



## Steep Turn by Captain During Approach Results in Stall and Crash of DC-8 Freighter

*The captain continued to fly the approach in a manner that placed the airplane in a dangerous flight regime despite warnings from the other crew members and the stall warning stick shaker, official U.S. report says.*

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The crash of a Douglas DC-8-61 freighter operated by American International Airways Inc. (AIA) has resulted in recommendations by the U.S. National Transportation Safety Board (NTSB) that the U.S. Federal Aviation Administration (FAA) upgrade flight and duty time regulations to incorporate the latest research on fatigue. The three crew members were seriously injured in the Aug. 18, 1993, accident.

The crew was making an approach to the U.S. Naval Air Station (NAS), Guantanamo Bay, Cuba, during daylight in visual meteorological conditions (VMC). The captain elected to land on Runway 10. An approach to this runway requires the traffic pattern to be flown to avoid Cuban airspace, which begins three-quarters of a mile (1.2 kilometers) west of the runway. As he flew the traffic pattern, the captain became preoccupied with locating a strobe light that marked the western perimeter of the naval base. The crew was unaware that the strobe light was not operational. While turning from base leg to final, the captain banked the airplane more than 50 degrees to avoid overshooting the runway. The airplane stalled and crashed 1,400 feet (427 meters) west of the approach end of Runway 10. The crew had been on duty approximately 18 hours at the time of the accident, the NTSB accident report said.

“The probable causes of this accident were the impaired judgment, decision-making, and flying abilities of the captain and flightcrew due to the effects of fatigue; the captain’s

failure to properly assess the conditions for landing and maintaining vigilant situational awareness of the airplane while maneuvering onto final approach; his failure to prevent the loss of airspeed and avoid a stall while in [a] steep bank turn; and his failure to execute immediate action to recover from a stall,” the NTSB said.

The NTSB added: “Additional factors contributing to the cause were the inadequacy of the flight and duty time regulations applied to [U.S. Federal Aviation Regulations (FARs)] Part 121, Supplemental Air Carrier, international operations, and the circumstances that resulted in the extended flight/duty hours and fatigue of the flightcrew members. Also contributing were the inadequate training and guidance by American International Airways, Inc., to the flightcrew for operations at special airports, such as Guantanamo Bay; and the Navy’s failure to provide a system that would assure that the local tower controller was aware of the inoperative strobe light so as to provide the flight crew with such information.”

The flight crew’s duty day began in Dallas, Texas, U.S., at 2300 local time on Aug. 17, 1993. The crew departed Dallas at 2400, landed in St. Louis, Missouri, then continued to Detroit, Michigan, where they landed at 0325 on Aug. 18. After changing airplanes and waiting for freight to be loaded, the crew departed Detroit at 0620, and landed in Atlanta, Georgia, at 0752.

The crew, who were supposed to be off-duty until 2300 that night, then left the airport. Nevertheless, an AIA flight at another location was canceled because of mechanical problems, and the off-duty crew was summoned to fill in for the canceled flight. Operating as AIA Flight 808 (under contract to the U.S. Department of Defense), the crew departed Atlanta at 1010 and flew to the Naval Air Station, Norfolk, Virginia, where they landed at 1140. They remained in Norfolk approximately two and one-half hours while freight was loaded onto the aircraft. During this time, the crew reviewed their flight plan, weight and balance information, and the weather for the next leg of their trip, to NAS Guantanamo Bay. They also reviewed arrival and landing procedures for Guantanamo Bay, because none of the crew had ever landed a DC-8 there before, the report said.

Flight 808 departed Norfolk at 1413 on instrument flight rules (IFR) and proceeded uneventfully to the Guantanamo Bay area. Before approaching the coast of Cuba, the crew was required to cancel their IFR flight plan and proceed under visual flight rules (VFR) to remain clear of Cuban airspace. At 1634:49, the crew was in contact with the Guantanamo radar controller, who shortly afterward told the flight to "... maintain VFR one two miles off the Cuban coast; no reported traffic in the area ... landing runway one zero; wind, one eight zero at eight ... ." said the report. The first officer acknowledged the transmission and asked for a landing on Runway 28.

