



# National Transportation Safety Board Aviation Accident Final Report

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|                                |                      |                         |                     |
|--------------------------------|----------------------|-------------------------|---------------------|
| <b>Location:</b>               | Atlantic Ocean, AO   | <b>Accident Number:</b> | IAD02LA039          |
| <b>Date &amp; Time:</b>        | 04/01/2002, 2005 EST | <b>Registration:</b>    | G-BNLS              |
| <b>Aircraft:</b>               | Boeing 747-400       | <b>Aircraft Damage:</b> | None                |
| <b>Defining Event:</b>         |                      | <b>Injuries:</b>        | 1 Serious, 213 None |
| <b>Flight Conducted Under:</b> | Part 129: Foreign    |                         |                     |

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## Analysis

About 20 minutes after departure, the airplane encountered "moderate turbulence" while climbing through Flight Level (FL) 350. During the turbulence encounter, a passenger was returning to her seat when she fell and broke her right ankle. The flight crew returned to the airport, and the airplane landed without further incident. Turbulence was not forecast for the route of flight, and the seat belt sign was illuminated for the entire flight.

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The airplane's encounter with turbulence, while climbing to an assigned altitude.

## Findings

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Occurrence #1: MISCELLANEOUS/OTHER  
Phase of Operation: CLIMB

### Findings

1. (C) WEATHER CONDITION - TURBULENCE

## Factual Information

On April 1, 2002, about 2005 eastern standard time, a Boeing 747-400, G-BNLS, operated by British Airways as flight 214, was not damaged when it encountered turbulence shortly after takeoff from Boston/General Edward Lawrence Logan International Airport (BOS), Boston Massachusetts. The 2 certificated airline transport pilots, 15 flight attendants, and 196 passengers were not injured. One passenger sustained serious injuries. Visual meteorological conditions (VMC) prevailed and an instrument flight rules (IFR) flight plan was filed for the flight destined for London-Heathrow Airport (LHR), London, England. The scheduled international passenger flight was conducted under 14 CFR Part 129.

In a written statement, the flight crew reported that 20 minutes after departure they encountered "moderate turbulence" while climbing through flight level (FL) 350, to their assigned altitude of FL 370. Several minutes later, they requested a descent from air traffic control to FL 330 to maneuver around the turbulence. During the descent, a flight attendant informed the flight crew that a passenger fell during the turbulence encounter and broke her right ankle. The flight crew then initiated a return to Boston, and landed without further incident. After landing, the passenger was transported to the hospital and the airplane was inspected for damage. When no damage was observed, the flight departed again at 2214, and continued to London uneventfully.

The flight crew reported that windshear advisories had been issued at Boston prior to their departure; however, no turbulence was forecasted for their route of flight. The seat belt sign was illuminated for the entire flight.

According to flight attendant interviews conducted by British Airways, the flight conditions were described as "fairly smooth" and the seat belt sign was illuminated as they prepared for the in-flight service. About 20-30 minutes into the flight, the airplane "shook briefly" and experienced a "sudden jolt." During the encounter, a passenger from seat 17J was returning to her seat from the lavatory, when she fell and was injured. A flight attendant administered first aid to the passenger and notified the flight crew of the injury. The flight crew then informed the flight attendants and passengers that the flight would be returning to Boston.

The weather reported at Boston, at 1954, included wind from 270 degrees at 18 knots, gusting to 31 knots, 10 miles visibility, clear skies, temperature 8 degrees Celsius, dewpoint -3 degrees Celsius, and altimeter setting 29.80 in Hg.

## Pilot Information

|                                  |  |  |                            |
|----------------------------------|--|--|----------------------------|
| <b>Certificate:</b>              | Airline Transport  | <b>Age:</b>                              | 48, Male                   |
| <b>Airplane Rating(s):</b>       | Multi-engine Land  | <b>Seat Occupied:</b>                    | Left                       |
| <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>     |  | <b>Toxicology Performed:</b>             | No                         |
| <b>Medical Certification:</b>    | Unknown  | <b>Last FAA Medical Exam:</b>            |                            |
| <b>Occupational Pilot:</b>       |  | <b>Last Flight Review or Equivalent:</b> |                            |
| <b>Flight Time:</b>              | 13200 hours (Total, all aircraft), 3500 hours (Total, this make and model) |  |                            |

