Docket No. SA-522

Exhibit No. 2-B

NATIONAL TRANSPORTATION SAFETY BOARD

Washington, D.C.

Attachment A
Excerpts from Interview Summaries

Pages 37-45

(10 Pages)

17. John Francis LaVelle, Captain B-737, American Airlines

Person Interviewed: John Francis Lavelle
Position: Captain, B-737, American Airlines
Represented By: Mr. Ray Duke, Attorney Allied Pilots Association
Location: Telephone Interview
Date and Time: July 15, 2002, 0915 EDT
Present: Operations Group members David Ivey, Bart Elias, James Goachee, Delvin Young, John Lauer

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Captain Lavelle stated that his date of birth was May 21, 1960 and that American Airlines hired him on October 28, 1986. He estimated his total flying time to be about 14,000 hours and currently was a captain on the B-737. Positions he had held since being hired by American included flight engineer B-727, first officer MD-80, first officer B-757/767, first officer MD-11, captain B-727 and was current as a captain and check airman on the B-737. Captain Lavelle estimated his flying times to be about 1,700 hours on the B-727 while flying as captain, and about 1,200 hours as captain on the B-737.

He stated he had met Ed States, the captain, and stated that they had met in operations a few times. He only had casual conversations with him.

He knew Sten Molin, the first officer. They had flown together on a number of occasions on the B-727. When they first met, Captain Lavelle was a junior captain and Sten Molin was a junior first officer. Both were on reserve in the New York base.

He described Mr. Molin's personality as that of a perfectionist who worked hard and did everything by the book. He was a real gentleman as well. He said the first met in May 1997, and the last time he saw Molin was sometime in the summer of 2001 in operations. He was just as he always was; a nice person and Captain Lavelle enjoyed his company.

Captain Lavelle said he flew two or three trips with Mr. Molin over a 12 month period. He stated that Mr. Molin's flying skills were excellent. He had excellent flying ability, however, he had one strange tendency: to be very agressive on the rudder pedals. Captain Lavelle stated that during a climb out in a B-727, while the airplane was "dirty of with flaps 5 degrees", Mr. Molin stroked the rudder pedals "1-2-3, about that fast." Captain Lavelle thought they had lost an engine. Captain Lavelle asked him what he was doing, and Mr. Molin said he was leveling wings due to wake turbulence. Captain Lavelle stated that Mr. Molin never leveled the wings, and his actions just created yawing moments on the airplane. After they cleaned up the airplane they discussed it further. Mr. Molin told him he was leveling the wings as per the AAMP. Captain Lavelle told him it was quite aggressive, and that it didn't really level the wings. They talked about the AAMP, Mr. Molin insisted that AAMP (Advanced Aircraft Maneuvering Program) gave him directions to use rudder pedals in that fashion. Captain Lavelle disagreed, and

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said he thought the use of rudder was, according to AAMP, for use at lower airspeeds. He disputed Mr. Molin and told him to be less aggressive and more coordinated using rudder.

Captain Lavelle said that on two subsequent occasions Mr. Molin modified his wake turbulence manuever to comply with his wishes. Mr. Molin used rudder during these encounters but did not go to the full stop. He was still very quick.

During this first wake turbulence encounter, Captain Lavelle stated that it did not require any more than aileron to level the wings. Occasion (wake encounter) was nothing more than needing a little aileron to level the wings. Captain Lavelle thought that Mr. Molin was more aggressive than he needed to be. He said the B-727 was a very stable airplane. He did not have to be that aggressive.

He recalled the first encounter to be during the "clean up" [after departure] on the B-727. The altitude was between 1,000 and 1,500 feet. It was somewhere around this altitude range that the event occurred. He believed Mr. Molin that the rudder was pushed to full stops. He said the effect on B-727 was that it created an uncomfortable yaw to the "left- right- left". There were heavy side-loads. He said he thought they went to left first, but was not sure. Mr. Molin stopped using the rudder on his own. Captain Lavelle thought they had an engine problem so his attention was drawn to the engine instruments. When asked, he said he did not think Mr. Molin made any aileron inputs during the encounter. The rudder never leveled the wings. He did not recall the wings moving, but experienced, "sideload, sideload, sideload".

His experience has been that you have to hold rudder in to get wing leveling from rudder. Mr. Molin brought up the AAMP program in their conversation after the event. He was adamant that he was complying with AAMP. Captain Lavelle requested that Mr. Molin review the AAMP program when he got home, and to be less aggressive when he flew with him. It never came up in conversation again. This was first time he flew with him. Months later, when they flew together, they encountered wake turbulence on two separate occasions with him again. During the subsequent times they flew together, the subject did not come up again in conversation if Mr. Molin had reviewed the AAMP.

Captain Lavelle knew Mr. Molin had a civilian background and had been a commuter pilot. He was proud that his dad had been an Eastern Airlines pilot. He told Captain Lavelle that his father had taught him to fly when he was very young.

Regarding the AAMP program, Captain Lavelle thought he went through it once in 1995 or 1996. He said he was a first officer on the B-767 at the time. He stated there was AAMP training in the simulator. Once every checkride there is some kind of airplane upset training received in the simulator.

He stated that Mr. Molin's knowledge of procedures, including approaches, flying the airplane, turns, descents, and power, was good and aggressive. In other aspects he

had "hands of silk." He could grease the B-727 on landings and had good systems knowledge.

Captain Lavelle when asked had no recollection of what type of airplane they were following during the first wake turbulence encounter.

Captain Lavelle stated that he was a C-130 pilot in the United States Air Force Reserves. On one occasion, he was the last airplane in a 12-ship formation and experienced wake turbulence. He had some very remarkable full aileron deflection with full-scale rudder deflection, yet still rolled in the opposite direction. It was not until the C-130 got out of the vortex that the airplane began to respond to control inputs. He went to about 60 degrees of bank and was at an altitude of 300 feet during low-level operations when the upset occurred. Once or twice while flying the MD-80 did he encounter wake turbulence and he may have hit a control stop with ailerons. He was behind a B-757 on one occasion. He used aileron only and leveled the wings. It was on an approach to a domestic airport.

Captain Lavelle said the first event involving Mr. Molin happened about May 1997. The subsequent two wake turbulence encounters were separated by a few months; perhaps in September 1997 and December 1997. He said that when he is the non-flying pilot, he follows along on the rudder pedals. He felt Mr. Molin's inputs on the rudder pedals during that first wake turbulence event. He said it is typical for him to fly with his feet on the pedals at critical times when the copilot is flying. He did not know what other captains did with their feet while flying.

When asked why he remembered the event with such clarity five years later, Captain Lavelle stated that it was a very aggressive maneuver and he had never seen any other pilot do this but Mr. Molin. When questioned about the initial direction of the yaw, Captain Lavelle said he thought it was the left rudder input first but it could have been the right. He said the wake vortex encounter with Mr. Molin was not much of anything. Maybe just some choppy air. He thought that Mr. Molin may have been responding to the choppy air. The ailerons were kept level and he used just the rudder pedals.

He stated that he was not a check airman at the time of the encounter. He did not become a check airman until he became a B-737 captain.

He said he did not document or inform anyone at American Airlines, regarding the event.

