



# National Transportation Safety Board Aviation Accident Final Report

<b>Location:</b>	Newark, NJ	<b>Accident Number:</b>	NYC07LA017
<b>Date &amp; Time:</b>	10/31/2006, 1830 EST	<b>Registration:</b>	D-ABVY
<b>Aircraft:</b>	Boeing 747-400	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>		<b>Injuries:</b>	312 None
<b>Flight Conducted Under:</b>	Part 129: Foreign		

## Analysis

During a night taxi, the leading edge left wingtip of a Boeing 747 (B747) impacted the trailing edge right wingtip of a Boeing 757 (B757) in tow, but stopped, near the intersection of diverging taxiways. The B747 crew was not aware of the B757 in tow. The captain indicated that the accident occurred in an area where the B757 in tow was backlit by apron lights, and that the crew's attention was diverted to another B757 ahead that they had been instructed to follow. The B757 in tow, which had been taxiing ahead of the B747 prior to reaching the diverging taxiways, had received its taxi instructions prior to the B747 crew being on the frequency. Some taxiways were mislabeled on a Federal Aviation Administration airport diagram; however, the mislabeling did not affect the outcome of the accident.

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The failure of the Boeing 747 crew to maintain an adequate visual lookout. Contributing to the accident were the night lighting conditions, the back lighting from the apron lights, and the crew's diverted attention in focusing on a Boeing 757 that they were instructed to follow.

## Findings

Occurrence #1: ON GROUND/WATER COLLISION WITH OBJECT  
Phase of Operation: TAXI

### Findings

1. (C) VISUAL LOOKOUT - INADEQUATE - FLIGHTCREW
2. (F) DIVERTED ATTENTION - FLIGHTCREW
3. (F) LIGHT CONDITION - NIGHT
4. (F) LIGHT CONDITION - OTHER

## Factual Information

### HISTORY OF FLIGHT

On October 31, 2006, at 1830 eastern standard time, a Boeing (B) 747-400, German registry D-ABVY, operated by Lufthansa German Airlines (LH) as flight 403 (LH403), incurred substantial damage when its left wingtip impacted the right wingtip of a Continental Airlines (CO) B757-200 that was under tow, but stopped, at Newark Liberty International Airport (KEWR), Newark, New Jersey. None of the 18 crewmembers and 294 passengers onboard LH403 were injured. There was no one onboard the B757 and the tug driver and radio operator were not injured. Night visual meteorological conditions prevailed. An instrument flight rules flight plan was on file for the flight, from Newark, to Frankfurt Airport (EDDF), Frankfurt, Germany. The scheduled international passenger flight was conducted under 14 Code of Federal Regulations Part 129.

The accident occurred in the vicinity of the intersection of taxiways A and S.

Taxiway A paralleled runway 4L/22R in the vicinity of Terminal B, and further northeast, split off to the left to curve around Terminal C. Where the split occurred, the pavement continued to parallel the runway, but was then designated taxiway S.

A voice communications recording from the tower ground control frequency was provided by the Federal Aviation Administration (FAA). The recording began at 1820, with subsequent transmission times determined by timing from that point. The times listed below also represent when the most significant parts of each transmission or action commenced. In addition, because of the number of airplanes involved, it was uncertain whether a specific transmission was made by a captain or a first officer, so the generic terms "crew", "they", or the flight number were utilized. Further information, such as airplane type, was gathered from other sources to enhance clarity. Unless otherwise noted, all instructions were read back by the receiving entity.

At 1823:15, CO1792, a B757, was instructed to taxi on taxiway B, hold short of S.

At 1823:25, CO312 a B737 that had just landed on runway 22L, was crossing runway 22R at taxiway E, and requested taxi to the ramp via taxiway RG. The controller instructed the crew to taxi via taxiway A to the ramp.

At 1823:48, CO466 was on taxiway V, and was instructed to taxi to the ramp via PA and A.

