



NATIONAL TRANSPORTATION SAFETY BOARD
Office of Aviation Safety
Washington, D.C. 20594

October 3, 2002

Human Performance

GROUP CHAIRMAN'S FACTUAL REPORT

A. ACCIDENT

Operator: American Airlines (flight 587)
Location: Belle Harbor, New York
Date: November 12, 2001
Time: 0916 eastern standard time¹
Aircraft: Airbus A300-600, N14053
NTSB Number: DCA02MA001

B. HUMAN PERFORMANCE GROUP

CHAIRMAN:

Bartholomew Elias, Ph.D.
Senior Human Performance Investigator
National Transportation Safety Board
Office of Aviation Safety
Human Performance Division (AS-50)
Washington, D.C. 20594

¹ Unless otherwise indicated, all times are eastern standard time, based on a 24-hour clock.

HUMAN PERFORMANCE GROUP MEMBERS:

Captain David J. Ivey
Operational Factors (AS-30)
National Transportation Safety Board
490 L'Enfant Plaza East, SW
Washington, D.C. 20594

Kristin Poland, Ph.D.
Vehicle Performance (RE-60)
National Transportation Safety Board
490 L'Enfant Plaza East, SW
Washington, D.C. 20594

Michael D. Michaelis
First Officer, American Airlines
Allied Pilots Association (APA)
14600 Trinity Blvd. Suite 500
Fort Worth, TX 76155-2512

Captain Lawrence E. Thompson
Flight Test, American Airlines
Maintenance and Engineering Center
MD 593
Tulsa, OK 74116

Captain Armand Jacob
Experimental Test Pilot
Airbus S.A.S.
1 Rond Point Maurice Bellonte
31707 Blagnac Cedex France

Thierry Loo, Investigator
BEA France
Batiment 153
Aeroport du Bourget
93352 LE BOURGET Cedex France

Thomas M. McCloy, Ph.D.
Federal Aviation Administration
800 Independence Ave., SW
AAR-100
Washington, DC 20591

Loran A. Haworth
Human Factors Specialist/Test Pilot
Federal Aviation Administration
Transport Airplane Directorate
ANM-111
1601 Lind Ave. SW
Renton, WA 98055-4056

C. ACCIDENT SUMMARY

On November 12, 2001, about 0916 eastern standard time, American Airlines flight 587, an Airbus A300-600, was destroyed when it crashed into a residential area of Belle Harbor, New York, shortly after takeoff from the John F. Kennedy International Airport (JFK), Jamaica, New York. Two pilots, 7 flight attendants, 251 passengers, and 5 persons on the ground were fatally injured. Visual meteorological conditions prevailed and an instrument flight rules flight plan had been filed for the flight destined for Santo Domingo, Dominican Republic. The scheduled passenger flight was conducted under Title 14 Code of Federal Regulations (CFR) Part 121.

D. DETAILS OF THE INVESTIGATION

On November 12, 2001, Dr. Elias traveled to JFK and participated in Operations Group activities during the on-scene phase of the investigation which concluded on November 18, 2001. On December 6, 2001, Dr. Elias traveled to New Jersey and interviewed the wife of the American Airlines flight 587 captain. From January 14 through January 18, 2002, Dr. Elias traveled to American Airlines facilities in Fort Worth, Texas and participated in Operations Group interviews. On January 22, 2002, Dr. Elias traveled to Connecticut and interviewed the father of the American Airlines flight 587 first officer.

In early April 2002, a separate Human Performance Group was formed. The group held a teleconference on April 30, 2002 and convened for an initial organizational meeting at NTSB Headquarters on June 18, 2002.

On the weeks of August 12 and August 19, 2002, the Human Performance Group convened at the National Aeronautical and Space Administration (NASA) Ames Research Center, Moffett Field, California to conduct observations and tests using the NASA Vertical Motion Simulator. From September 12 to 17, 2002, the Human Performance Group convened at Airbus Industrie facilities in Toulouse, France to conduct a ground test examining biomechanical aspects of flight control inputs on an Airbus A300-600 airplane. Observations and findings from these activities will be presented in separate study reports.

E. FACTUAL INFORMATION

E.1. The Captain

E.1.1. Background

The captain, age 42, was born on August 22, 1959. He was issued his most recent FAA first class medical certificate without limitations on June 5, 2001. The certificate application indicated that the captain was 72 inches tall, weighed 205 pounds, and had a medical history of high blood pressure, and was taking Diovan (160 mg) and Triamterene HCTZ 75/150 by prescription. Hypertension was first reported on his medical certificate application dated December 22, 2000. According to information provided on this application, the presence of hypertension was first detected during a hypertension evaluation on October 15, 2000. A subsequent review of the captain's medical history by the FAA Aeromedical Certification Division determined that the captain was eligible for a first class medical certificate in a letter dated December 14, 2000. The captain's wife said he was diagnosed with high blood pressure about one and one-half years prior to the accident and was taking medicine to treat it. She indicated that he was initially treated by his general practice doctors and was then referred to a kidney specialist for treatment. She noted that the captain was in good health and was able to keep his hypertension under control with prescribed medication and a regimen of running and exercise.

The captain's wife described him as a light drinker who occasionally drank wine with dinner or had an occasional beer but was conscientious about abstaining from alcohol consumption within the required period before reporting for duty. She further indicated that he was a nonsmoker and did not use any tobacco products.

According to the captain's wife, when off-duty, he would awake around 0600 to 0630, eat breakfast, have lunch at home or eat out on occasion, and would typically eat dinner at home. He would usually have an evening snack around 2100. He would typically fall asleep watching television on the couch around 2200 and would retire to the bedroom around 2300. According to his wife, the captain did not suffer from any sleep disorders.

According to his wife, the captain typically spent his off-duty days working on home improvement and woodworking projects. He was also involved in his children's sports and after school activities. The captain's wife indicated that there had been no changes to the captain's eating, sleeping, or off-duty activities in the year before the accident.

The captain attended Embry-Riddle Aeronautical University from 1977-1981 where he received a bachelor's degree in Aeronautical Science and two associates degrees. After graduating from Embry-Riddle, he worked as an instructor pilot at an airport in New Jersey. About 1982, he entered the United States Air Force (USAF) Reserves. He attended officer training school then completed his initial pilot training at Reese Air Force Base, Texas. He then went to Altus Air Force Base in Oklahoma for C-141 training. He then was assigned to the 514th Air Mobility Wing, 335th Group at McGuire Air Force Base, New Jersey where he remained in an active duty flying status until about 1984. The captain remained in the USAF reserves on flight status, and attended aircraft commander school at Altus Air Force Base, OK before leaving the USAF Reserves in 1991 to spend more time with his family. The captain was hired by American Airlines in 1985.

The captain's wife said that the captain had rented light single engine airplanes from an airport near his residence for local sightseeing flights on infrequent occasions. According to his wife, the last time he had done so was about 2 to 2 ½ years before the accident. The captain's wife had only accompanied him on one of these flights and did not think he ever performed aerobatic maneuvers on any of these flights. She also was unaware of any specific aerobatic instruction or training that the captain may have received other than what was taught by the USAF during pilot training.

A search of the National Driver Register found no history of driver's license suspensions or revocations for the captain.