The two or three events did not seem very significant. Usually he did not encounter wake turbulence very often. Perhaps once every quarter. Captain Lavelle said he flew with Mr. Molin three times. Three separate trips and both of them were on reserve status. He did not recall how many legs they flew together.

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During the second and third encounters Mr. Molin applied rudder with coordinated aileron and it was not aggressive.

During the first event, he stated he did not think Mr. Molin applied any aileron. Maybe a little, but it was full or close to full rudder deflection. He did not believe it was the first leg of the first trip together in which the turbulence encounter happened. It was probably the second or third time that Mr. Molin was at the controls. It startled him because Mr. Molin had been so smooth on the controls.

Captain Lavelle stated the wake turbulence encounter could have been due to thermal activities or a preceding airplane. He did not think they were following a heavy airplane. He did not recall aggressive movements or abnormal rudder inputs from Mr. Molin during approaches or during the last two or three times they flew together.

When asked if he had ever made any accidental inputs to the rudder pedals while he feet were on the pedals, Captain Lavelle answered in the negative.

Captain Lavelle's concluding thoughts were that he considered Mr. Molin a friend. He was a great guy. He was a great pilot in all aspects except the one quirk; his use of the rudder pedals. When asked why he had waited until now to disclose this event with the accident first officer, he stated that he believed the NTSB was more interested in interviewing pilots that flew the A300 and had more recent experience flying with the accident crew. He said he had thought about his prior event when he heard that a wake turbulence encounter with the accident airplane might have been a factor in the accident.

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18. Peter McHale, First Officer American Airlines

Person Interviewed: Peter McHale
Position: First Officer, Boeing 757/767, American Airlines (LGA base)
Represented By: Ray Duke, Attorney, Allied Pilots Association
Location: via Telephone
Date and Time: Wednesday, August 28, 2002, 0900 EDT
Present: Skupeika, Lauer, Young, Elias, Ivey, Brenner

Mr. McHale stated he was a first officer on the B-757/767 and was based in LaGuardia Airport, NY. He had been continuously based there since starting his employment with American Airlines.

He stated his date of birth as February 13, 1960 and his date of hire with American Airlines as October 1992.

He estimated his total pilot time as about 4,000 hours. Of that time, about 2,000 hours was flying the ET3E (P-3) for the U.S. Navy. He stated he had about 2,100 hours as a first officer on the B-757/767 since becoming qualified on the airplane in January 1999. His total time did not reflect flight engineer time and he estimated he had accrued about 2,100 hours as a flight engineer on the B-727 with American Airlines. He stated he had been furloughed from December 1993 until December 1996.

He said he knew Captain States. He was the last pilot he flew with prior to being furloughed at American and the first pilot he met when he came back to work. Captain States welcomed him back from furlough and Mr. McHale was surprised that he remembered that he had been furloughed. He only knew Captain States professionally and did not socialize outside the airline with him. He was as ordinary as everyone else: standardized, and by the book. He was a very nice guy. He had no comments regarding Captain States' flying skills in the B-727.

He stated he knew Sten Molin. They occasionally crossed paths in training. Over a 3-year period he flew with him a lot in the cockpit. He had flown with him on a more regular basis than with Captain States. Occasionally McHale said he would see Molin around the company. McHale characterized Molin's flying abilities as a "good stick". He flew the plane well, and was comfortable in the seat. He did a good job. He felt comfortable at what he was doing. "Good stick" meant he had a good sense of concentration, always on altitude, and never recalled a bounced landing. He put the airplane where he wanted it. McHale said he felt comfortable and relaxed when Molin was flying.

He flew with Molin all those years until January 1999, when he transitioned to the B-757/767. The New York base was small group. There were only about 30 crewmembers in each seat on the B-727.

McHale said that Molin came from Buisness Express that flew out of LGA until American Airlines picked him up as a pilot. He had flown with Sten the last month he was on the B-772. He went on the A300 and McHale went to B-757/767 about the same time. Molin enjoyed sailing. He had no idea if he had participated in acrobatics. He seemed to like flying the heavier commercial transport airplanes. He would not characterize Molin as someone interested in high angles of bank such as done in aerobatics.

McHale said he had flown with Captain Lavelle on as many as 10 sequences over a year. The three of them had flown at least 1 full sequence together. Captain Lavelle was gregarious, a nice person, and very similar to Molin. He was very professional, smart, and an easygoing good guy. He thought that when Lavelle and Molin flew together, that Lavelle had been a brand new captain. He stated that Molin was not one that was criticized by others. He can recall times when he had his eyebrows raised or had concerns while flying with other pilots. Molin flew the airplane smoothly and accurately. He would not characterize Molin as jerking the airplane around, driving the airplane to the ground during a landing, or making excessive bank angles.

He stated that Molin was more senior and had bid a reserve line of flying purposely in order to fill up his month. If Molin had been on reserve at the time, he would have been surprised.

McHale was asked if he remember a yawing event associated with wake turbulence after takeoff when the three of them were flying together and Molin was the flying pilot. He responded that if something had yawed the airplane during their flight together, he would have remembered it. He did not recall a yawing motion. When asked if Captain Lavelle had questioned Molin about what happened or his use of the flight controls after the event, he replied that he did not recall the conversation. He stated that he did not believe Captain Lavelle was making this up, but it was not something he recalled. When asked if during the incident, Captain Lavelle had mentioned he was checking for an engine power loss, he said he did not recall him doing so.

McHale said he did remember that Lavelle definitely had a discussion about a piloting issue and flying the airplane with Molin. He was not privy to their conversation as he was busy with other duties and could not recall where or when the discussion was held. He said he never felt anything uncomfortable in the airplane that would have provoked the discussion. McHale said he thought that since Captain Lavelle was a new captain that he might have been more conservative.

McHale said there was nothing about this incident that he remembered. He said that normally that kind of stuff would get his attention very quickly. He said the Molin did not talk to him about the incident later, although Captain Lavelle did talk to him about Molin. McHale said that he thought Captain Lavelle's safety envelope might have been narrower since he was new as a captain. He said Captain Lavelle made a passing comment to him about the incident, but he typically did not listen to comments about the flying abilities of other pilots.

He did not recall either one of them discussing the AAMP program. He said he had never heard that type of discussion [AAMP] in his 10 years with American Airlines. He said he did not hear any conversation regarding rudder usage either.

McHale said that he did not think Captain Lavelle and Molin were similar, although their standardization was excellent. That was not an issue. Both of them were confident enough in their own abilities. They did not clash, but they were not best buddies either. He thought Captain Lavelle had to become a captain on the B-727 and came from the B-757/767. He said he did not think Captain Lavelle wanted the B-727. He said Captain Lavelle was a new guy while Molin was an experienced B-727 first officer. Molin never did a thing that shook McHale up.

McHale said he had never heard the words "engine loss," "engine failure" or "rollback" at anytime when he was flying the B-727.

McHale described most wake turbulence as a very distinctive bump in the road, with some destabilization of the aircraft. He said he knew what it was as opposed to normal turbulence.

Molin never mentioned anything about his father being an air line pilot or about his initial aviation training.

McHale said he would not question Captain Lavelle's integrity. Captain Lavelle had "no axe to grind." Both Captain Lavelle and Molin worked undistinguishable and professional together; no different from any other American Airlines pilots.