At 1824:14, Supertug 117 (ST117), a two-man tug that was initiating a tow of an unmanned CO B757 from gate 86 to Westpark Bay 1, was instructed to follow CO312 that was approaching from the right, on taxiway A, hold short of M. ST117 subsequently proceeded onto taxiway A via RF.

At 1826:00, LH403 was instructed to taxi via taxiway A, and hold short of S. The controller then advised CO466 to give way to LH403 on its left. Air traffic strip markings indicated that LH403 exited the Terminal B ramp at taxiway RE.

At 1826:25, CO312 advised the controller that it was on taxiway A, short of RG, and that the gate was changed, requiring an entry at RF, which they already passed. The controller instructed the crew to make a right turn on taxiway RG and hold short of B.

At 1827:02, the controller advised ST117 that the CO 737 (CO312) would be out of their way in a

moment. The ST117 crew did not respond.

At 1827:13, the controller instructed CO1190 (B737) to follow an American MD-80 via taxiways K and R.

At 1827:31, the controller advised CO1792 that coming from the opposite direction, they should have seen an American MD-80 pass by, and a B737-500 [CO1190] should be "moving on up" on taxiway R. When the crew confirmed seeing the B737-500, the controller instructed CO1792 to taxi via taxiways J and R, and to "follow your company."

At 1828:04, the controller advised CO312 that a B757 was to its left, and once it passed by, and then after LH403 passed by, CO312 would be cleared to the gate.

At 1828:21, LH403 was instructed to continue straight ahead and hold short of taxiway J.

At 1828:50, the controller asked LH403 if they saw a CO 757 moving left to right. The crew advised that they did, and the controller instructed them to make a right turn on taxiway J, R, follow the CO 757, and when at W, monitor the tower on 118.3

At 1829:12, the controller instructed CO312 to give way to LH403, then turn right on taxiway B, and proceed S, A, to the ramp.

At 1829:47, CO466 advised the ground controller that LH403 had "just impacted the seven five seven on alpha." After a query by the controller, CO466 confirmed the impact, as well as the fact "that it knocked the winglet off."

At 1830:03, the controller advised CO1792 that LH403 had just hit them, and a crewmember responded that they had not felt a thing, and that they were on taxiway R, approaching M.

At 1830:17, the controller asked LH403 to hold position, and the response was that they had "felt something" but weren't sure what it was.

At 1830:25, CO466 advised that LH403 had hit the CO 757 under tow, that the ST was holding short of RG, and when LH403 impacted the airplane, it knocked the winglet off.

At 1830:43, the controller advised CO1792 "it was not you" and that they could continue and monitor tower

At 1830:51, the controller advised ST117 that LH403 had "hit" the B757 in tow.

At 1831:27, CO466 advised that they had watched the accident, and confirmed that the B757 under tow was stopped when it was hit.

At 1832:07, CO312 reported that they also saw it, confirmed that LH403 also had damage, and that the impact was winglet to winglet.

#### PERSONNEL INFORMATION

The captain held a German airline transport pilot certificate, with a Boeing 747-400 type rating. His latest first class medical certificate was issued in May 2006. The pilot indicated 18,300 hours of flight time with 6,346 hours in type. The captain had flown into Newark "about 10 times."

The first officer held a German airline transport pilot certificate with a Boeing 747-400 type rating. His latest first class medical certificate was issued in July 2006. The pilot indicated 8,692 hours of flight time with 4,960 hours in type. The first officer had flown into Newark six times during the previous 6 years.

## AIRCRAFT INFORMATION

The LH Boeing 747-400 with winglets had a total wingspan of 213 feet when fully fueled. The CO Boeing 757 with winglets had a wingspan of 134 feet, 9 inches.

## METEOROLOGICAL INFORMATION

Weather, reported at 1851, included winds from 260 degrees true, at 9 knots, 10 statute miles visibility, and a broken cloud layer at 25,000 feet. According to data from the U.S. Naval Observatory, sunset was at 1654, and civil twilight ended at 1723. The phase of the moon was "waxing gibbous" with 70 percent of the visible disk illuminated.