E.1.2. Activities Prior to the Accident

American Airlines records indicate that the captain had a scheduled day off on November 8, 2001. He then flew a trip that started on November 9, 2001 and ended on November 10, 2001, and had a scheduled day off on November 11, 2001. According to his wife, the captain returned home from his trip on Saturday night, November 10, 2001. On Sunday, November 11, 2001, he attended a church service in the morning from about 0900 to 1000. After the service, he and his wife talked with other churchgoers outside the church while his children attended Sunday school. He then returned home and ate lunch. In the afternoon, the captain watched television and took his children to a nearby house where he attended a Cub Scout committee meeting. According to his wife, the captain drank one beer around 1600. He returned home about 2000-2030 and went to sleep around 2200. On Monday, November 12, 2001, the captain awoke about 0416, and departed his residence about 0500. According to American Airlines records, the captain checked in for flight 587 at 0614.

E.2. The First Officer

E.2.1. Background

The first officer, age 34, was born on March 28, 1967. His most recent FAA first class medical certificate was issued October 18, 2001, with the limitation: "Holder shall wear correcting lenses while exercising the privileges of his/her Airman Certificate." The certificate application indicated that he was 71 inches tall, weighed 165 pounds, and was using prescription Claritin. The first officer had previously reported a medical history of mild seasonal allergies. The first officer's father indicated that he took Claritin for allergies, but did not take any other medications. His father described him as being in good health and very health conscious. The first officer's father indicated that the first officer drank only very occasionally and never used illicit drugs nor tobacco products. The first officer's father described him as an earlier riser who was always on time for planned activities and kept to schedule. No further details regarding the first officer's typical daily habits or schedule could be ascertained.

According to the first officer's father, the first officer began initial flight training at the age of 18. He received his initial flight training from his father, who was a pilot for Eastern Airlines, primarily in Cessna 152 airplanes. He received his private pilot certificate in June 1987 after about 9 months of training. He earned his instrument, commercial, flight instructor, and multi-engine certificates and ratings during a 90-day course at the Bolivar Flight Academy in Tennessee in the fall of 1987. According to his father, The first officer had never completed any formal training in aerobatics, however he had practiced spins maneuvers and recoveries in a Cessna 152 on several occasions during his training at Bolivar Flight Academy. After completing his training at Bolivar Flight Academy, the first officer returned home to Connecticut where he worked as a flight instructor and obtained his multi-engine flight instructor certificate.²

According to his father, the first officer was then hired by Holiday Airlines operating out of Newark Airport (EWR) where he flew DeHavilland Twin Otters (DHC-6). He later flew for Catskill Airlines where he flew the Beech 99. He later flew for Business Express where he flew as a first officer on the Shorts 360. According to the first officer's father, while at Business Express, The first officer had entered captain upgrade training a few times, but never completed this training due to training freezes. He was then hired by American Airlines.³

The first officer was not married and did not have any children. The first officer's was described as being very sociable, having many friends including fellow pilots. The first officer owned a single family home that he rented out and

² According to Federal Aviation Administration records, the first officer received his multi-engine flight instructor certificate in January 1988.

³ According to American Airlines records, the first officer was hired by American Airlines on March 15, 1991 (see Operations Group Chairman's Factual Report)

lived in a condominium that he also owned. The first officer had many hobbies and activities including cooking, sailing, skiing, art and photography, playing tennis, and working with computers. He also maintained a home-based business as a computer consultant to local businesses.

A search of the National Driver Register found no history of driver's license suspensions or revocations for the first officer.

E.2.2. Activities Prior to the Accident

American Airlines records indicate that the first officer had scheduled days off on November 6 and November 7, 2001. The first officer then flew a one-day trip on November 8, 2001. The first officer flew another one-day trip on November 9, 2001. American Airlines records indicate that the first officer went off duty at 2209 on November 9, 2001 and then had a 48-hour crew rest period on November 10th and November 11, 2001 (see Attachment 3). On Sunday, November 11, 2001, the first officer helped a friend prepare her sailboat for the winter and later had friends over for dinner. The first officer spoke by telephone with a friend sometime between 2000-2200 for about 20 minutes, and later spoke with his parents by telephone about 2230 and informed them that he would be flying the following day. According to the first officer's father, the first officer's alarm had been set for 0530. According to American Airlines records, the first officer checked in for flight 587 at 0630.

E.3. Medical and Pathological Information

Tissue specimens from the captain did not detect the presence of any legal or illegal drugs but indicated positive concentrations of ethanols.⁴ Tissue specimens from the First Officer indicated positive levels of ephedrine and pseudoephedrine.

Submitted By:

Bartholomew Elias, Ph.D.
Senior Human Performance Investigator

⁴ Toxicological screening performed by the Federal Aviation Administration's Toxicology and Accident Research Laboratory screen for legal and illegal drugs including, but not limited to: amphetamine, opiates, marijuana, cocaine, phencyclidine, benzodiazepines, barbiturates, antidepressants, antihistamines, meprobamate, methaqualone, and nicotine. See Attachment 2.

ATTACHMENT 1: INTERVIEW SUMMARIES

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Person Interviewed: Mary L. Alden
Position: Spouse of Captain States
Represented By: Captain Robert A. Shore,
Chief Pilot - New York, American Airlines
Location: Residence, New Jersey
Date and Time: 12/06/2001, 1030 est
Interviewed By: Bart Elias

Captain States aspired to be a pilot since he was in the fourth grade. He attended Embry-Riddle Aeronautical University from 1977-1981 where he received a bachelor's degree in Aeronautical Science and two associates degrees. After graduating from Embry-Riddle, he built up flight hours by working as an instructor pilot at an airport in northern New Jersey, perhaps Teterboro. Captain States had grown up in Park Ridge, New Jersey.

Captain States entered the United States Air Force (USAF) Reserves around 1982. He attended officer training school then completed his initial pilot training at Reese AFB, TX. He then went to Altus AFB, OK for C-141 training. He then went to McGuire AFB, NJ where he remained in active duty status until about 1984.

Captain States was hired by American Airlines in 1985. Ms. Alden thought that his date of hire was on or about July 5, 1985.

Captain States remained in the USAF Reserves until 1991. At that time, Captain States made the decision to leave the Reserves in order to have more time to devote to his family. Just prior to leaving the USAF Reserves, Captain States had attended aircraft commander school at Altus AFB, OK. He was not activated for Operation Desert Storm. At McGuire AFB, Captain States was in the 514th Air Mobility Wing, 335th Group. Captain States service commitment to the USAF Reserves was for eight years, but he remained in the USAF Reserves for about 10 years.

Captain States had on infrequent occasions rented light single engine airplanes from an airport near his residence. The last time he had rented a single engine airplane for such a flight was about two summers ago. He would take friends and his children on local sightseeing flights and take aerial pictures of his house. Ms. Alden had only accompanied him on one of these flights. She did not think he performed any aerobatic maneuvers on these flights. She thought it was unlikely that he did any aerobatic maneuvering on these flights since he often had their children with him when he made these flights and he respected her concerns over the children's safety during these flights.

Ms. Alden was not aware of any aerobatic instruction or training that Captain States may have received other than what is taught by the USAF during pilot training.

Ms. Alden had been married to Captain States for about 12 1/2 years. They met in May of 1987, and were married in May of 1989. They have two boys, ages 8 and 10.

Captain States loved his job and loved working for American Airlines. He chose American over two other opportunities when he was hired. He had been involved with the pilots' union, had attended the union's media training, and had on occasion acted as a spokesperson to the media on behalf of the union.