McHale said he went through the AAMP program and it was a course that was about 4-5 hours in length. It was given to the pilots in the New York base. Later, he received training in the simulator for upsets. He personally thought the program was to discuss cases where you either recover or crash – not normal upset recovery such as typical wake encounters.

He said he had never observed anyone using excessive rudder while he was flying as a flight engineer on the B-727. He found the AAMP training interesting and similar to what he had been taught in the military during initial training.

He was furloughed in December 1993, recalled in August 1996 and returned to the line in December 1996. He went through the AAMP program in 1997 after he was recalled from furlough. He said that he did not recall an emphasis on rudder usage in the AAMP.

He said he last saw Sten Molin in Miami about 2 weeks prior to the crash. He did not speak to him. He had not seen Ed States since they flew together on the B-727.

He was not aware of any prior airplane emergencies involving either Sten Molin or John Lavelle. He stated that everyone brings a good natured ness to the cockpit.

He remembered that a discussion about flying skills transpired between Lavelle and Molin but could not recall any details regarding when the discussion occurred or what specifically was said or what it was in reference to.

McHale said he had never flown the B-727 as a captain or a first officer. He stated that he flew the B757/767 with feet on pedals to guard for an engine failure. He liked to hand fly to about 10,000 feet. When asked what to do in an upset recovery, he stated that wings level was number one – use ailerons first. He said that the Navy taught rudder became an aileron at 90 deg of bank. During his 3 ½ to 4 year tenure on the B-727, there were a handful of events that got his attention. The one in question was not one of them. If something had happened he would have remembered it.

McHale stated he had not felt "large" yaw moments but he had felt yaw moments during wake turbulence. Most wake turbulence encounters are pitch and roll, with maybe a little yaw. This was not with Captian Lavelle and Sten Molin.

On another occasion, he remembered another event while flying with Sten Molin. While on final, flying an ILS to runway 4 at LaGuardia in IMC conditions, a landing airplane had not cleared the runway. There was a B-737 in front of them on final and it went around. He stated they got into the wake of the B-737, while Molin was the flying pilot, and he made the decision to go around. He stated that it was a "weird" feeling. The tail pushed down and the nose pitched up. Sten called for power and they went around. As the flight engineer, McHale had a different experience than the two pilots. He said that Molin flew the airplane to do what was necessary to keep the airplane under control. There was a heavy jolt and the nose pitched. There was no discussion or hesitation. "I'm outta here." Sten made a fast decision to apply max power to climb out and go around. The airplane most likely rolled but he did not think that the bank angle was in excess of 30 degrees. He felt the tail of the airplane go down as the nose of the airplane pitched up. They were in the clouds with no visual cues. He said they were about 3,000 to 5,000 feet about 7 miles from the runway when this happened. He thought the event happen sometime in 1997. Whatever Molin felt inspired him to go around. It was one of the more memorable events in McHale's career. He was not sure but he thought that Captain Rich Solomon was the captain on the flight. He said no other notable events with Sten come to mind.

He thought that Captain Solomon and Molin flew together probably more than anyone else. The captain commented that Sten did a good job on the incident.

He said this was a "good one" regarding wake turbulence. It was a jolt, and Sten made a quick decision to get out. He stated he did not experience wake turbulence very frequently.

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He recalled there was an event when a captain went inverted at DFW and recovered after a wake encounter. (Captain Young of the Operations Group indicated it was an American Airlines MD-80)

He stated that the only post accident discussions he had heard about the accident crew were in sympathy for the pilots.

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2. Jay Donald Sullivan, First Officer A-300, American Airlines

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Person Interviewed: Jay Donald Sullivan
Position: First Officer, A-300 American Airlines MIA base
Represented By: J. Bennett Boggess, Allied Pilots Association
Location: American Airlines Admirals Club, JFK
Date and Time: 11/14/2001, 1545 EST
Present: Operations Group

Date of Hire: 1/1992, Employee number 332994.
Total flight time: 7300 hrs.
A-300 time: 1500 hrs. all as F/O

He has been flying the A-300 for about 4 years. He was an Air Force Academy graduate and flew F-15s for the Air Force. Flew on flight 988 from MIA to JFK on 11/11/01. He was the PNF, it was Capt. Kelly's leg. This was a through flight from San Jose, Costa Rica (SJO) with a crew change in MIA. He did not meet the crew that brought in the flight from SJO.

He glanced at the maintenance log for the last three days but didn't recall anything specific. He remembers there were a few write ups, but nothing remarkable and no open items.

He thought there was a flight attendant crew change in MIA. He thought it was possible that it was the same crew that flew the SJO-MIA leg, but didn't think so.

He was not aware of any maintenance performed on the airplane in MIA. They got to the airplane late due to security and left a little late because of that. No maintenance was being done when they got to the airplane.

During the walk around he noted nothing unusual. The APU was on.

They departed around dusk, 1930 scheduled departure and they left about 14 minutes late.

During taxi nothing was abnormal – all systems worked normally. The captain checked the rudder and he as F/O checked the top control surfaces by looking at the ECAM for full deflection. He had once, in the past, experienced a flight when they did not get full deflection during a control check and returned to the gate for maintenance and got a different airplane to continue the flight.

Nothing unusual occurred prior to takeoff. Flex takeoff was normal. It was a full airplane at medium weight and they were under max gross landing weight at takeoff. There was nothing unusual during the climb. The captain switched on the autopilot at a

medium altitude above 10000 feet. He did not notice any problems with the autopilot. The weather was good and they had a smooth ride.

Approach and landing were normal. The captain switched off the autopilot just prior to intercepting the ILS at 3000 feet. The landing was smooth.

He had flown with the accident captain often on the B-727 and considered him to be an extremely good pilot. He described him as very relaxed and competent and couldn't imagine him panicking. He did not know him personally, only professionally.

He did not know the accident F/O.

On landing, there were no maintenance items identified, and he was unaware of any comments from passengers.

He experienced no turbulence nor heard any abnormal noises during the flight. There were no ECAM alerts during the flight.

During landing there was a slight headwind from the left. He did not notice any yawing in the flare. The altimeters were normal throughout the flight. There was a slight fuel imbalance, left side heavy by about 800 pounds, this is not unusual for the A300. The auto-fuel feed corrected this problem.

Wake turbulence training includes simulator training of some extreme unusual attitudes for wake turbulence encounters. For example a nose down roll to an inverted attitude. Actual wake turbulence encounters in the A300 have been much less extreme – typically just some wing rock and you just fly straight through it.

Wake turbulence was addressed in a special program, the advanced maneuvering program given a few years ago. It was reviewed in recurrent training in the simulator, which he went through last month (October). The simulator ride included an unsuspected unusual nose high attitude. Recovery was to add power and feed rudder to the horizon.

Unusual attitude training stresses returning to proper attitude using power, bank. There are no memory items related to unusual attitudes per se. In an extreme situation, there may be a need for max power. Situations where max power is called for include takeoff, windshear, terrain alert.