## RECORDERS

A CO gate security camera captured parts of the event. The camera revealed that the CO 757 in tow was displaying its position lights.

The cockpit voice recorder from LH403 was forwarded to the National Transportation Safety Board for download. The recorder was good; however, the power to it had not been secured after the accident, and it continued to record over itself, negating any communications leading up to, during, or immediately after the accident.

German Federal Bureau of Aircraft Accident Investigation (BFU) investigators downloaded the flight data recorder and provided a copy of the raw data to the Safety Board; however, it could not be decoded.

LH personnel downloaded the Quick Access Recorder (QAR), and according to flight safety personnel, LH403 impacted the stopped CO 757 in tow at 8 knots.

According to an FAA inspector, an interview with the ST117 radio operator revealed that the B757 was stopped at the time of the accident, and could not move forward due to a company airplane ahead of it [CO312] to clear the area. The tug driver could not see the approaching LH403 as he was facing forward.

## WRECKAGE AND IMPACT INFORMATION

There was substantial damage to the winglet, outboard leading edge, and a wing rib of LH403.

The outboard, approximately 4 feet, of the CO757 right wing was severed, and came to rest 107 feet left of taxiway S centerline. For accident reporting purposes, the CO 757 was considered to be a ground vehicle rather than an airplane since there was no crew onboard and no intent for flight.

## ADDITIONAL INFORMATION

An initial statement provided by LH flight safety personnel indicated that before the impact, the LH403 crew was unaware that ST117 was on the radio frequency. After the accident, when the captain looked toward where the B757 would have been, he still did not see it due to "blinding" by the ramp apron lights. LH403 utilized navigation lights, turnoff lights, and inboard landing lights during the taxi.

Following a meeting with LH and FAA personnel, where copies of ground control transmissions and the CO gate security tape were provided, LH safety personnel re-interviewed the flight crew. At that time, the captain was "astonished" when he found out that ST117 was taxiing on taxiway A. He also indicated that because of the position of ST117 relative to the

ramp, he would only have noticed it as a "dark object." The apron lights were shining brightly toward his position which would have blinded his view of the tow. In addition, the crew's attention was focused on the B757 [CO1792] that was coming out of taxiway J and that they were instructed to follow.

The first officer thought that ST117 was never in front of LH403. In addition, he felt that given the positions of the stopped aircraft (ST117 and CO312), it would have been impossible for LH403 to bypass by CO312.

A visit to the Newark Air Traffic Control Tower by Safety Board, FAA and LH personnel (together) revealed that even in daylight, the distance from the cab to the intersection of taxiways A and S precluded an ability to judge wingtip to wingtip distances in that area.

#### SAFETY RECOMMENDATION

During the investigation, LH flight safety personnel noted a labeling discrepancy between some taxiway designations and the FAA airport diagrams, but not between any taxiway designations and Jeppesen airport diagrams, which were correct. Although LH utilized Lido charting, which was based on FAA diagrams, there was no evidence that the discrepancies affected the events that led up to, or occurred during the accident sequence.

Further investigation by the Safety Board confirmed the labeling discrepancies, and found that the FAA had no formal guidance or written procedures for the revision, publication and review of airport diagrams. In addition, there was no requirement that airport district offices review revised airport diagrams each publication cycle. As a result, on May 27, 2008, the Safety Board adopted recommendations A-08-30 and A-08-31, that recommended the FAA establish the formal guidance, and ensure airport district office review of diagrams. Those recommendations were forwarded to the FAA on June 2, 2008.