Regarding his career, Ms. Alden indicated that Captain States had made career advancements when he felt it was right for him and for the family. That is, he made decisions to take career-advancing promotions while balancing the amount of time he could spend with his family and be at home for holidays and family events.

When Ms. Alden met Captain States in 1987, he was flying as an F/O on the Boeing 727. He had previously flown as a flight engineer on the Boeing 727. In the late 1980s (about 1989) he became an F/O on the Airbus A300. He was then promoted to captain on the Boeing 727 around 1992. She accompanied him to Duties and Responsibilities (D&R) training for captains and their spouses in Dallas in November 1993. He became a captain on the Airbus A300 about four years ago. She thought it might have been July 1997 when he was made a captain on the Airbus A-300.

Captain States liked flying the Airbus A300 and particularly liked the routes he flew on the Airbus A300. He often flew turns (out and back trips) that allowed him to be home more frequently. He also was able to get London trips during August when more senior captains were taking leave. Ms. Alden had accompanied him on two of these trips, and recently he had brought her and their children along on one of these trips.

Ms. Alden knew that Captain States had flown with the first officer on the accident flight (Sten Molin) on previous occasions. She was unsure how often they had flown together but noted that "Sten was a household name" during their conversations about his coworkers. She had never personally met Mr. Molin. She knew that Mr. Molin, like Captain States, liked the schedule and routes they flew that allowed them to be home more frequently. Prior to the accident, Ms. Alden was unaware if Mr. Molin was married. Captain States got along well with Mr. Molin.

Captain States enjoyed his job and the crews he flew with. The New York base is a pretty close knit group. Also, Ms. Alden is in the USAF Reserves, and

many pilots that she works with in the USAF Reserves flew with Captain States at American Airlines. After the terrorist attacks of September 11, 2001, Captain States changed his briefing to flight attendants to discuss enhanced security measures and made it a point to get to know the people he worked along with better. He enjoyed sharing jokes with his coworkers.

Regarding awards and commendations, Ms. Alden recalled that Capt. States once received recognition from American Airlines for not taking any sick leave during the course of the year. He also had received pins for years of service milestones. Ms. Alden was not aware of any disciplinary action during Captain States professional career as a pilot.

Ms. Alden was not aware of any aviation incidents or accidents involving Captain States. Captain States had broken his wrist snowboarding about 3 years ago, but otherwise had not been involved in any accidents or incidents in personal life outside of aviation.

Captain States had been involved a few instances involving in-flight emergencies and diversions. Once he had to divert a flight to Raleigh, NC after a flight attendant became "anxious". He also had a passenger death on a flight from Tallahassee to Dallas and diverted to somewhere in Louisiana. Recently, perhaps in the spring of 2001, a passenger had a medical emergency on one of his flights. He diverted the flight to San Juan. There was a medical doctor on board who initially indicated that a diversion was not necessary, but Captain States elected to divert anyway. The doctor later indicated that the patient's condition had deteriorated and suggested that Captain States divert, which he had already done. Ms. Alden was not aware of any in-flight emergencies or situations encountered by Captain States involving problems with the airplane.

Regarding recent changes in Captain States' personal life, Ms. Alden indicated that after the terrorist attacks of September 11, 2001, she faced the potential of her USAF Reserve unit being activated. This resulted in her and Captain States making preparations in the event that this occurred, including getting Christmas shopping done early and making plans for care of their two children. Also, in response to the terrorist attacks of September 11, 2001, Captain States had participated in Tai Kwon Do training both to learn techniques for self-defense and also for physical fitness. She noted that it had otherwise been a good year and Captain States had been able to arrange his schedule to get time off for family vacations. There had been no recent changes in their financial situation.

On days when he was not flying, Captain States would awake around 0600 to 0630. On school days, he would help with getting his sons ready for school. He typically would spend the day working on home improvement projects and woodworking projects. His house was a focal point for much of his off-duty activities. He also had done woodworking projects for his children's

school and the church they attended. He also served as the chairman overseeing committee activities for the Cub Scout pack that his two sons belonged to. If Ms. Alden was at home on days when Captain States was home, they would often go out for lunch together, however, she was often working at her job on days when he was home. Captain States also spent time attending his children's baseball practices and weekend games during his off-duty time.

On off-duty days, Captain States would typically fall asleep watching television on the couch around 2200 and would retire to the bedroom around 2300. He did not suffer from any sleep disorders.

On off-duty days, Captain States would eat breakfast, would have lunch at home or eat out on occasion, and would typically eat dinner at home. He would usually have an evening snack around 2100.

There had been no changes to Captain States' eating, sleeping or off-duty activities over the past year. Over the past year, he had done some remodeling work around the house, and was working on a bathroom remodeling project.

Ms. Alden could not recall when Captain States returned home after his trip that ended Saturday night, November 10, 2001. On Sunday, November 11, 2001, Captain States attended church services with his family from about 0900 to 1000. After the service, they talked with other churchgoers outside the church while their children attended Sunday school. They then returned home and ate lunch. In the afternoon, Captain States watched football on television with his children and later went outside to throw the football around with them. Around 1500, Captain States and his children went to a nearby house where he attended a Cub Scout committee meeting while the children played football outside. He returned home about 2000-2030 and went to sleep around 2200.

On Monday, November 12, 2001, Captain States awoke at 0416, which was the time set on his alarm clock and left the house about 0500.

Captain States jogged regularly and also had a Nordic Track exercise machine that he also used. He tried to do some form of exercise every day. He had recently enrolled in Tai Kwon Do classes. Captain States would bring his running gear on trips and jogged on his trips. Even when he had short layovers, he would try to get a run in.

Captain States was in good health. About one and one-half years ago he was diagnosed with high blood pressure and was taking medicine to treat it. He was initially treated by his general practice doctors and was then referred to a kidney specialist.

Captain States' father had hypertension, had undergone two open-heart surgeries, and had died of a heart attack.

Captain States was able to keep his hypertension under control with the prescribed medication and his regimen of running. He had always engaged in running for exercise ever since Ms. Alden first met him and had recently participated in a flag run (an American Flag relay across the United States honoring the victims of the September 11, 2001 terrorist attacks).

Captain States occasionally drank wine with dinner. Typically he drank red wine because of its reported benefits for the heart. Captain States also drank beer on occasion. Ms. Alden described Captain States as a light drinker. Captain States drank one beer around 1600 on Sunday, November 11, 2001. Captain States was always very conscientious about abstaining from alcohol consumption within the required period before reporting for duty. Captain States did not smoke or use any tobacco products.

Captain States loved flying and was very safety conscious. Ms. Alden described him as a great husband, neighbor, father, and pilot who touched many lives.

Person Interviewed: Stanley Molin
Position: Father of First Officer Sten Molin
Also Present: Rhonda Molin (Mother of First Officer Sten Molin)
Represented By: Captain Robert A. Shore,
Chief Pilot - New York, American Airlines
Location: Residence, Connecticut
Date and Time: 01/22/2002, 1000 est
Interviewed By: Bart Elias

Sten Molin was raised in an aviation family. His father, Stanley Molin, was a pilot with Eastern Airlines throughout his childhood. During his teen years, his father let him handle the controls of single engine airplanes that he rented at a local airfield and he thought it was fun. However, he did not start formal flight training until he was 18. After completing one year of college, Sten Molin became interested in training for a career as a pilot. Stanley Molin renewed his flight instructor certificate and began private pilot instruction for Sten Molin. Sten Molin attained his private pilot certificate in about 9 months. During this period, he worked part time to earn money for airplane rentals. His initial training was primarily in a Cessna 152.

