|
| Conditions at Accident Site: | Visual Conditions | Condition of Light: | Day |
| Observation Facility, Elevation: | MSP, 841 ft msl | Observation Time: | 1445 CDT |
| Distance from Accident Site: | 0 Nautical Miles | Direction from Accident Site: | 0° |
| Lowest Cloud Condition: | Scattered / 2500 ft agl | Temperature/Dew Point: | 25°C / 10°C |
| Lowest Ceiling: | Broken / 8000 ft agl | Visibility | 10 Miles |
| Wind Speed/Gusts, Direction: | 6 knots, 80° | Visibility (RVR): | |
| Altimeter Setting: | 30.15 inches Hg | Visibility (RVV): | |
| Precipitation and Obscuration: | | | |
| Departure Point: | MINNEAPOLIS, MN (MSP) | Type of Flight Plan Filed: | IFR |
| Destination: | PHILADELPHIA, PA (PHL) | Type of Clearance: | None |
| Departure Time: | | Type of Airspace: | Unknown |

Airport Information

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|----------------------|-------------------------------------|---------------------------|---------|
| Airport: | MINNEAPOLIS-ST PAUL INTL/WOLD-(MSP) | Runway Surface Type: | Unknown |
| Airport Elevation: | 841 ft | Runway Surface Condition: | Unknown |
| Runway Used: | | IFR Approach: | Unknown |
| Runway Length/Width: | | VFR Approach/Landing: | Unknown |

Wreckage and Impact Information

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|---------------------|------------------|----------------------|-------------|
| Crew Injuries: | 4 None | Aircraft Damage: | Substantial |
| Passenger Injuries: | 38 None | Aircraft Fire: | None |
| Ground Injuries: | 2 Minor | Aircraft Explosion: | None |
| Total Injuries: | 2 Minor, 42 None | Latitude, Longitude: | |

Administrative Information

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|-----------------------------------|--|---------------|------------|
| Investigator In Charge (IIC): | John M Brannen | Adopted Date: | 07/02/2002 |
| Additional Participating Persons: | Patrick Schmitz; Northwest Airlines, Dept N7180; St. Paul, MN Bradley T Berntsen; FAA-Northwest Airlines CMO; Bloomington, MN Mark Bauman; Aircraft Mechanics Fraternal Association; Bloomington, MN | | |
| 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/ . | | |

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