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3. Thomas Edward Kelly, Captain A-300, American Airlines

Person Interviewed: Thomas Edward Kelly
Position: Captain, A-300 American Airlines MIA base (International)
Represented By: J. Bennett Boggess, Allied Pilots Association
Location: American Airlines Admirals Club, JFK
Date and Time: 11/14/2001, 1630 EST
Present: Operations Group

Date of Hire: 2/4/85, Employee number 93371.
Total flight time: 17000 hrs.
A-300 time: 3000 hrs. 2500 as Captain, 500 as F/O

He has been an A-300 Captain for about 4 years.

He was the captain of AA988 MIA to JFK leg on 11/11/01. This was the beginning of a two day trip that he was paired with the F/O . He was the pilot flying on this leg.

He did not see the incoming flight crew in MIA. He saw no mechanics in the area where the airplane was parked at MIA. He reviewed the airplane's log and there were no open items, no MELs, and no CDLs – it was a clean airplane.

There were no problems during preflight through taxi. He checked the rudder. The F/O checked the control column. All flight controls checked okay. They check the flight controls using the flight control ECAM page, checking flap extension, and flight control position and free and correct travel. He did not notice any resistance and got full extension in both directions on the rudder. There were no ECAM alerts or advisories.

There was no crosswind on takeoff. The winds were fairly light.

He said that this was a pretty trouble free airplane [referring specifically to the accident airplane].

Regarding problems with the A-300, he said that he lost the blue hydraulic system on two occasions due to quantity loss (this was on two different airplanes in the last four years). The blue system powers the spoilers and roll control among other things.

He has not experienced any rudder problems on any airplanes.

Flight 988 was a good ride with no turbulence, no comments about problems in the back, and no ECAM alerts or advisories. He engaged the autopilot about 25000 feet and it was a smooth, normal engagement. One flight attendant commented that one of

the galleys was unkempt and asked where the flight came in from, but otherwise had no comments about problems in the cabin.

It was a smooth descent and he disengaged the autopilot around 4000 feet while being vectored to join the ILS. They were then cleared for a visual approach. When he disengaged the autopilot it was smooth, not jerky.

There was no lag in engine response, some slight differential power during cruise but nothing more than normal. He used the autothrottles and they worked normally. He left them on through the landing at JFK.

The landing was good, they turned off on the high speed taxi and taxied at slow speed after that. There was no extreme movement with the tiller.

There were no negative comments or comments about problems from passengers or flight attendants. He did not hear about any comments regarding unusual noises in the back. He had no maintenance items to report (write up) from the flight.

Wake turbulence training is given in the simulator and integrated into unusual attitude recovery. He was given a scenario of following a heavy jet followed by a moderate turbulence encounter resulting in an unusual attitude. Such scenarios are given during every training cycle. He's been to training about one time per year, but now there is a new 9 month program. They get two such scenarios each visit. Usually he sees one nose high attitude and one nose low attitude, both with significant bank. These simulated wake turbulence encounters are unexpected and are given below 10000 feet on approach or departure.

AA has addressed wake turbulence in training since several wake turbulence problems following B-757s being reported several years ago. At that time the B-757 was not considered a heavy airplane, but they changed the B-757 flight separation since then.

An engine failure during climb is dealt with by recognition, the PNF works the ECAM and runs the checklist. There are time critical and non time critical items. Max power is used depending on where the engine failure occurs – it is used if the engine failure takes place during a critical phase of flight. He said he would push it up to max power if he were low to the ground.

The procedure for dealing with a nose high unusual attitude may call for using max power and doing a "slice maneuver" to lower the nose to the horizon.

In the landing flare at JFK he used a little bit of rudder and got normal response from the rudder. There was a slight left crosswind. Rudder application was smooth. He perceived no binding.

He did not observe any altimeter anomalies during the flight nor any instrument, ECAM or CRT flicker.

Landing at JFK the throttles retarded to idle at about 5 feet. He was overriding somewhat to guard the throttles to keep power up a little bit to prevent premature spoiler deployment due to the crosswind. He flew it on to the runway.

He has experienced wake turbulence. Worst encounter he can remember was in a B-727 following a G3 on approach to Fort Myers and resulted in about a 30-40 degree bank. He's had other brief encounters, usually at altitude.

The A-300 wing is stiff, there is not a lot of flex and has a harsh ride in turbulence. In windshear encounters it responds pretty well. It has adequate power for handling windshear.

Regarding possible speculation about the accident, he thought an explosion in the forward cargo hold may cause an unusual yaw. He commented that it is a strong airplane and can't imagine a force that could take the vertical stab off.

5. Edward C. Monoski, Captain 767/757, American Airlines

Person Interviewed: Edward C. Monoski
Position: Captain, Boeing 757/767, American Airlines
Represented By: J. Bennett Boggess, Allied Pilots Association
Location: via Telephone (Telephone call to Buenos Aires, Argentina)
Date and Time: 11/15/2001, 0815 EST
Present: Operations Group

Captain Monoski's hire date at American Airlines was October 1978. He is a B-767/757 Captain. He was Captain of AA Flight 686 from John F. Kennedy Airport to Bermuda. His total flight time was about 20,000 hours.

The accident aircraft, AA 587, took off in front of his flight. He was in the hold short position. When tower cleared AA 587 for takeoff, the aircraft sat there for about 15 seconds. The wind was from the left and 587's takeoff seemed normal. There was a slight yaw to the right.

He was on the hold position 45 degrees to the runway. He saw the JAL flight that seemed to be at a fairly level attitude; but, maybe it was because he was going away. The wind was less than 10 knots. The last time he saw AA 587 was about 200 feet.

Flight 587 seemed to yaw to the right at rotation or at liftoff. He thought that this may have been attributable to parallax from the window or his view angle.

After he took off, departure control was looking for them but they were not answering. In Europe, 1500 feet is used as cleanup. In the States, AA uses 1000 feet. Everyone should clean up at the same time.

Captain Monoski saw fire and black smoke. He was the pilot flying (PF).

He held a small amount of aileron and minor rudder pressure against the wind.

ATC uses either 2 minutes or 5 miles for separation. He believes ATC used 5 miles in this case. Clearance is usually to 5000 feet. There was no turbulence and no wind direction change. It was a Kennedy 9 departure with a Bridge Climb. They were flying the same departure he believed. JAL heading to Bridge seemed more level altitude then climbing, maybe because he was heading away from us. JAL might have been farther to the west. The Airbus lifted off earlier than JAL. He had never thought about the wake turbulence in the crossing paths during cleanup.

He did not know either pilot.

He saw the latter stages of JAL's takeoff roll. He could not be sure.

AA does wind shear recovery as part of recurrent training. In the simulator, they will mention a B-747 is in front of you. The wake turbulence is used to lead to an upset situation.

It will roll you up to 90 degrees bank. AAMP would cover any kinds of upsets. These were pretty much unusual attitude recoveries. He would get one every simulator check. He completed one in October 2001. He got a situation of 90 degrees of bank, nose-high. He also had a wind shear. Instructions are to use all means available to recover. There are no flight control restrictions while operating in the airplane's flight envelope.

He said the First Officer made a couple of radio calls regarding the fire on the ground.

[The telephone line was disconnected at 0835 est, attempts to re-contact Capt. Monoski were unsuccessful].