## Co-Pilot Information

|                                  |   |  |                            |
|----------------------------------|---|--|----------------------------|
| <b>Certificate:</b>              | Airline Transport   | <b>Age:</b>                              | 35, Male                   |
| <b>Airplane Rating(s):</b>       | Multi-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>     |   | <b>Toxicology Performed:</b>             | No                         |
| <b>Medical Certification:</b>    | Unknown   | <b>Last FAA Medical Exam:</b>            |                            |
| <b>Occupational Pilot:</b>       |   | <b>Last Flight Review or Equivalent:</b> |                            |
| <b>Flight Time:</b>              | 8000 hours (Total, all aircraft), 4000 hours (Total, this make and model) |  |                            |

## Aircraft and Owner/Operator Information

|                                      |                                      |                                       |                           |
|--------------------------------------|--------------------------------------|---------------------------------------|---------------------------|
| <b>Aircraft Make:</b>                | Boeing                               | <b>Registration:</b>                  | G-BNLS                    |
| <b>Model/Series:</b>                 | 747-400                              | <b>Aircraft Category:</b>             | Airplane                  |
| <b>Year of Manufacture:</b>          |                                      | <b>Amateur Built:</b>                 | No                        |
| <b>Airworthiness Certificate:</b>    | Transport                            | <b>Serial Number:</b>                 | 24629                     |
| <b>Landing Gear Type:</b>            | Retractable - Tricycle               | <b>Seats:</b>                         | 291                       |
| <b>Date/Type of Last Inspection:</b> | 03/23/2002, Continuous Airworthiness | <b>Certified Max Gross Wt.:</b>       | 270000 lbs                |
| <b>Time Since Last Inspection:</b>   |                                      | <b>Engines:</b>                       | 4 Turbo Jet               |
| <b>Airframe Total Time:</b>          |                                      | <b>Engine Manufacturer:</b>           | Rolls-Royce               |
| <b>ELT:</b>                          | Installed, not activated             | <b>Engine Model/Series:</b>           | RB211-524H                |
| <b>Registered Owner:</b>             | BRITISH AIRWAYS                      | <b>Rated Power:</b>                   | 59500 lbs                 |
| <b>Operator:</b>                     | BRITISH AIRWAYS                      | <b>Operating Certificate(s) Held:</b> | Foreign Air Carrier (129) |
| <b>Operator Does Business As:</b>    |                                      | <b>Operator Designator Code:</b>      | BRAF                      |

## Meteorological Information and Flight Plan

|                                  |                      |   |           |
|----------------------------------|----------------------|---|-----------|
| Conditions at Accident Site:     | Visual Conditions    | Condition of Light:                     | Night     |
| Observation Facility, Elevation: | BHB, 83 ft msl       | Distance from Accident Site:            |           |
| Observation Time:                | 1955 EDT             | Direction from Accident Site:           |           |
| Lowest Cloud Condition:          |                      | Visibility                              | 10 Miles  |
| Lowest Ceiling:                  | Broken / 4300 ft agl | Visibility (RVR):                       |           |
| Wind Speed/Gusts:                | 7 knots /            | Turbulence Type<br>Forecast/Actual:     | /         |
| Wind Direction:                  | 230°                 | Turbulence Severity<br>Forecast/Actual: | /         |
| Altimeter Setting:               | 29.52 inches Hg      | Temperature/Dew Point:                  | 5°C / 3°C |
| Precipitation and Obscuration:   |                      |   |           |
| Departure Point:                 | Boston, MA (BOS)     | Type of Flight Plan Filed:              | IFR       |
| Destination:                     | London (LHR)         | Type of Clearance:                      | IFR       |
| Departure Time:                  | 1920 EST             | Type of Airspace:                       | Class E   |

## Wreckage and Impact Information

|                     |                     |                      |                       |
|---------------------|---------------------|----------------------|-----------------------|
| Crew Injuries:      | 17 None             | Aircraft Damage:     | None                  |
| Passenger Injuries: | 1 Serious, 196 None | Aircraft Fire:       | None                  |
| Ground Injuries:    | N/A                 | Aircraft Explosion:  | None                  |
| Total Injuries:     | 1 Serious, 213 None | Latitude, Longitude: | 42.572500, -70.718611 |

## Administrative Information

|                                   |  |              |            |
|-----------------------------------|--|--------------|------------|
| Investigator In Charge (IIC):     | Jill M Andrews   | Report Date: | 08/26/2003 |
| Additional Participating Persons: | Jack Donahue; Federal Aviation Administration; Boston, MA  |              |            |
| 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 <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. A factual report that may be admissible under 49 U.S.C. § 1154(b) is available [here](#).