#### Pilot Information

<b>Certificate:</b>	Airline Transport	<b>Age:</b>	57, Male
<b>Airplane Rating(s):</b>	Multi-engine Land; Single-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>	Airplane Multi-engine; Airplane Single-engine	<b>Toxicology Performed:</b>	No
<b>Medical Certification:</b>	Class 1	<b>Last Medical Exam:</b>	05/01/2006
<b>Occupational Pilot:</b>		<b>Last Flight Review or Equivalent:</b>	03/01/2006
<b>Flight Time:</b>	18300 hours (Total, all aircraft), 6346 hours (Total, this make and model), 236 hours (Last 90 days, all aircraft), 90 hours (Last 30 days, all aircraft), 9 hours (Last 24 hours, all aircraft)		

## Co-Pilot Information

<b>Certificate:</b>	Airline Transport	<b>Age:</b>	38, 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>	None	<b>Toxicology Performed:</b>	No
<b>Medical Certification:</b>	Class 1	<b>Last Medical Exam:</b>	07/01/2006
<b>Occupational Pilot:</b>		<b>Last Flight Review or Equivalent:</b>	09/01/2006
<b>Flight Time:</b>	8692 hours (Total, all aircraft), 4960 hours (Total, this make and model), 91 hours (Last 90 days, all aircraft), 69 hours (Last 30 days, all aircraft), 9 hours (Last 24 hours, all aircraft)		

## Aircraft and Owner/Operator Information

<b>Aircraft Manufacturer:</b>	Boeing	<b>Registration:</b>	D-ABVY
<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>	29869
<b>Landing Gear Type:</b>	Retractable - Tricycle	<b>Seats:</b>	377
<b>Date/Type of Last Inspection:</b>	10/01/2006, Continuous Airworthiness	<b>Certified Max Gross Wt.:</b>	849999 lbs
<b>Time Since Last Inspection:</b>		<b>Engines:</b>	4 Turbo Fan
<b>Airframe Total Time:</b>	32204 Hours	<b>Engine Manufacturer:</b>	General Electric
<b>ELT:</b>	Installed, not activated	<b>Engine Model/Series:</b>	CF6-80C2B1F
<b>Registered Owner:</b>	Lufthansa German Airlines	<b>Rated Power:</b>	57000 lbs
<b>Operator:</b>	Lufthansa German Airlines	<b>Air Carrier Operating Certificate:</b>	Foreign Air Carrier (129)

## Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Night
Observation Facility, Elevation:	KEWR, 18 ft msl	Observation Time:	1851 EST
Distance from Accident Site:		Direction from Accident Site:	
Lowest Cloud Condition:		Temperature/Dew Point:	19° C / 8° C
Lowest Ceiling:	Broken / 25000 ft agl	Visibility	10 Miles
Wind Speed/Gusts, Direction:	9 knots, 260°	Visibility (RVR):	
Altimeter Setting:	29.89 inches Hg	Visibility (RVV):	
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Newark, NJ (KEWR)	Type of Flight Plan Filed:	IFR
Destination:	Frankfurt (EDDF)	Type of Clearance:	IFR
Departure Time:	EST	Type of Airspace:	

## Airport Information

Airport:	Newark Liberty Intl (KEWR)	Runway Surface Type:	
Airport Elevation:	18 ft	Runway Surface Condition:	
Runway Used:	NA	IFR Approach:	None
Runway Length/Width:		VFR Approach/Landing:	None

## Wreckage and Impact Information

Crew Injuries:	18 None	Aircraft Damage:	Substantial
Passenger Injuries:	294 None	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	312 None	Latitude, Longitude:	40.692500, -74.168611

## Administrative Information

Investigator In Charge (IIC):	Paul R Cox	Adopted Date:	09/26/2008
Additional Participating Persons:	Charles A Emering; FAA/FSDO; Teterboro, NJ Lothar Mueller; Accredited Representative (BFU Germany); Braunschweig, Germany, Joachim Fleger; Lufthansa (Advisor to German Acc Rep); Cologne, Germany,		
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:pubinq@ntsb.gov">pubinq@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> .		

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