At 1641:53, the captain said to the other crewmembers, "[We]otta make that [Runway] one zero approach just for the heck of it to see how it is; why don't we do that let's tell 'em we'll take [Runway] one zero; if we miss we'll just come back around and land on [Runway] two eight," the report said. The first officer then asked the controller for a landing on Runway 10, which the controller acknowledged and asked if they wanted a left or right entry into the pattern for Runway 10.

The crew then discussed whether to make a left or right pattern entry for Runway 10. "The captain said, 'It does say right traffic in the, in that uh, training clip that's all it says.' The first officer followed with the comment, 'Right, I know for sure uh, cause I just went through recurrent [training] ... besides there's a big hill over there; it might give you some depth perception problems,'" the report said. After a brief discussion about the weather, the first officer asked the controller for Guantanamo Bay weather, which the controller reported as 10,000 feet (3,050 meters) scattered, and seven miles (11.3 kilometers) visibility.

At 1646:07, the crew was in contact with the Guantanamo tower controller, who told them, "Runway one zero, wind two two zero at seven, altimeter two niner niner seven, report Point Alpha," the report said. "The first officer acknow-

ledged the transmission and requested 'clarification' of the location of Point Alpha. The controller provided the crew with the information and followed this transmission several seconds later with, 'eight zero eight, would you like runway two eight.' The first officer responded, 'We're gonna try [Runway] ten first.'"

As the crew approached the airport from the east, the captain (pilot flying) called for the approach checklist, and the flaps were lowered to 15 degrees. "At 1652:03, the tower controller transmitted, 'Connie eight oh eight [AIA was doing business as Connie Kalitta Services Inc.], Cuban airspace begins three-quarters of a mile west of the runway. You are required to remain within this, within the airspace designated by a strobe light.' The first officer responded, 'Roger, we'll look for the strobe light ...'" said the report.

The strobe light marks the fence on the western border of the naval base. There is only one strobe, mounted on top of a guard tower, and located at the corner of the Cuban border and the shoreline. On the day of the accident, the strobe was not operational. The tower controller who provided Flight 808 with landing instructions was a trainee, and was unaware that the strobe light was inoperative. A supervisory controller was on duty and monitoring communications, but did not alert Flight 808 about the status of the light, the report said.

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As the captain maneuvered the airplane for the approach, the first officer remarked, "I'd give myself plenty of time to get straight ... maintain a little water off because you're gonna have to turn ... I think you're gettin' in close before you start your turn," the report said. "The captain responded, 'Yeah, I got it, I got it ... going to have to really honk it, let's get the gear down.'"

The report continued: "During the next several seconds, the CVR [cockpit voice recorder] recorded the captain stating to the other crewmembers that he was having difficulty identifying the runway environment as they approached the airport and as the wing flaps were being lowered to the 50-degree down position. The captain then said, 'Now we gotta stay on uh one side of this road here, right.' The first officer responded, 'Yeah, we gotta stay on this side, on this side over here, you can see the strobe lights.'" The CVR transcript indicated that the captain was preoccupied with locating the strobe light to avoid entering Cuban airspace ("Final Minutes of AIA Flight 808," page 7).

More than 20 witnesses, on or near the airport, observed Flight 808 during its approach. "A crew of four U.S. Navy pilots, who were located in the cockpit of a Lockheed C-130 that was on the airport ramp, observed the approach and subsequent crash of Flight 808," the report said.

It added: "One of the pilots stated: '... I saw the DC-8 on a wide right base for Runway 10. It appeared to be at approximately 1,000 feet [305 meters] agl [above ground level]. I was interested in watching such a large airplane shoot the approach ... It looked to me as if he was turning to final rather late so it surprised me to see him at 30 to 40 degrees AOB [angle of bank] trying to make final. At 400 feet [122 meters] agl, he increased angle of bank to at least 60 degrees in an effort to make the runway and was still overshooting. At this time, the aircraft's nose turned right, and it appeared he was trying to use bottom rudder to make the runway. At this point, he appeared to be 200 to 300 feet [61 to 91.5 meters] agl. He was still overshooting, and my copilot remarked he was going to land on the ramp. His wings started to rock towards wings level and the nose pitched up. At this point, the right wing appeared to stall, the aircraft rolled to 90 degrees AOB and the nose pitched down. ...'" the report said.