6. Paul Kevin Sulovski, Captain A-300, American Airlines

Person Interviewed: Paul Kevin Sulovski
Position: Captain, A-300 American Airlines MIA base
Represented By: J. Bennett Boggess, Allied Pilots Association
Location: Marriott Courtyard Hotel, JFK
Date and Time: 11/15/2001, 0930 EST
Present: Operations Group

Captain Sulovski's hire date at American Airlines was November 6, 1984. His total flight time was about 10,000 hours. Of these, approximately 2,100 hours were as Captain of the A-300; his Captain's checkout was November 1997.

On November 11, 2001, he was the Captain on American Flight 989 from Miami (MIA) to San Jose (SJO) and returning to Miami as a turnaround. Their scheduled departure time was 10:55 AM but pushed back from the gate a little later due to passenger boarding. He did not meet the inbound crew from Newark (EWR). He had flown the same turnaround the day before, November 10.

The log was clear and there were no open items.

Captain Sulovski briefed the flight attendants prior to the flight. The First Officer (FO) did not indicate any preflight problems. The engine start was normal, followed by normal taxi out. The flaps were set for 15/15. They selected the flight controls page and he observed the flight checks for full deflection of flight controls. Everything was totally normal. He was the pilot-flying (PF) on AA 989 to San Jose. The aircraft controlled well and it was a relatively smooth ride. They did not go IFR the whole day. The aircraft performed fine. The approach and landing were good. No passengers made any negative comments about the flight.

On the return flight, (AA 988), they departed at the scheduled time or very close. Captain Sulovski performed the exterior preflight. On the empennage section, the only anomaly was a missing air deflector or dirt flap (descriptive term). (This was in the past, not on flight 988.) This was the only time in 4 years.

The airplane was good on preflight. Engine start and taxi were normal. He has the FO check his rudders when he is the pilot-not-flying (PNF) to ensure he has full-throw, if needed. Both looked at the indicators and it "looked fine."

The takeoff was an improved performance takeoff; normal operation. The right engine overheat light came on at 946 degrees. The left engine light came on about 950 degrees. The right one came on first. This is not a rare occurrence. This is very common at San Jose, Costa Rica.

This was the first flight with the FO. The FO flew well; nothing out of the ordinary. At 4 DME on departure, he initiated a left turn back to the VOR on the field; then cleaned up. They climbed to FL 310. The FO was a smooth pilot. No significant chop was observed – maybe a slight bump.

He hand flew the aircraft to cruise and used climb power to level off. The Captain recalled the climb to be straight and the FO had to avoid buildups in cruise. Deviations were limited to 1 or 2 in cruise with 10-15 degrees of bank and 20 degrees of heading change at most. It was a smooth ride.

No flight attendants made any comments about the ride. They received no ECAM messages and there were no reports by passengers or flight attendants regarding any anomalies of the flight. The only report was an air louver that needed repair and the Captain called maintenance. There were no calls by flight attendants regarding passenger complaints.

Captain Sulovski did not recall anything about an unusual noise. The louver may have been on the previous day. He did not see maintenance on arrival.

He had recurrent training at American Airlines in November 2001 with the new 9-month schedule. The 9-month training program covered all the 1-year recurrent training items and more. It is 4 days in length.

Day 1 – Human factors, Aircraft Safety Action Program (ASAP) reports, radar system usage – ½ day training. He deadheaded in the first half of the day.

Day 2 – Flight manual brief, performance, system review.

Day 3 – Flight simulator with instructor, the warm-up, and debrief.

Day 4 – LOFT for 2 hours plus 2 hours "free play" with check airmen. "Free play" consists of going over "hot items" and any items requested by the pilot. He requested to see if the aircraft would auto-land with a slat system failure with 2 hydraulic systems inoperative. The aircraft did fine. There was then a debrief of the sim.

Day 5 – International recurrent training for international flying only.

Upset training was during the Day 3 warm-up session. The instructor gave a scenario of being in-trail of a B-747 heavy. This was followed by turbulence and a couple of seconds later was upside down and a little nose low. He has had this training every year in recurrent training, along with wind shear and terrain avoidance. His corrective action for the upset situation was "Turn to the sky pointer as you roll towards 90 degrees."

He had 2 nose–high scenarios: one nose high and one extremely nose high. On the extremely nose-high, he used rudder to get down to horizon. Unload the wing, and use

max power at pilot's discretion. Use full flight control deflection if needed to keep blue side up; there are no full flight control limits. Mr. Vandenburg developed this program.

In unusual attitudes, there are guidelines for recovery. He believed it is for folks who have never flown aerobatics. They are good and simple guidelines.

He has had unusual attitudes covered in both ground school, simulator, and simulator briefing.

The slats would have been retracted about 220 knots on AA 989. AA 988 would have been about the same speed. No bumps were felt during retraction. AA 989 was about 330,000 pounds; 988 was about 275,000 pounds gross weight.

When asked to clarify about the direction of the departure turn out of San Jose, he stated that the tear drop turn back to the right to get to the airport is normal. At no time did they make a 180 degree turn back towards San Jose. There were no engine problems.

He did not know either the Captain or the First Officer on the accident aircraft.

11. Nicolas J. Deitz, First Officer A-300, American Airlines

Person Interviewed: Nicolas J. Deitz
Position: First Officer, A-300 American Airlines LGA base
Represented By: Ray Dukes, Allied Pilots Association
Location: Marriott Courtyard Hotel. JFK
Date and Time: 11/16/2001, 1100 EST
Present: Operations Group

Date of Hire: 4/1/91
Total flight time: 10000 hrs.
A-300 time: 2500 all as F/O

He has flown the A-300 for about 4-5 years.

He knew Capt. Ed States fairly well. He didn't know F/O Sten Molin, just recognized him.

He flew with Capt. States in the United States Air Force, (USAF) at McGuire AFB. He was active duty and Capt. States was in the USAF Reserve. Capt. States was his copilot on C-141s back in 1986. He had met him before that, maybe in 1985.

Capt. States got out of the reserves around the time of the Gulf War in 1991.

He hadn't recently socialized with Capt. States since they do not live in close proximity to each other. He didn't think Capt. States was ever on active duty and commented that this is probably why Capt. States became a Captain while he was just an F/O. Mr. Deitz was serving on full time active duty and therefore had less seniority at AA.

He thought he had flown with Capt. States about 3-4 times in the USAF 15-18 years ago. He thought that maybe 1 or 2 of these occasions were extended trips lasting about 2 weeks. Other occasions were just doing pattern work.

He thought that at that time. Capt. States was flying essentially full time with the USAF reserve, and then about 2 years later got hired by American Airlines.

The last time he flew with Capt. States was a two day trip on Friday 11/9/01 and Saturday 11/10/01. During the trip they discussed personal issues such as Capt. States' children's activities and Capt. States' bathroom remodeling project.

On 11/9/01 he arrived for duty at EWR around 0630 for an 0930 scheduled departure to MIA. They laid over in MIA. On 11/10/01 they had a 1200 call time for a

1400 departure from MIA to San Juan, Puerto Rico. From San Juan they returned to EWR. They arrived in EWR around 2200-2300 Saturday night.

He described Capt. States demeanor during the trip as very normal, happy, upbeat and said that he was very happy at home and indicated that he had a very happy home life.

They discussed family and common interests. Capt. States had 2 boys around the same age as his daughter and their children had similar interests that they discussed. Things discussed included children's activities including scouting, piano lessons and karate. They were also both doing bathroom remodeling projects and discussed these projects during the trip.