After receiving his private pilot certificate, Sten Molin accumulated the 125 flight hours that was required at that time for an instrument rating over a period of about a year. Stanley Molin researched flight schools for Sten Molin to attend. In the fall of 1987, Sten Molin attended Bolivar Flight Academy, Bolivar, Tennessee where he completed a 90-day course, attaining his instrument, commercial, flight instructor, and multi-engine certificates and ratings. After completing this training, Sten Molin returned home to Connecticut where he worked as a flight instructor, and obtained his Multi-engine flight instructor certificate. He was then hired by Holiday Airlines operating out of Newark (EWR) where he flew twin otters. He later flew for Catskill Airlines where he flew the BE99. He may have returned to Holiday Airlines for a short period. He was then hired by Business Express where he flew the Shorts 360. While at Business Express, he had entered captain upgrade training a few times, but did not complete the training due to training freezes at the time. He was then hired by American Airlines. Stanley Molin thought that he had about 3000 hours of multi-engine turbine time when he was hired by American Airlines.

Sten Molin had not completed any formal training in aerobatics. During his training at Bolivar Flight Academy he had practiced spins in a Cessna 152 on several occasions.

Sten Molin handled the airplane very well and was very teachable and did not have any particular problems in his training. His stick and rudder skills and

control coordination were good. Prior to his first solo, Sten Molin was evaluated by another flight instructor who noted that he responded appropriately to unusual attitudes and felt that he was ready to solo.

When Sten Molin started flying for commercial operators he had encounters with bad weather in areas like Martha's Vineyard and Cape Cod that he had not experienced in his training. However, Stanley Molin was not aware of any other difficult situations or incidents in aviation that Sten Molin had encountered.

Sten Molin was not married and did not have any children. Sten Molin was very sociable and had many friends including fellow pilots. He got along well with other pilots at American Airlines. On trips he often listened to Captains' personal problems and provided them with advice and solace.

Sten Molin owned a single family home that he rented out and lived in a condominium that he also owned. He had many hobbies and activities including cooking, sailing, skiing, art and photography, playing tennis, and working with computers. Since the age of 14, he had worked as a computer consultant to local businesses. While flying for American Airlines, he continued to work as a computer consultant on the side.

As a teenager, he had been a driver for the Safe Rides program which offered rides to other teenagers. He was a teetotaler as a teenager and drank very little as an adult.

Stanley Molin was not aware of any prior aviation incidents or accidents nor any disciplinary action involving Sten Molin. Outside of aviation he could only recall one minor automobile accident in which Sten Molin slid off an unfamiliar road in a snowstorm.

Sten Molin was an earlier riser. He was always on time for planned activities and kept to schedule. An E-Z Pass toll bill for Sten Molin's car indicated that he had passed through the Whitestone Bridge toll plaza at 0603 on November 12, 2001. On a previous day when he had the same flight schedule he had passed through the toll plaza about the same time (within about 5 minutes). His alarm clock had been set for 0530 that morning.

On Sunday afternoon, November 11, 2001 he had helped a friend prepare her sailboat for the winter and they went out to lunch together. That evening he had some friends over for dinner. He talked to his parents on the telephone about 1030 that evening.

Sten Molin took Claritin for allergies. He was very allergic to cats. He did not take any other medications. He was in good health and there had been no recent changes in his health. He drank only very occasionally and typically he

would just have a taste of wine or alcoholic drink. He did not ever use illicit drugs. He did not use any tobacco products. He was very health conscious.

Person Interviewed: Diane Mascia
Position: Flight Attendant, American Airlines
Location: via Telephone
Date and Time: 09/06/2002, 1100 edt
Interviewed By: Bart Elias, David Ivey, Malcolm Brenner (NTSB)

American Airlines hired Ms. Mascia in October 1991. She was qualified to serve as a flight attendant on the 757/767, Super 80, DC-10, 727, and Airbus 300 airplanes. She flew the Airbus on international trips in 1999 for about one year, but no longer flew in the Airbus very often.

She indicated that she knew Captain Ed States through work and described him as a very nice man. She said he had a great disposition, was a team player, and was very dedicated to his family. She said that everybody liked him and that you knew you would have a good trip when he was the captain.

She described Sten Molin as really upbeat and a caring person. She said that Mr. Molin was very friendly to everybody, had no attitude, and was funny. She met Mr. Molin in 1994 when they worked together on a 727 trip with him as first officer and her as flight attendant. They dated for almost three years, 1994-97, and she stayed in touch with him after that. They had developed a really good friendship. Although they did not see each other socially outside of occasional contact at the airport, they talked regularly on the telephone.

Asked whether Mr. Molin ever discussed having a problem, she indicated that he did not confide in her any problems with captains. She indicated that Mr. Molin was not a person that had conflicts with others. He looked forward to going to work.

Ms. Mascia indicated that she did not know Captain John Lavelle but did know Captain Richard Solomon. She indicated she had never flown with either Sten Molin or Captain Solomon under conditions of unusual turbulence.

Ms. Mascia indicated that she last flew professionally with Mr. Molin in 1999 when she was reassigned to take a trip to San Juan on an Airbus and Mr. Molin was the first officer.

Ms. Mascia indicated that she last spoke with Mr. Molin on Sunday, November 11 sometime between 2000 and 2200. He had helped a friend earlier in the day to cover a sailboat, and later in the day had invited two friends over and cooked dinner for them (the dinner was over at the time they spoke). Ms. Mascia talked with him about her upcoming trip to Pittsburgh to visit her mother.

Asked whether she had ever flown in a small airplane with Mr. Molin, Ms. Mascia stated that she once flew with him in a two-seat airplane. It was from an airport in Connecticut and Mr. Molin arranged it. They flew sightseeing over both their houses and the flight was routine. Ms. Mascia, who not a pilot, indicated that she was impressed by Mr. Molin's piloting.

Asked whether Mr. Molin spoke about his father, Ms. Mascia indicated he did and that he said that his father taught him to fly. Asked whether she had sat in the airline jumpseat when Mr. Molin was flying, Ms. Mascia indicated that she once sat in the jumpseat but Mr. Molin had radio responsibilities so she spoke with the captain. Asked whether she had any recent conversations with Mr. Molin about his personal life prior to the accident, Ms. Mascia said no. She said that Mr. Molin was always a happy, upbeat person. He was in a great mood on Sunday. At work, he was holding the flight schedule he wanted at work and things were good. He enjoyed flying the Airbus and going on "turns" (one day out and back trips), although Ms. Mascia said she personally did not like the Airbus trips because they involved such long days.

Mr. Molin was in good health. He did not drink alcohol and drank little coffee.

Mr. Molin was truly conscientious. Other pilots told her what a good pilot Mr. Molin was. She felt totally confident in his flying. He was not moody, not emotional, but was smart and knowledgeable about cars and many other things.