"The airplane struck level terrain, approximately 1,400 feet [427 meters] west of the approach end of Runway 10," the report said. "Several fires erupted after the airplane impacted the ground. These fires were either self-extinguished or were extinguished by the Guantanamo Bay Naval Air Station airport rescue and fire fighting (ARFF) personnel. According to base personnel, all major fire fighting apparatus responded within approximately one minute of the accident and were used to extinguish the fire that engulfed the airplane wreckage and the approximate 30 acres of vegetation surrounding a portion of the accident site." The airplane was destroyed. Its value was estimated at US\$5 million.

All three flight crewmembers were seriously injured. Toxicological tests were performed on blood and urine samples taken from the crew. "The first officer tested positive for codeine, which is a pain suppressant," the report said. "According to personnel in the hospital trauma center, this drug was most probably administered after the accident. All other toxicology tests performed on the samples from the three crewmembers were negative."

When investigators examined the wreckage path of the airplane, they found that "the airplane initially struck the ground 200 feet [61 meters] north of the extended runway centerline and 1,400 feet west of the Runway 10 threshold," the report said. "The wreckage debris was oriented on a magnetic heading of approximately 100 degrees and extended for a distance of about 1,000 feet from the initial impact point. ... The initial impact mark was a thin, shallow trough that fanned outward to about 25 feet [7.6 meters] and extended 150 feet [45.7 meters] in the direction of flight. The right wing tip, found 200 feet north of the first impact point, exhibited compression damage and scratch marks that were consistent with the airplane in a roll attitude of 51 degrees at the point of initial ground impact.

"All major portions of the airplane and flight control systems were accounted for at the accident site. There was no evidence

of an in-flight fire, nor was there evidence of structural anomalies that would indicate a preimpact structural failure. Examination of the wreckage also revealed that the landing gear was in the down and locked position; the elevator pitch trim was in the 7 degree-nose-up position; the leading edge [slats] were in the open position; and the wing flaps were in the 50-degree down position at the time of ground impact."

The survival aspects of the accident were examined. "The forward portion of the fuselage, including the cockpit, separated from the remainder of the airplane and came to rest partially inverted outside the fire burn area," the report said. "Except for a hole in the right side wall between the first officer's seat base and the rudder pedals, the cockpit remained intact. The forward seat supports failed on both the captain's and first officer's seats, and although the cockpit floor was inverted, the flight engineer seat was found attached in its normal mounted position. The safety belts were found frayed but were not broken. ... The cargo straps in the forward fuselage were found secured to their respective [tie-down] rings, and the cargo was still restrained under the cargo netting. ... The dynamic forces of the airplane's movement on the ground did not exceed the levels of human tolerance."

A review of the maintenance and inspection program on the accident airplane "revealed that all applicable ADs [airworthiness directives] and SBs [service bulletins] had been accomplished, and that the four DMIs [deferred maintenance items] had been closed," the report said. The accident airplane's flight manual was reviewed, and contained a supplemental type certificate (STC) "which increased the airplane landing and zero fuel weights, and required the installation of the Quiet Nacelle Corporation Plus (QNC+) acoustically treated engine nacelles (stage 2 hush kit for noise reduction)."

"According to the supplement to the AIA airplane flight manual for the DC-8-61 equipped with the QNC+ conversion, the 'Certificate Limitations, Procedures and Performance Information' authorizes 35 degrees of flaps as the normal landing flap configuration. It also states, '... flaps 50 is no longer an authorized landing flap (except for emergency purposes), and the 50-degree performance data in the Basic AFM [aircraft flight manual] is considered to be part of Emergency Procedures for the purpose of this AFM Supplement,'" the report said.