Capt. States was close with his wife and he knew that she worked in the USAF reserves. He thought she was a Tech. Sergeant who had an administrative position at McGuire AFB. He did not think Capt. States was having any kind of financial problems.

Capt. States was in good health and they both worked out in the hotel gym on Saturday morning during their layover in MIA. He was aware that Capt. States participated with his sons in a flag run across America and commented that he was in good enough shape to participate in this run.

He was unaware of any personal problems with Capt. States and commented that Capt. States was upbeat and looking forward to future plans.

When he first joined American, he was assigned to be a flight engineer on the B-727. At that time Capt. States was an F/O on the B-727 and they flew together on occasion. Later, he was assigned to be an F/O on the B-727 and Capt. States made captain on the 727 so they again had occasion to fly together.

He was in USAF flight training class 84-04, and knew that Capt. States went through USAF flight training earlier than him, maybe in class 83-06 or 83-08. He did not go through C-141 training with Capt. States.

He described Capt. States flying skills as being as good or better than anyone he knew. He said that he was very smooth in his control and aeronautical judgment was in line with his own. He said that Capt. States crew briefings were thorough, and considered special security measures in light of the events of 9/11/01. He said that Captain States had great rapport with the F/As and solicited their opinions.

Regarding Capt. States' system knowledge of the airplane, he could not recall a specific abnormal or emergency situation while they were flying together, but said that Capt. States generally had outstanding knowledge of the airplane.

He had never done a simulator training session with Capt. States.

He did not think Capt. States had any outside interests in flying outside of AA, but was not certain. He did know that Capt. States had a 16 ft. rowboat that he used recreationally, but didn't think he owned an airplane.

During their most recent trip, Captain States discussed his children, his wife, his remodeling at his house – he was looking forward to the future and did not mention any problems or have any complaints.

He described Capt. States management style as ideal. He said that Capt. States let him fly the airplane, but wouldn't hesitate to make suggestions or offer his opinion. Capt. States dealt with FAs in the same way, soliciting others opinions regarding the operation of the airplane.

When asked how Capt. States might react if wake turbulence was encountered while an F/O was flying he said that in his experience wake turbulence counters are of very short duration. He said that encounters at altitude with the autopilot on are usually over by the time you are ready to react. He expected that Capt. States would assume control if there was a significant departure from controlled flight for a longer duration.

The wake turbulence encounters he has experienced have been nothing more than a bump or two and commented that with the A-300 being itself a heavy jet, wake turbulence has not been much of a factor in his experience.

The worst wake turbulence encounter he could recall was during a landing flare when he got an unexpected rolling movement that surprised him since he was not expecting vortices below 100 feet.

He has never had to use rudder to overcome a wake turbulence encounter.

He has his feet on the rudder pedals when he is hand flying. He typically hand flies to altitude and hand flies the full descent.

Earlier in his flying career with AA, he personally was not keeping his feet on the rudder pedals. A check pilot by the name of Burke Schlott told him to fly with his feet on the pedals. Typically the A-300 doesn't require rudder input due to turn coordination and yaw damper systems.

In simulator training he was exposed to wake turbulence scenarios every year during recurrent training. This involved unusual attitude recoveries that were set up by entering wake turbulence. Roll was at least to a 90 degree back. He was given a nose high unusual attitude on climb out that occurred abruptly. Using rudder to lead the turn can be very useful in turn control for recovery.

In simulator training they also typically encounter engine failures anywhere from V1 up to top of climb.

Regarding use of rudder in recovery, he said that procedure was to use whatever is required to recover. His recoveries were acceptable, but thought that the simulator instructor would point it out if recovery techniques were too abrupt or not enough, but this never came up for him.

He also recalled a simulator scenario in which an uncontained engine failure results in a failure of the flaps requiring a single engine no flaps landing.

He thought that it was commonly accepted that the simulator is more sensitive than the actual airplane. He wasn't sure if the airplane would respond the same way during an unusual attitude since he has never experienced one in an airplane, but assumed it would.

When they arrived in MIA on Friday, 11/9/01 they both took a nap when they arrived at the hotel because of the early start. He went to the hotel gym about 1300 where he saw Capt. States who was already there working out. After their workouts, they both went to the hotel pool. Later they had dinner together, then he went to sleep. On Saturday, he thought it was a 1200 pick up for a 1400 flight.

He said that in a nose high unusual attitude, you should apply power as needed.

He commented that he thought it hard to believe that a wake turbulence encounter would cause this type of damage to a structurally sound airplane.

13. Walter Paul Gershoff, First Officer A-300, American Airlines

Person Interviewed: Walter Paul Gershoff
Position: First Officer, A-300 American Airlines JFK base
Represented By: Ray Dukes, Allied Pilots Association
Location: Marriott Courtyard Hotel, JFK
Date and Time: 11/16/2001, 1300 EST
Present: Operations Group

First Officer Gershoff's American Airlines hire date was in May 1992. His total flight time was about 6,000 hours of which about 1500 hours are as an A300 First Officer (FO). His A300 FO checkout date was November 10, 1999.

He did not know FO Sten Molin: but had flown with the captain 3 times. The dates were November 7, 2001, on the JFK-- SJU—JFK turn, October 23, 2001, for the same trip, and about a year ago on a 2-day trip.

FO Gershoff remembered CA Ed States as a very nice guy. He got along with everybody and never had any problems with him. CA States was not a nervous type and did not get upset.

CA States shared tips on soccer with FO Gershoff. They talked about the AA and TWA merger. AA and TWA are still flying as separate carriers. They never discussed personal or financial problems.

CA States seemed to be in perfect health.

FO Gershoff remembered CA States as confident, respected, and able to get a point across in a nice way; he didn't push people around but had a "command presence." At no point during the flight did he ever wonder what the Captain was doing. He had not asked Capt. States any personal questions, but he knew CA States was married and had two boys and that he had flown cargo in the Air Force.

Capt. States let him fly the leg to San Juan. On November 7, San Juan brought us in too high. CA States asked him what he "wanted to do." He said, "I want to go around," and the CA asked the controller to bring us back around. It was rainy and the weather was bad. The CA confirmed he was making the right decision and never pressured him to land.

He has encountered wake turbulence on the A300 before. It was usually a quick jolt that lasted about a second. It bumped your seat. He transitioned from the DC-10 to the Airbus and was told that if it was a little bumpy in the cockpit, the passengers are getting it a little rougher in the back.

He hand flies from takeoff to level off and in descent from 10,000 feet to landing. When flying, he has his feet on the rudder pedals. The only time he uses rudder is on a crosswind landing. He has never noticed yawing while flying the A300.

CA States may have put the autopilot on earlier. Most pilots don't hand fly as much as FO Gershoff does.

At least twice on A300, he has had upset training (initial and recurrent). It was something he had also seen in the Air Force. To recover, he remembered that you unload, control, power up (if going up), and power back, speedbrake (if going down); wingtips on horizon and pull.

Training at AA taught him to be gentler in an airliner. The judgment was left to the pilot as to how much control input was needed to handle the situation. This depended completely on the situation.