On Sunday, November 11, 2001 she had traded calls with him several times during the day before they talked. Their telephone conversation was probably about 20 minutes long. Mr. Molin said that his male neighbor and a female friend were over for dinner. There was no romantic interest involving the female friend. Ms. Mascia discussed her upcoming plans to visit Pittsburgh for five days. Mr. Molin was really happy and had a nice evening with the friends. He said he had to work on Monday and he probably planned to go to bed between 2200-2300. He would go to bed early when he worked.

When Mr. Molin was not working, he would typically go to bed between 2200-2300 and wake up between 0800-0900.

Mr. Molin was excited about his upcoming trip on Monday because Ed States was the captain. States was such a great person, and nice to work with. Ms. Mascia did not work with him often. Sten Molin and Captain States had known each other since at least 1994, when she transferred to the New York base, but they did not socialize together. Mr. Molin liked his flying schedule because he built up time in one day of flying and would return home and get three days off. He loved flying to Santo Domingo because he would get back home at a decent hour. He also liked getting up early for trips.

Ms. Mascia said prior to Sunday, November 11, 2001, she had last spoken with Mr. Molin on Friday, November 9, 2001. It was a 20 minute call beginning about 2100. Mr. Molin sounded great. He asked whether she wanted to go out to get something to eat with him, but she declined because she was tired from a trip.

Ms. Mascia said she never experienced wake turbulence in an airplane with Mr. Molin and that they never discussed wake turbulence. Asked whether Mr. Molin ever discussed emergencies or difficult flights, she said no. Mr. Molin always exuded confidence. He once mentioned a windy flight, indicating that he made a good landing despite a strong crosswind. She was not aware of the American Airlines Advanced Maneuver's Program until after the accident.

Ms. Mascia believed that Mr. Molin's financial situation was good. He was always good at saving, did not spend money frivolously, and never spoke of financial problems.

Mr. Molin never used tobacco and actually hated it. She did not think he took any prescription or non-prescription drugs.

Ms. Mascia indicated she did not know how often Mr. Molin flew in light airplanes. He did not own an airplane. Mr. Molin showed complete familiarity and confidence when he piloted the small airplane with her. He told her that piloting was not hard, and that she could do it. She thought his pilot skills were amazing. This flight happened around 1996. The weather was perfect that day and there were no issues related to turbulence, although there might have been small bumps typical of flying in small airplanes.

Asked whether she ever met Mr. Molin's father when she was with Mr. Molin, Ms. Mascia indicated that they had. The conversation did not involve flying. Rather, Mr. Molin's father shared stories about Eastern Airlines and place he flew, such as Acapulco, Mexico. She saw Mr. Molin's father after the accident. Mr. Molin's father said that he was proud of his son and thought Mr. Molin had great skills. Asked whether the father indicated any concerns to her about the accident, Ms. Mascia indicated the father did not raise any concerns and that they only discussed Mr. Molin and his house.

Asked whether anyone had discussed "rudder" or Mr. Molin's use of rudder with her before the accident, Ms. Mascia said no.

Asked whether Mr. Molin had discussed light airplane flying with her after 1996, Ms. Mascia indicated that she did not recall any such discussion.

Ms. Mascia did not speak with Mr. Molin every day.

Ms. Mascia indicated that Mr. Molin liked Captain Ed States and made very favorable comments about him. Mr. Molin looked forward to flying with Captain States.

Concerning her telephone conversation with Mr. Molin on Friday evening, Ms. Mascia indicated that Mr. Molin was probably calling from home and was not doing anything. They lived about 25 minutes apart. It was not unusual for Mr. Molin to ask her to go out to eat. They were just friends and he often invited her along. She was tired that evening and did not want to go. She was more of a homebody than Mr. Molin in general.

Mr. Molin was a good pilot. She had complete confidence in his ability. He was an upbeat, secure, and calm man. There was nothing in his life to distract him.

On Sunday, she had telephoned him first and they traded calls on their answering machines. Mr. Molin had helped her with her 401K investments and they talked often. They managed to talk earlier on Sunday, before Mr. Molin's friends came to dinner, but had to discontinue talking because she got a beeper message from her father. She did not know whether Mr. Molin had an ongoing romantic relationship with anyone.

ATTACHMENT 2:
FINAL FORENSIC TOXICOLOGY FATAL ACCIDENT REPORTS
(2 pages)



U.S. Department
of Transportation
**Federal Aviation
Administration**

Mike Monroney
Aeronautical Center

P.O. Box 25082
Oklahoma City, Oklahoma 73125

Tuesday, January 29, 2002

National Transportation Safety Board
2001 Route 46, Suite 504
Parsippany, NJ 07054

ACCIDENT #	0322	INDIVIDUAL#:	001	NAME:	STATES, EDWARD A.	MODE:	AVIATION
DATE OF ACCIDENT	11/12/2001			DATE RECEIVED	11/20/2001	PUTREFACTION:	No
	N # N14053			NTSB #	DCA02MA001	CAMI REF #	200100322001
LOCATION OF ACCIDENT	BELLE HARBOR, NY						
SPECIMENS	Hair, Kidney, Muscle						

FINAL FORENSIC TOXICOLOGY FATAL ACCIDENT REPORT

CARBON MONOXIDE: The carboxyhemoglobin saturation was determined by spectrophotometry with a 10% cut off.

>> NOT PERFORMED

CYANIDE: The presence of cyanide was screened by Conway Diffusion. Positive cyanides are quantitated using spectrophotometry. The limit of quantitation of cyanide is 0.25 ug/mL. Normal blood cyanide concentrations are less than 0.15 ug/mL, while lethal concentrations are greater than 3ug/mL.

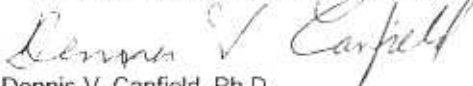
>> NOT PERFORMED

VOLATILES: The volatile concentrations were determined by headspace gas chromatography at a cut off of 10 mg/dL. Where possible, positive ethanols were confirmed by Radiative Energy Attenuation.

- >> 17 (mg/dL, mg/hg) ETHANOL detected in Muscle
- >> 27 (mg/dL, mg/hg) ETHANOL detected in Kidney
- >> 3 (mg/dL, mg/hg) ACETALDEHYDE detected in Muscle
- >> 13 (mg/dL, mg/hg) ACETALDEHYDE detected in Kidney
- >> 2 (mg/dL, mg/hg) N-PROPANOL detected in Kidney

DRUGS: Immunoassay and chromatography are used to screen for legal and illegal drugs which include: amphetamine (0.010), opiates (0.010), marijuana (0.001), cocaine (0.020), phencyclidine (0.002), benzodiazepines (0.030), barbiturates (0.060), antidepressants (0.100), antihistamines (0.020), meprobamate (0.100), methaqualone (0.100), and nicotine (0.050). The values in () are the threshold values in ug/mL used to report positive results. Values below this concentration are normally reported as not detected. GC/Mass Spec, HPLC/Mass Spec, or GC/FTIR, is used to confirm most positive results.