The report said that the STC reduced "the 'authorized' landing flap configuration from 50 degrees to 35 degrees of flaps to reduce engine thrust (reduced noise output) to comply with the [FAA] noise regulations. The 50-degree flap restriction was not an aircraft performance limitation because of the conversion."

Investigators reviewed the weight-and-balance and performance data of the accident airplane. Data provided to the crew by AIA personnel indicated that the accident airplane

could have landed on either Runway 10 or 28 with a tailwind of not more than 10 knots, provided the airplane's landing weight did not exceed 237,800 pounds (107,864 kilograms). "At the time of the accident, the wind was reported to be from 200 degrees at 7 knots. At the projected landing weight of 237,199 pounds [107,592 kilograms], Flight 808 would not have exceeded the limitation for landing on Runway 10," the report said.

The background and qualifications of the crew were reviewed. The captain, age 54, held a U.S. airline transport pilot (ATP) certificate with multi-engine land airplane privileges, and type ratings in the DC-8, DC-9 and Boeing 727. He also held a commercial pilot certificate with a single-engine land airplane rating, a flight engineer certificate with a turbo-propeller rating, and an airframe and powerplant (A&P) certificate.

From 1966 to 1991, the captain was employed by Eastern Airlines Inc. until it ceased operation. In 1991, he was hired by AIA as a DC-8 captain. At the time of the accident, the captain's total flight time was 20,727 hours, of which 1,527 hours were as captain of the DC-8. He had a current first class medical certificate with a limitation requiring him to possess correcting lenses for near vision.

"Interviews with pilots who have flown with the captain described him favorably and commented that he was very conscientious and good at managing the crew," the report said. "A company flight instructor who had given the captain several checkrides described him as a good pilot who was 'middle of the pack' in ability and who displayed good judgment when dealing with emergencies."

The report said, "The captain had received a 2-day crew resource management (CRM) training while he was employed at Eastern Airlines. AIA does not have a formal CRM program; however, the company did attempt, on a limited basis, to instruct CRM principles informally during initial and recurrent training."

The background of the first officer, age 49, was also reviewed. He held a U.S. ATP certificate with multi-engine land airplane privileges, and type ratings in the Learjet, DC-8, and DC-9. He also held a commercial pilot certificate with single-engine land airplane privileges and a flight engineer certificate with turbo-propeller and turbo-jet ratings.

From 1966 to 1991, the first officer was employed by Eastern Airlines Inc., where he had flown as a flight engineer, first officer and captain. He was hired by AIA in 1991. At the time of the accident, the first officer's total flight time was 15,350 hours, of which 492 hours were as first officer and captain of the DC-8. He had a current first class medical certificate with no limitations.

"The first officer had completed a 2-day CRM class while employed at Eastern Airlines; however, during his employment

with AIA he had received 'informal' CRM training. ... Interviews revealed that his peers regarded him as a 'very competent' and 'excellent' pilot," the report said.

The background of the flight engineer, age 35, was also reviewed. He held a U.S. commercial pilot certificate with single- and multi-engine land and instrument airplane ratings. He also held a flight engineer certificate with reciprocating and turbo-jet powered aircraft ratings, and an ALP certificate. Since being hired by AIA in 1991, the flight engineer was furloughed twice; first for six months, then for one month. At the time of the accident, his total flight time was 5,085 hours, of which 1,085 hours were as flight engineer on the DC-8.

"The flight engineer was described by his peers as 'competent and conscientious,' and [it was said] that he did an effective job and spoke when he observed an unusual or abnormal situation. ... [He] had not received any CRM training from AIA," the report said.

Investigators reviewed the approach to Runway 10 at Guantanamo Bay and the performance of the flight crew of Flight 808 during their approach. "For pilots of large aircraft, the approach presents challenges that are not normally encountered during routine air carrier line operations," the report said. The approach to Runway 10 "requires the pilot to accomplish a tight radius turn from base leg to final approach using a steeper than normal angle-of-bank and rolling out on runway heading over or nearly over the runway threshold. The rollout to a wings-level attitude is completed at low altitude with minimum distance to correct for runway misalignment."