There was an initial course on upset training that he attended and subsequently was trained in the simulator. The simulator was placed in a nose-high and a nose-low situation for demonstration purposes. The setup scenario was preceded by a wake turbulence encounter. In the Air Force, the pilot closed his eyes and the backseater (F-4) would give an unusual attitude. The pitch up was so that he could not see the horizon line. He looked at other instruments to determine the direction to roll and push throttles full forward. He then rolled off with bank and he did not use rudder to bring the nose to the horizon and recover. He did not use full control displacement to recover. The training was good. It allowed him to see more of the aircraft envelope.

In recurrent training at AA, he did not recall anything different; it was probably the same.

He has never had a problem in the Airbus.

He had seen the accident FO one time, but did not know him.

The simulator feels like you are in the airplane. The visual is not that good, but the feel of the flight is.

During the upset in the high pitch up, he looked at the VVI to see if he was going up, if the altimeter was climbing, if the airspeed was decreasing, and the pointer in the attitude indicator to see the shortest direction to the horizon.

On takeoff, he used aileron for crosswind takeoff and rudder to stay on centerline.

16. Louis J. Merz, Captain A-300, American Airlines

Person Interviewed: Louis J. Merz
Position: Captain, A-300 American Airlines JFK base, International
Represented By: Ray Dukes, Allied Pilots Association
Location: Marriott Courtyard Hotel, JFK
Date and Time: 11/17/2001, 0930 EST
Present: Operations Group

Captain Merz was hired at American Airlines in January 1977. His total flight time was approximately 20,000 hours. He has about 6,000 hours as Captain of the A300. His A300 Captain's checkout was approximately 1994 and has been a captain for 6 or 7 years.

He did know the accident aircraft's Captain, Ed States. He had flown with him years ago when CA States was an FO. They probably flew together 5 or 6 times over the years. He did not know CA States' background. They last flew together over 5 years ago. They had no social contacts outside the airlines. He did not know CA States outside the airlines.

He knew the accident aircraft First Officer (FO) Sten Molin. They met about 2 years ago. He did not socialize with the FO outside the airline. FO Molin seemed very upbeat, always in a good mood, and got along with everybody. He saw him as an overall good guy.

He thought FO Molin was a very competent pilot who flew the airplane well; did a good job. He ranked the FO as an 8.5 out of 10. They had flown 6 or 7 times in the last 2 years. The FO always did what he needed to do.

He flew with FO on November 8 for the last time. It was the same trip as the accident trip. The FO was normal, upbeat. They had some small talk during the trip. The FO talked about buying another condominium. FO Molin was interested in real estate instead of the market and was just seeking his advice since he owned a condo in Florida. He mentioned no financial problems. His health seemed fine.

CA Merz was not aware of any outside flying activities. The FO was not married, but he had a girlfriend.

CA Merz said the Airbus has been a good aircraft. He has never had flight control problems or any rudder load limiter problems.

He has experienced occasional wake turbulence. Most of the encounters are momentary and it is over before you know it. He had never seen the rudder pedals move in an un-commanded fashion. When hand flying, he keeps his feet on the rudder pedals.

He usually hand flies to 18,000 feet and does the same on the descent. He did not believe that he had wake turbulence training during his initial. It has been in place during the last 3 to 5 years.

Every training period he has had wind shear and unusual attitude training. He thought it may have been covered in the briefing phase of the simulator. The instructor goes over the procedures. There are no specific limitations; whatever is necessary. Make it a smooth recovery. There are no limitations discussed on the amount of force required. The training is pretty good.

He does not use an excessive amount of rudder during recovery. He uses whatever it takes. He was not sure if recovery technique was covered in ground school, but did know that it was discussed in the simulator briefings. The scenario was usually introduced as "behind a heavy" as the beginning of unusual attitudes.

He owned an acrobatic airplane (Skybolt) but has never competed. Having been exposed to acrobatics, he did not think that aerobatic training could hurt in unusual attitude. He said that he has not changed his rudder technique flying the A-300 since he started flying his aerobatic airplane. When asked if there is a difference between a large airplane and a small airplane, he commented that an airplane is an airplane.

Most pilots hand fly on both climb out and descents from mid-range attitudes. His last recurrent training was in January 2001. He did not know what the AAMP acronym meant. He had it the last time he was at training. He said training of upsets has never stopped.

He said that FO Molin was a pretty good pilot to hand fly the airplane. He hand flew back into JFK and it was gusty. He did a nice job and CA Merz saw no weaknesses.

CA Merz has had no formal aerobatic training. He did not have any real interest in aerobatics. His training did not involve recovery from unusual attitudes from aerobatics.

He thought the AAMP, the course presentation, was a valuable tool. He said that nothing new was introduced from what he had learned in his flying career, but it served as a refresher and gave him the opportunity to practice recovery maneuvers in the simulator.

He did not know the background of the FO's flight experience. The F/O liked to hand fly the airplane.

CA Merz received his training in Dallas, TX.

To recover from nose-high, roll the airplane toward the horizon. There is no limitation on bank. When at the horizon, bring the wings level.

He has never been over a 90 degree bank during unusual attitude training in the simulator.

He has not flown since last Thursday. CA Merz flew to SDQ and the FO flew back to JFK.

He stated he checks the trapezoid base during his cross check while hand flying. If the trapezoid were displaced, he would adjust the rudder pressure appropriately.

He cannot see the other pilots' feet on the rudders. If there were an uncoordinated turn, he would notice it because he lightly rests his feet on the rudder pedals. He does so after takeoff to be aware of the possibility of an engine failure, if it occurred. He does this when the FO is flying. When he is hand flying, he always keeps his feet on the rudder pedals. He feels "uncomfortable flying an airplane with his feet on the floor." The airplane basically flies a coordinated turn. When hand flying the A-300, he does not know if he is applying a small amount of pressure or if the airplane is making the coordinated turn.

19. Richard Eric Salomon, Captain B-757/767, American Airlines

Person Interviewed: Richard Eric Salomon
Position: Captain, B-757/767, American Airlines
Represented By: Declined representation
Location: Telephone Interview
Date and Time: July 15, 2002, 1015 EDT
Present: Operations Group members David Ivey, Bart Elias, James Goachee, Delvin Young, John Lauer

Captain Solomon gave his date of birth as August 13, 1952 and said American Airlines hired him on August 8, 1986. He estimated his total flying time to be about 12,000 hours. He stated he had flown for two years as a flight engineer on the B-727, four years as a first officer on the B-727, one and one half years as a first officer on the DC-10, about four and one half years as a captain on the B-727, and the last four years as a captain on the B-757/767.

He did not know Captain States very well. They were about the same seniority and he would see him occasionally in operations. He knew Mr. Molin. They had flown as junior captain and junior first officer together on the B-727 in 1992. They had about the same relative seniority "seat wise" and would coincidentally wind up flying together. Mr. Molin was new when Captain Solomon had checked out as captain on the B-727.

He said that Mr. Molin was a considerate person and perhaps, a tad immature socially. He was pleasant although sometimes talked down to people. He and Mr. Molin came from different sides of the tracks. As a pilot, he was excellent. He was well above the norm. Very professional and worked hard and was very serious about what he was doing.