>> NO DRUGS LISTED ABOVE DETECTED in Kidney


Dennis V. Canfield, Ph.D.
Manager, Toxicology and Accident
Research Laboratory

FEB 13 2002



U.S. Department
of Transportation
**Federal Aviation
Administration**

THESE RECORDS MAY BE RELEASABLE UNDER THE FOIA REQUEST 15
DAYS AFTER SIGNATURE DATE UNLESS WE HEAR OTHERWISE FROM
FAA NTSB COUNSEL

Mike Monroney
Aeronautical Center

P.O. Box 25082
Oklahoma City, Oklahoma 73125

Wednesday, March 20, 2002

National Transportation Safety Board
2001 Route 46, Suite 504
Parsippany, NJ 07054

ACCIDENT # 0322 INDIVIDUAL#: 002 NAME: MOLIN, STEN P. MODE: AVIATION
DATE OF ACCIDENT 11/12/2001 DATE RECEIVED 11/20/2001 PUTREFACTION: No
N # N14053 NTSB # DCA02MA001 CAMI REF # 200100322002
LOCATION OF ACCIDENT BELLE HARBOR, NY
SPECIMENS Kidney, Liver, Lung, Muscle

AMENDED FORENSIC TOXICOLOGY FATAL ACCIDENT REPORT

CARBON MONOXIDE: The carboxyhemoglobin saturation was determined by spectrophotometry with a 10% cut off.

>> NOT PERFORMED

CYANIDE: The presence of cyanide was screened by Conway Diffusion. Positive cyanides are quantitated using spectrophotometry. The limit of quantitation of cyanide is 0.25 ug/mL. Normal blood cyanide concentrations are less than 0.15 ug/mL, while lethal concentrations are greater than 3ug/mL.

>> NOT PERFORMED

VOLATILES: The volatile concentrations were determined by headspace gas chromatography at a cut off of 10 mg/dL. Where possible, positive ethanols were confirmed by Radiative Energy Attenuation.

>> NO ETHANOL detected in Muscle

DRUGS: Immunoassay and chromatography are used to screen for legal and illegal drugs which include: amphetamine (0.010), opiates (0.010), marijuana (0.001), cocaine (0.020), phencyclidine (0.002), benzodiazepines (0.030), barbiturates (0.060), antidepressants (0.100), antihistamines (0.020), meprobamate (0.100), methaqualone (0.100), and nicotine (0.050). The values in () are the threshold values in ug/mL used to report positive results. Values below this concentration are normally reported as not detected. GC/Mass Spec, HPLC/Mass Spec, or GC/FTIR, is used to confirm most positive results.

>> EPHEDRINE detected in Kidney
>> PSEUDOEPHEDRINE detected in Kidney

Dennis V. Canfield

MAR 20 2002

Dennis V. Canfield, Ph.D.
Manager, Toxicology and Accident
Research Laboratory

ATTACHMENT 3:
AMERICAN AIRLINES DUTY RECORDS
FOR THE CAPTAIN AND FIRST OFFICER
(2 pages)

NA/93836

STATES

MONTH ENDING 01DEC01 AS OF 12NOV01/0648 INTL TT-YES SC-Y
 STATES EA 02326 093836 LGA 1141-CA A300 FMC

MMA 75.00 WAV48-N

H 6092757432 B 7322364653
 PROJ 80.12 GTD 26.16 PPROJ 80.12 SPROJ 78.26
 ORIG GUAR 64.00 ADJ GUAR 64.00 ADJ GUAR PENDING NO
 C EXP 0.00 I EXP 60.42 MISC EXP 0.00 CPA 1.58 FTCPA 0.00
 RALS 0.00 MMBA 0.00 FLT TIME 24.06 YTD TTL 517.17
 ACT/SKD PROJ 62.04 YTD 555.15 DUTY 4.0

DD	ST	RMV	ADD	SEQ	FLT	FLT	SKED	STTL	ACT	GRTR	GTTL
01	11			48	0000						
02	11			48		2400					
03	11			DO							
04	11	SD		335	-989		3.00				
05	11	SD			-869	-1270	8.37	11.37			0.00

MIDSEQ 24 - SEE LEG DETAIL

04	11			24	1130						
05	11			24		1130					
05	11		CT	31016	D903	-916	6.09	6.09	3.09	6.23	6.23
06	11			DO							
07	11		SP	337	-699	-1416	7.41	7.41	8.16	8.16	8.16
08	11			DO							
09	11			335	-989		3.00		2.39	3.00	
10	11				-869	-1270	8.37	11.37	6.03	8.37	11.37

335 EXP TAFB 40.21 MIA 4

MIDSEQ 24 - SEE LEG DETAIL

11	11			DO							
12	11		SP	338	-587	-588	7.38	7.38	3.59	7.49	
12	11			24	1730						
13	11			24		1730					
14	11		SP	337	-699	-1416	7.41	7.41			
15	11			DO							
16	11			DO							
17	11	T6	SP	337	-699	-1416	7.41	7.41			7.41
18	11			DO							
19	11			335	-989		3.00				
20	11				-869	-1270	8.37	11.37			

335 EXP TAFB 40.42 MIA 4

MIDSEQ 24 - SEE LEG DETAIL

20	11			48	2209						
21	11			48							
22	11			48		2209					
23	11			DO							
24	11			335	-989		3.00				
25	11				-869	-1270	8.37	11.37			

335 EXP TAFB 40.42 MIA 4

MIDSEQ 24 - SEE LEG DETAIL

25	11			48	2209						
26	11			48							
27	11			48		2209					
28	11		SD	341	-635	-638	7.31	7.31			
28	11			48	2203						
29	11			48							
30	11			48		2203					
29	11	SD		335	-989		3.00				
30	11	SD			-869	-1270	8.37	11.37			0.00

MIDSEQ 24 - SEE LEG DETAIL

01 11 DO

END OF DISPLAY

***** END OF MESSAGE *****

HA/318918

MOLIN

MONTH ENDING 01DEC01 AS OF 12NOV01/0848 INTL TT-YES SC-Y
MOLIN SP 06763 318918 LGA 1162-FO A300 FMC

MMAX 75.00 WAV48-N

H 203-869-9460
T 203-820-4789

PROJ 77.18 GTD 36.50 PPROJ 92.34 SPROJ 75.09
ORIG GUAR 64.00 ADJ GUAR 64.00 ADJ GUAR PENDING NO
D EXP 0.00 I EXP 52.05 MISC EXP 0.00 CPA 0.00 FTCPA 0.00
FALS 0.00 MMBA 0.00 FLT TIME 36.25 YTD TTL 530.15
ACT/SKD PROJ 67.03 YTD 560.53 DUTY 5.0

DD	ST	RMV	ADD	SEQ	FLT	FLT	SKED	STTL	ACT	GRTR	GTTL
01	14		SD	339	-611	-664	7.06	7.06	7.29	7.29	7.29
02	14			48		1933					
03	14			48							
04	14			338	-587	-588	7.38	7.38	6.58	7.38	7.38
05	14		MM	31010	D903	-916	6.09	6.09	3.09	6.23	6.23
06	14			DO							
07	14			DO							
08	14			338	-587	-588	7.38	7.38	7.14	7.38	7.38
09	14		SP	341	-635	-638	7.31	7.31	7.36	7.42	7.42
09	14			48		2209					
10	14			48							
11	14			48		2209					
12	14			338	-587	-588	7.38	7.38	3.59	7.49	
12	14			48		1730					
13	14			48							
14	14			48		1730					
15	14			DO							
16	14			338	-587	-588	7.38	7.38			
16	14			48		1730					
17	14			48							
18	14			48		1730					
19	14			338	-587	-588	7.38	7.38			
19	14			48		1730					
20	14			48							
21	14			48		1730					
22	14	2R		338	-587	-588	7.38	7.38			0.00
23	14	2R		DO							
24	14	2R		DO							
25	14	2R		338	-587	-588	7.38	7.38			0.00
26	14	2R		DO							
27	14			TRFF		0000					
28	14			TRFF		2400					
29	14			336	-881	-1305	5.34				
30	14				-1932	-881					
					-1152		5.58				
01	14				-1291	-1272	5.51	17.23			
				336	EXP TAFB	60.53	SJU	3	MIA	3	