A prevailing southerly wind at Guantanamo Bay increases the difficulty in flying a right traffic pattern to Runway 10, because the increased ground speed encountered on base leg requires a steeper than normal bank to avoid overshooting the final, the report said.

The report said, "The Safety Board determined that the approach to Runway 10 was within the theoretical performance limits of the accident airplane using a maximum bank angle of 30 degrees. The DC-8 at the landing gross weight of 236,000 pounds [107,048 kilograms] with the flaps extended to 50 degrees would have a wings-level stall speed ( $V_{so}$ ) of about 109 knots indicated airspeed (KIAS), and a nominal approach speed of 147 KIAS ( $1.3 V_{so} + 5$ ). At this approach speed, the radius of turn with 30 degrees of bank is approximately 3,325 feet [1,014 meters]. Thus, the airplane approaching from the south and aligned precisely with the Cuban border fence should have been able to complete a turn to the east and return to a wings-level attitude on final for Runway 10 with about 1,300 feet [396 meters] remaining to the runway threshold. Assuming a touchdown aim-point 1,000 feet [305 meters] beyond the runway threshold, and a constant 3-degree-per-second descent path, the airplane would have been approximately 120 feet

[36.6 meters] above the ground as it rolled wings-level attitude on final approach.

“A ground track generated from FDR [flight data recorder] and meteorological data indicated that Flight 808 was approximately 3,000 feet [915 meters] west and 2,000 feet [610 meters] south of the Runway 10 threshold (approximately 1,000 feet from the shoreline) when the turn from base leg to final approach was initiated. From this position, it is probable that the captain, being in the left seat, did not have the runway threshold in sight. However, there is no evidence that he requested assistance from his first officer who was in a better position to view the runway, nor is there any evidence that the first officer volunteered the essential information regarding the position and proximity of the airplane to Runway 10.”

The report added: “In addition to being too close to the runway threshold on the base leg, the FDR indicated that the captain permitted the airspeed to decrease to 140 KIAS, about 7 knots below the target airspeed. Based on the actual point where the turn was initiated, the required radius to complete the turn and be in a position to cross the runway threshold, aligned with the centerline would have been 2,700 feet [823 meters]. At 147 KIAS, a constant bank angle of 55 degrees would have been required to achieve this turn, an inappropriate maneuver for a DC-8. Additionally, a load factor of 1.7 would have to be developed to maintain such a turn and the stall speed would have increased to 143 KIAS.”

Seven seconds before impact, the airplane was in a right bank of more than 50 degrees. The stick shaker activated at 136 knots. “Based on the FDR and CVR data, and the performance characteristics of the DC-8, upon activation of the stall warning stick shaker, the captain would have had about 5 seconds to initiate corrective action and eliminate the stall hazard. The data also suggests that conventional stall recovery techniques (maximum thrust and wings level) and the execution of a go-around could have prevented ground impact,” the report said. The NTSB found no indications that engine thrust had been increased or that the bank angle had been reduced from the time the stick shaker activated until ground impact.

Investigators examined the flight crew’s duty schedule to determine if their extended schedule had adversely affected their performance. The report said: “The Safety Board [NTSB] believes that the substandard performance by an experienced pilot may have reflected the debilitating influences from fatigue. In his testimony before the Safety Board at its public hearing, the captain described his memory of the last period before the accident in terms that suggested fatigue:

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***“... the captain had been awake for 23.5 hours at the time of the accident, the first officer for 19 hours, and the flight engineer for 21 hours.”***

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‘All I can say is that I was — I felt very lethargic or indifferent. I remember making the turn from the base to the final, but I don’t remember trying to look for the airport or adding power or decreasing power. On the final — I had mentioned ... that I had heard Tom [the first officer] say something about he didn’t like the looks of the approach. And looking at the voice recorder, it was along the lines of, are we going to make this? I remember looking over at him, and there again, I remember — being very lethargic about it or indifferent. I don’t recall asking him or questioning anybody. I don’t recall the [flight] engineer talking about the airspeeds at all. So it’s frustrating and disconcerting at night to try to lay there and think of how this — you know — how you could be so lethargic when so many things were going on, but that’s just the way it was.’”