END OF DISPLAY

***** END OF MESSAGE *****

ATTACHMENT 4:
EXCERPTS FROM AIRBUS INDUSTRIE
A310/300-600 FLIGHT CREW TRAINING MANUAL -
REVISION 20, DECEMBER 2000
(6 pages)

N3 FFS TAKE-OFF DATA																																																														
<p style="text-align: center;">INIT PAGE</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; text-align: center;">CO RTE</td> <td style="width: 50%; text-align: center;">FROM/TO</td> </tr> <tr> <td style="border: 1px solid black; text-align: center;">TLSORY</td> <td style="border: 1px solid black; text-align: center;">LFBO/LFPO</td> </tr> <tr> <td style="text-align: center;">ALTN/CO RTE</td> <td></td> </tr> <tr> <td style="border: 1px solid black; height: 20px;"></td> <td></td> </tr> <tr> <td style="text-align: center;">FLT NBR</td> <td></td> </tr> <tr> <td style="border: 1px solid black; text-align: center;">[Airline] 203</td> <td></td> </tr> <tr> <td style="text-align: center;">LAT</td> <td style="text-align: center;">LONG</td> </tr> <tr> <td style="border: 1px dashed black; text-align: center;">4338.1N</td> <td style="border: 1px dashed black; text-align: center;">00122.1E</td> </tr> <tr> <td style="text-align: center;">COST INDEX</td> <td></td> </tr> <tr> <td style="border: 1px solid black; text-align: center;">50</td> <td></td> </tr> <tr> <td style="text-align: center;">CRZ FL/TEMP</td> <td style="text-align: center;">TROPO</td> </tr> <tr> <td style="border: 1px dashed black; text-align: center;">FL 310 /</td> <td style="border: 1px dashed black; text-align: center;">36 090</td> </tr> </table>	CO RTE	FROM/TO	TLSORY	LFBO/LFPO	ALTN/CO RTE				FLT NBR		[Airline] 203		LAT	LONG	4338.1N	00122.1E	COST INDEX		50		CRZ FL/TEMP	TROPO	FL 310 /	36 090	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">TRIP DIST</td> </tr> <tr> <td style="border: 1px solid black; text-align: center;">345 NM</td> </tr> <tr> <td style="text-align: center;">CRZ WIND</td> </tr> <tr> <td style="border: 1px solid black; height: 20px;"></td> </tr> <tr> <td style="text-align: center;">ALTN</td> </tr> <tr> <td style="border: 1px solid black; text-align: center;">LFPG</td> </tr> <tr> <td style="text-align: center;">ALTN DIST</td> </tr> <tr> <td style="border: 1px solid black; text-align: center;">80 NM</td> </tr> <tr> <td style="text-align: center;">FL to ALTN</td> </tr> <tr> <td style="border: 1px solid black; text-align: center;">FL 100</td> </tr> </table>	TRIP DIST	345 NM	CRZ WIND		ALTN	LFPG	ALTN DIST	80 NM	FL to ALTN	FL 100	<p style="text-align: center;">ATIS</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%;">RWY</td> <td>15 R</td> </tr> <tr> <td>WIND</td> <td>180°/10 kt</td> </tr> <tr> <td>VISI</td> <td>CAVOK</td> </tr> <tr> <td>CEILING</td> <td></td> </tr> <tr> <td>TEMP</td> <td>10°C</td> </tr> <tr> <td>DEW POINT ...</td> <td>8°C</td> </tr> <tr> <td>QNH</td> <td>1010 hPa/29.83 inHg</td> </tr> <tr> <td>QFE</td> <td>992 hPa/29.29 inHg</td> </tr> <tr> <td>RWY COND ...</td> <td>DRY</td> </tr> <tr> <td>Observations :</td> <td>Twilight</td> </tr> <tr> <td></td> <td>_____</td> </tr> <tr> <td></td> <td>_____</td> </tr> <tr> <td></td> <td>_____</td> </tr> </table>	RWY	15 R	WIND	180°/10 kt	VISI	CAVOK	CEILING		TEMP	10°C	DEW POINT ...	8°C	QNH	1010 hPa/29.83 inHg	QFE	992 hPa/29.29 inHg	RWY COND ...	DRY	Observations :	Twilight		_____		_____		_____
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<p style="text-align: center;">INIT NEXT PAGE</p> <p style="text-align: center;">ZFCG/ZFW</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border: 1px solid black; padding: 5px;"> A310 : 24.6% 94 t - 206 800 lb </td> </tr> <tr> <td style="border: 1px solid black; padding: 5px;"> A300-600 : 24.1% 105 t - 231 500 lb </td> </tr> <tr> <td style="text-align: center; padding: 5px;">BLOCK</td> </tr> <tr> <td style="border: 1px solid black; padding: 5px;"> A310 : 26 t - 57 200 lb A300-600 : 25 t - 55 100 lb </td> </tr> </table>	A310 : 24.6% 94 t - 206 800 lb	A300-600 : 24.1% 105 t - 231 500 lb	BLOCK	A310 : 26 t - 57 200 lb A300-600 : 25 t - 55 100 lb	<p style="text-align: center;">PERF PAGE</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td></td> <td style="text-align: center;">310</td> <td style="text-align: center;">300-600</td> </tr> <tr> <td style="text-align: right;">V1</td> <td style="border: 1px solid black; width: 40px;"></td> <td style="border: 1px solid black; width: 40px;"></td> </tr> <tr> <td style="text-align: right;">VR</td> <td style="border: 1px solid black;"></td> <td style="border: 1px solid black;"></td> </tr> <tr> <td style="text-align: right;">V2</td> <td style="border: 1px solid black;"></td> <td style="border: 1px solid black;"></td> </tr> <tr> <td style="text-align: right;">FLEX</td> <td style="border: 1px solid black;"></td> <td style="border: 1px solid black;"></td> </tr> </table>		310	300-600	V1			VR			V2			FLEX			<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">T/O FLAPS</td> </tr> <tr> <td style="border: 1px solid black; text-align: center;">15°</td> </tr> <tr> <td style="text-align: center;">T/O C.G.</td> </tr> <tr> <td style="border: 1px solid black; text-align: center;">25%</td> </tr> <tr> <td style="text-align: center;">TOGA</td> </tr> <tr> <td style="border: 1px solid black; text-align: center;">FLEX</td> </tr> </table>	T/O FLAPS	15°	T/O C.G.	25%	TOGA	FLEX	<p style="text-align: center;">NOTE :</p> <ol style="list-style-type: none"> 1. Take-off speeds 2. FLEX TEMP 																																		
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MALFUNC REF.	- N3 FFS -				-	+
	<i>Basic handling - Flight in marginal conditions - Turbulence ILS approach raw data</i>					
	SIMULATOR SAFETY BRIEFING					
	INIT T/O					
	TRAINEE 1					
	1 - TRANSIT COCKPIT PREPARATION					
	2 - BEFORE START					
	3 - ENGINE START					
	4 - AFTER START					
	■ 5 - TAKE OFF					
	6 - SID - CLIMB FL 120					
	7 - 30° THEN 45° BANK TURNS					
	■ 8 - ABOVE 45° BANK TURNS					
	9 - APPROACH TO STALL CLEAN CONFIGURATION - RECOVERY					
	■ 10 - APPROACH TO STALL LANDING CONFIGURATION - RECOVERY					
	■ INIT FL 330					
	■ 11 - MACH TRIM EFFECT					
	■ 12 - DUTCH ROLL RECOVERY					
	13 - HIGH ALTITUDE CONTROL IN TURBULENCE					
	■ 14 - ALPHA TRIM EFFECT					
	15 - DESCENT - USE OF SPEED BRAKES					
	16 - DIRECT TO IAF AND HOLDING					
	17 - DESCENT PREPARATION					
	18 - RADAR VECTOR					
	■ 19 - ILS RWY 15R - RAW DATA					
	20 - LANDING					
	21 - 180° TURN TECHNIQUE					
	TRAINEE 2					
	INIT T/O					
	22 - FMS INITIALIZATION					
	■ 23 - TAKE OFF					
	24 - SID - CLIMB FL 120					
	25 - 30 ° then 45° BANK TURNS					
	■ 26 - ABOVE 45° BANK TURNS					
	■ INIT FL 330					
	■ 27 - DUTCH ROLL RECOVERY					
	28 - RETURN TO LFBO - DESCENT PREPARATION					
	■ 29 - DESCENT - USE OF SPEED BRAKES					
	30 - RADAR VECTOR					
	■ 31 - ILS RWY 15R					
	32 - GO AROUND					
	33 - RADAR VECTORS					
	34 - ILS RWY 15R - RAW DATA					
	35 - LANDING					
	36 - 180° TURN TECHNIQUE					