When the first officer was asked about his own fatigue status, he told investigators “that he felt somewhat fatigued when he accepted the trip to fly to Guantanamo, but that he felt fully alert and exhilarated just before the accident as they approached the airport. ... According to the captain, the first officer reviewed the tower transcript after the accident and ‘thought he might be more fatigued than he thought he was because of the way he answered some of the transmissions and the way he stuttered in some of the transmissions,’” the report said.

The NTSB cited three background factors that are normally examined during accident investigations for evidence of fatigue: cumulative sleep loss, continuous hours of wakefulness and time of day. “The Safety Board’s examination of the flight and duty time revealed the captain had been awake for 23.5 hours at the time of the accident, the first officer for 19 hours, and the flight engineer for 21 hours. ... The accident occurred at 1656, at the end of the afternoon physiological low period. The crewmembers had been awake for the preceding two nights and had attempted to sleep during the day, further complicating their circadian sleep disorders. Therefore, the evidence in this accident shows that the flight crewmembers met all three of the scientific criteria for susceptibility to the debilitating affects of fatigue,” the report said.

Investigators interviewed AIA management about company operations, and the report noted that the “CEO [chief executive officer] described the operating philosophy of the company and indicated that flight and duty time schedules were an important issue in air freight service. He said that to remain competitive, the company must often assign long duty times and ‘work everything right to the edge’ of what was allowed by federal regulations. He indicated that this practice was ‘common’ in the air freight industry.”

The CEO told investigators that morale was “‘fairly decent,’ although the pilot group had recently voted to unionize,” the

report said. “According to the CEO, a major factor in the pilots acquiring union representation was due, in part, to the company’s practice of upgrading pilots by performance rather than seniority. The CEO also said that ‘good’ pilots were recognized for their professionalism and ‘pulling for the company’ through support of company requirements and practices, thus they were upgraded ‘out of seniority.’”

Investigators also interviewed the FAA Principal Operations Inspector (POI) responsible for overseeing AIA’s operations. The report said: “The POI characterized AIA as a company that meets the ‘minimum standards and no more,’ because ‘they operate close to the cuff.’ He also said that the president tried to run the airline like a ‘mom and pop operation,’ with minimum numbers of personnel, many of whom were ‘over-worked.’ He also stated that it was difficult to get the company to respond to changes he felt were necessary. He said that when he found problems, AIA would fix them by ‘decree’; however, upon his [the POI’s] return, the problems still existed and it took more than one letter to the carrier to ‘get things accomplished.’ The POI said that he often had to resort to unorthodox methods to make AIA take corrective actions on the negative findings.”

AIA conducts flight operations in Michigan, Florida, Saudi Arabia and South America. Flight crew training is conducted in Colorado and Minnesota. The POI told investigators that he had informed FAA management that, because of fiscal restraints, he could not perform adequate surveillance of AIA’s international operations and training, the report said.

“The POI stated he had been contacted many times by crewmembers via telephone and letters regarding long duty days, flight hours, and safety violations,” the report said. “Most of the individuals wanted to remain anonymous for fear of company reprisals.”

The NTSB report said that during the investigation of this accident, it received “numerous unsolicited telephone calls from former AIA employees citing the alleged conduct and safety violations of the company. These allegations were forwarded to the FAA for further investigation and validation.”

The report noted that when the flight crew of the accident flight was interviewed, the first officer said that “the crewmembers had discussed the trip to Guantanamo and decided that although it was ‘legal,’ it seemed like a long day and might be ‘pushing the edge.’ He added that based on his previous experience regarding the company’s attitude, ‘if the trip was legal, you better really be tired’ to refuse the trip. Several former AIA pilots expressed to the Safety Board their concerns about the scheduling practices at the airline. One pilot stated that he was with a crew that refused to fly a [FARs] Part 91 ferry flight at

the end of a long duty [period] and that he felt the crew was subjected to intimidation by the company.”