<p>AIRBUS INDUSTRIE <small>Training & Flight Operations Support Division</small></p> <p>A310/300-600</p> <p>FLIGHT CREW TRAINING MANUAL</p>	<p>REGULAR COURSE</p> <p>NORMAL COURSE SYLLABI</p>	<p>2.02.04 Page 8A</p> <p>REV 20 DEC 2000</p>
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N3 FFS SESSION GUIDE

01 - BRIEFING TOPICS

- Taxi technique
- Basic handling technique - rotation during take off
- FPV . 45° bank with and without FPV
- Approach to stall - Clean and landing configuration
- High altitude flight characteristics
- Upset recovery - Video (20 minutes)
- MMEL (YAW DAMPERS)

02 - SESSION OBJECTIVE

- To recognize approach to stall and to perform a safe recovery.
- To demonstrate Dutch roll recovery, alpha trim effect and high altitude control in turbulence.
- To develop the visual clues for a correct ILS visual segment.

03 - SESSION PROFICIENCY CRITERIA

- Good take off procedure and calls
- Acceptable handling with FPV
- Acceptable recovery technique

04 - SESSION GUIDE

- 5, 23 : Make sure the rotation during take off is done using the correct rate to avoid a tail strike. Refer to FCOM Bulletin n° 26 - Avoiding tail strikes.
- 8, 26 : Emphasize on the necessary pitch and bank control to obtain FPV steady information
- Init FL 330: Confirm FMS position and eventually perform a manual up-dating (PROG)
Climb FL 350
Adjust the fuel :

A 310	: 120 t CG 25% add 4 t in trim tank CG 37.5%
A 300-600	: 130 t CG 25% add 3 t in trim tank CG 37.5%
- 10 : **After trainee 1 practice, transfer controls to trainee 2 for STALL recovery**
- 11 : Speed trim (active above 200 kt) - Mach trim (active above MN 0.7)
Nose up order to optimize the longitudinal stability and handling qualities.
- 12, 27 : Dutch roll entry, PNF kicks rudder until bank 40° at PF's request then releases.
 - Demonstrate automatic damping with YAW DAMPERS ON, then the 2 types of Dutch roll recovery without YAW DAMPERS
 - Emphasize the necessity to descend maintaining pitch at 0° or below

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N3 FFS SESSION GUIDE (END)

04 - SESSION GUIDE (END)

- 14 : Demonstrate buffet onset during a tight turn 46 to 47°, then reducing bank, ask the trainees to pull on the stick
Alpha trim : active at high angle of attack, and high Mach number.
Nose down order to increase the pull up stick force and prevent reaching an excessive angle of attack. Available in clean configuration and A/P off.
- 19, 31 : Final using RAW DATA, point out pitch attitude, pitch trim and Power setting during approach
- 29 : Emphasize the declutch A/THR blue on FMA condition in RETARD mode.
Set the FPV and request a level off, A/THR still declutched.

INSTRUCTOR ONLY

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DUTCH ROLL

01 - TRAINING OBJECTIVE

- To recognize the indications of Dutch roll.
- To take appropriate actions to recover.

02 - DURATION

- 10 minutes

03 - TRAINING REFERENCES

Documentation :

- FCOM 1.09.14 - FLIGHT CONTROLS

04 - REMARKS

- At maximum or high altitudes with no yaw dampers engaged, all versions of the A310 and A300/600 exhibit safe handling characteristics. In the event of any disturbance in yaw the resulting Dutch roll, if no action is taken, will slowly damp itself out.
- The amplitude of the Dutch roll and the rate of damping will be dependant on the altitude versus the aircraft weight (ultimately angle of attack), the centre of gravity and the magnitude of the initial disturbance.
- With the A310/300 and A300/600R aircraft, it is possible, with the use of the trim tank to optimize cruise CG, to be at the maximum altitude with an aft CG (38.5% for A310/300). This combination provides the worst conditions for natural (without yaw damper) Dutch roll damping.

Dispatch with no yaw dampers :

- Not allowed for Extended Range Operations.
- For other flights do not exceed FL 310
- For A310/300 and A300/600R prevent trim tank operation by selecting trim tank pumps to OFF before take off. Adjust flight plan fuel requirements as necessary.

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DUTCH ROLL (END)

04 - REMARKS (END)

Failure in flight leading to loss of both yaw dampers :

A310/300 and A300/600 :

- Select trim tank mode selector to FWD. Fast forward transfer now takes place (450 kg / 990 lbs per minute) and CG moves forward.

All aircraft :

- If Dutch roll is present (after above action) and is considered severe, descent to lower altitude FL 310 or 4000 ft below optimum whichever is lower.
- If descent not possible or undesirable due to weather, for instance, monitor Dutch roll and if necessary attempt to damp it manually by use of ailerons.

Technique :

THERE IS NO HURRY - DO NOT USE THE RUDDER

- Check the speed, low speeds in cruise aggravate Dutch roll, take M 0.79 as minimum.
- Study motion of aircraft in roll on PFD.
- Apply aileron input momentarily in opposition to up-going wing and release.
- Observe effect and repeat as necessary.
- It is better to make a small control input then release and observe.
- When Dutch roll is damped aircraft may still have residual constant bank angle, therefore roll wings level.

NOTES :

- It is easier to wait and apply the correction as the up-going wing is passing the horizontal
- Whenever possible it is better to let the aircraft own natural stability limit or damp the Dutch roll.
- Make a very careful assessment of the severity of the problem before taking the above recovery technique.