Investigators examined the flight and duty time regulations that applied to the crew of the accident flight, and found that several different regulations were applicable to the accident trip. The flight crew’s domestic U.S. flights were conducted under FARs Part 121.505 for supplemental air carriers and commercial operators. Under this rule, a pilot cannot be scheduled to fly more than eight hours, or be on duty more than 16 hours, in 24 consecutive hours. The flight to Guantanamo Bay was conducted under FARs Part 121.521, for supplemental air carriers on international flights. Under this rule, a pilot can be scheduled to fly up to 12 hours in 24 consecutive hours. “... because the pilots of Flight 808 would have accumulated about 9.0 hours of flight time and 21 hours of duty time when they arrived at Guantanamo Bay, the time that would have accumulated during this trip would have exceeded the limits of ... 121.505, but not the limits of ... 121.521,” the report said.

The plan for Flight 808 had been to have its freight off-loaded at Guantanamo Bay, then have the crew return the airplane to Atlanta. This return flight would have been conducted under Part 91 as a non-commercial ferry flight. “Currently, there are no flight or duty limits applicable to commercial operators when the airplane is flown under ... Part 91, to ferry the airplane. ... Therefore, the accident trip was under the provisions of a combination of separate regulations that allowed extended flight and duty times to be scheduled, contrary to safe operating practices,” the report said.

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***“... based on his previous experience regarding the company’s attitude, if the trip was legal, you better really be tired’ to refuse...”***

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The NTSB developed 13 findings as a result of its investigation. The most significant findings in the report were:

- “The flightcrew members had experienced a disruption of circadian rhythms and sleep loss, which resulted in fatigue that had adversely affected their performance during a critical phase of flight.
- “The flightcrew had been on duty about 18 hours and had flown approximately 9 hours at the time of the accident. The company had intended for the crew to ferry the airplane back to Atlanta after the airplane was off-loaded in Guantanamo Bay. This would have resulted in a total duty time of about 24 hours and 12 hours of flight time, the maximum permitted under ... 121.521, supplemental rules for overseas and international flights.
- “If the flightcrew had been scheduled to conduct a flight within the United States, similar to that of Flight 808, the flight crew would have exceeded the flight and duty time requirements of ... 121.505.

## Final Minutes of AIA Flight 808\*

1653:28 Captain (Capt.): Where's the strobe?  
1653:29 Flight Engineer (FE): Right over there.  
1653:31 Capt.: Where?  
1653:33 First Officer (FO): Right inside there, right inside there.\*\*  
1653:35 FE: You know, we're not getting our airspeed back there.  
1653:37 Capt.: Where's the strobe?  
1653:37 FO: Right down there.  
1653:41 Capt.: I still don't see it.  
1653:42 FE: #, we're never goin' to make this.  
1653:45 Capt.: Where do you see a strobe light?  
1653:48 FO: Right over there.  
1653:57 Capt.: Where's the strobe?  
1653:58 FO: Do you think you're gonna make this?  
1653:58 Capt.: Yeah ...  
1654:00 Capt.: If I can catch the strobe light.  
1654:01 FO: Five hundred, you're in good shape.  
1654:06 FE: Watch the, keep your airspeed up.  
1654:09 ((Sound similar to stall warning.))  
1654:10 Unidentified crew: (Don't), stall warning.  
1654:11 Capt.: I got it.  
1654:12 FO: Stall warning.  
1654:12 FE: Stall warning.  
1654:13 Capt.: I got it, back off.  
1654:13 Unidentified crew: Max power. ((concurrent with previous statement.))  
1654:15 Unidentified crew: There it goes. There it goes.  
1654:16 Unidentified crew: Oh no.  
1654:17 ((Sounds of several screams.))  
1654:20 ((End of recording.))

# = Expletive

() = Questionable Insertion

(( )) = Editorial Insertion

\* Transcript from aircraft's cockpit voice recorder.

\*\* The accident report said that the first officer falsely identified the strobe.

Source: U.S. National Transportation Safety Board

- "In view of all the circumstances, the captain's decision to land on Runway 10 was inappropriate.
- "The [U.S.] Department of Defense/Navy did not have a procedure in place at Guantanamo Bay to ensure that all air traffic controllers were made aware of the inoperative strobe light and to ensure that the controllers communicated the operational status to flightcrews.
- "The captain did not recognize the deteriorating flight-path and airspeed conditions due to preoccupation with locating the strobe light on the ground. This lack of recognition was despite the conflicting remarks made by the first officer and the flight engineer questioning the success of the approach. Repeated callouts by the flight engineer stating slow airspeed conditions went unheeded by the captain.
- "The captain initiated the turn from base leg to final approach at an airspeed that was below the calculated reference speed of 147 KIAS, and less than 1,000 feet from the shoreline, and he allowed bank angles in excess of 50 degrees to develop.
- "The stall warning stick shaker had activated 7 seconds prior to impact, 5 seconds before the airplane reached stall speed.
- "There was no loss of roll authority at the onset of the artificial stall warning (stick shaker) and no evidence to indicate that the captain attempted to take proper corrective action at the onset of stick shaker.
- "AIA's management structure and philosophy were insufficient to maintain vigilant oversight and control of the rapidly expanding airline operation. ...
- "The surveillance and oversight of AIA by the FAA POI, PMI [principal maintenance inspector], and PAI [principal avionics inspector] were not totally effective because of the minimal to nonexistent FAA geographical support for oversight of remote operations."

Based on its findings, the NTSB made three recommendations to the FAA:

- "Revise the applicable subpart of ... Part 121, to require that flight time accumulated in noncommercial 'tail end' ferry flights conducted under ... Part 91, as a result of ... Part 121, revenue flights, be included in the flight crewmember's total flight and duty time accrued during those revenue operations.
- "Expedite the review and upgrade of Flight/Duty Time Limitations of the Federal Aviation Regulations to ensure that they incorporate the results of the latest research on fatigue and sleep issues.

- “Revise ... 121.445, to eliminate subparagraph (c), and require that all flight crewmembers meet the requirements for operation to or from a special airport, either by operating experience or pictorial means.”

The NTSB also reiterated two previous recommendations to the FAA:

- “Require U.S. air carriers operating under ... Part 121, to provide for flightcrews not covered by the Advanced Qualifications Program (AQP), a comprehensive crew resource management (CRM) program as described in FAA Advisory Circular 120-51A.
- “Require U.S. air carriers operating under ... Part 121, to include, as part of pilot training, a program to educate pilots about the detrimental effects of fatigue, and strategies for avoiding fatigue and countering its effects.”

The NTSB made the following recommendations to AIA:

- “Revise the AIA training program to ensure that all pilots receive crew resource management (CRM) training that conforms to the guidelines set forth in FAA Advisory Circular 120-51A.
- “Review and revise the AIA special airports training program to require, in addition to flightcrew members, flight engineers to participate in the AIA special airports training program. The revised program should ensure that all flightcrew members who operate airplanes with

high approach speeds are aware and understand the effects of high bank angles and increased load factors, adverse wind conditions, and required flight path profiles necessary to perform the approach.”

The NTSB also made the following recommendation to the U.S. Department of Defense:

- “Provide to all civilian contract operators and flightcrew members either verbal and/or written airfield briefing information regarding normal or emergency operations and flight restrictions pertaining to those airfields classified as ‘special airports.’ ...” ♦

Editorial note: This article was adapted from *Aircraft Accident Report: Uncontrolled Collision with Terrain, American International Airways Flight 808, Douglas DC-8-61, N814CK, U.S. Naval Air Station, Guantanamo Bay, Cuba, August 18, 1993*, Report No. NTSB/AAR-94/04, prepared by the U.S. National Transportation Safety Board. The 144-page report includes figures and appendices.

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#### **ACCIDENT PREVENTION**

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