He said that Mr. Molin had worked for a commuter company named Business Express. He said he had flight instructed a little bit as well. He said Mr. Molin was very young when he came to American Airlines and he told Captain Solomon that he had become a flight instructor to build flying time to enable him to get on with an airline. He said that Mr. Molin told him he wanted to fly from the "gitgo".

The last time he saw Mr. Molin was within one month of the accident. He said they both liked to fly turnarounds. Captain Solomon liked to be home at nights but did not know why Mr. Molin wanted to fly turnarounds. He said that Mr. Molin was getting close in seniority to check out as a captain.

He said he learned a lot more about Mr. Molin after he attended his funeral service. Mr. Molin had lost a brother to leukemia when his younger brother was two years old and he was five. He also found out that his father had been an Eastern Airlines captain and he had never mentioned it to Captain Solomon. He said he did not socialize

with Mr. Molin other than on layovers. He did occasionally talk to him on the phone. Captain Solomon was a former plumber and Mr. Molin was renovating a condominium and would ask him questions.

Mr. Molin had a couple of girl friends one of which was a flight attendant. Mr. Molin and she had flown several trips together with him on various occasions. He never saw him ever take a drink. He was not aware of anything unusual in Mr. Molin's life. There had been no major upcoming events in his life of which he was aware.

Mr. Molin was a very serious a pilot. He was professional and thoughtful. Both he and Mr. Molin had come from general aviation backgrounds. Both he and Mr. Molin were always aware of passenger comfort. Molin flew the airplane like he had his family back there. His judgment and handling of the airplane was good. They flew a couple of CAT II approaches together. Molin never did anything in the cockpit that raised Captain Solomon's eyebrows

Captain Solomon said that as the pilot not flying he did not rest his feet on the rudder pedals when the other pilot is flying. During takeoffs and landings was the exception. You guard everything, but otherwise no. He didn't use rudders much.

He had flown Navajos in general aviation. General aviation airplanes were pretty much coordinated by themselves. He had never flown any aerobatics, and he did not like to push the limits. He said he never saw the need to be on the rudders except for takeoffs, landings, and approaches.

Captain Solomon said the Mr. Molin never indicated to him that he had flown acrobatics and they had never discussed rudder usage.

Captain Solomon said he could only remember one remarkable wake turbulence encounter. He was behind a B-757 while flying a B-727. He got a good roll to about 45 degrees. He never encountered anything that required abrupt or extreme inputs to get out of it. He encountered it a few times in general aviation. He used opposite aileron and then it was over. He never used rudder to correct for wake turbulence.

He recalled one landing in Miami while flying with Mr. Molin. There was a storm on the far end of runway when they landed. Molin touched down on the dry end of the runway with some pretty good winds that started at about 200-300 feet on the approach. Molin did a fine job flying. He got a great landing out of it. The storm just popped up out of nowhere. Captain Solomon said he had his feet on the rudder pedals that time and felt that rudder use was unremarkable. If Molin had used rudder, he said he would have been aware of it. He was smooth. There was no doubt in his mind that there was no aggressive use of rudder. Captain Solomon said he tended to monitor inputs by the first officers because he is aware that there are people in the back of the airplane. Some pilots never seem to think about that. No other trips flown with Molin came to his mind.

Captain Solomon stated that he was on the DC-10 flying as a first officer in 1996 when he received the AAMP training. It was held in a conference room in a New York hotel. He said he had been in the simulator just last week and received his R-18 training (maneuvers validation). He now received training on a nine-month cycle. (R-9, R-18, R-9 etc.) and completed his most recent training on July 13, 2002. Regarding changes to the procedures, he said they had received a pink bulletin dated July 9, 2002 that had a slight change to upset recovery training. He stated that the simulator training regarding upsets in the B-757 included a nose high unusual attitude, a roll to about 100 degrees with the nose falling, and a nose high attitude to about 70 degrees of pitch.

To initiate the upset maneuver, the instructor told you to close your eyes and they place you manually in the unusual attitude. They jostle the simulator some prior to telling you to open your eyes. The maneuvers were briefed and he did not recall any emphasis or discussion about the use of rudder.

When asked about flying with any other first officers that might have used excessive rudder, Captain Solomon said he had not. He had flown with pilots who had used excessive pitch and bank, but not rudder. He also stated that he had not witnessed Mr. Molin use excessive rudder.

He recalled flying with Mr. Molin in 1997. They started training together. They had the same training month and the same training cycle.

He said that Mr. Molin was a little spoiled or a bit immature. He recalled that he was pouting once when they flew together. It was due to a disagreement with his girl friend. Once in a while he would have to correct Mr. Molin about talking down to people. He said that Mr. Molin was from the privileged side and he was from the other side of the tracks. The example he cited involved a cleaner that was servicing the forward lavatory. Molin said to the cleaner, "Hey Mister, how do you like cleaning toilets?" Captain Salomon told him not to talk to people like that. He said that Molin was a good kid with a good heart.

Captain Salomon said he never discussed any training issues as it related to Mr. Molin's flight instruction. It did not effect how Captain Salomon dealt with him.

Recalling the flight into Miami with the weather at the rollout end of the airport, Captain Salomon said he thought the flight may have been in 1997 but it was just a wild guess as to when it occurred. He said the weather popped up rapidly. There was wind and water on the rollout end of the runway. More water than wind. As they descended below 300 feet, they were jostled by the winds. Mr. Molin was smooth on the controls. He did not remember him being jerky or putting in any unusual inputs. He flew the airplane smoothly to touchdown.

He said he never saw Mr. Molin fly the airplane in an aggressive manner. He liked to hand-fly the airplane quite a bit. Both during climbs and descents. He would hand-fly up to what he estimated to 18,000 feet in climbs and turn off the autopilot about

there during descents. Most pilots that Captain Salomon flew with would turn on the autopilot early during the climb and leave it on until later in descents. Mr. Molin hand flew the airplane a lot; more than most first officers. He never had to question Mr. Molin's flying ability. He was in the top 10% of the first officers that he had flown with.

Captain Salomon said he never remembered Molin using rudder or not using coordinated rudder when he was hand-flying the airplane during turns.

He did not recall ever discussing the AAMP with him.

He said that Mr. Molin was a good pilot and a good kid. His personality needed a little work.

20. Robert Matthew Marinaro, Captain A300, American Airlines

Person Interviewed: Robert Matthew Marinaro
Position: Captain, A300, American Airlines
Represented By: Mr. Ray Duke, Attorney, Allied Pilots Association
Location: Telephone Interview
Date and Time: July 24, 2002, 1000 EDT
Present: Operations Group members David Ivey, Bart Elias, James Goachee, Delvin Young, John Lauer, Ron Skupeika, and Bernard Boudron (BEA)

Captain Marinaro stated his date of birth as January 6, 1951 and was hired by American Airlines in February 1985. He estimated his total flying time to be about 15,800 hours and had accrued about 12,000 hours as an American Airlines pilot. He checked out as captain on the A300 in December 1999 and had accumulated about 2,800 hours on the airplane, all while flying as a captain. He said he was based in New York at the LaGuardia base for flying.

He said he knew the accident captain only to say "hello" to him.

He knew the accident first officer, Sten Molin. They first met back in 1994 when they were both on the B-727. He was a captain on the B-727 and Molin had about two years with the company and was a new first officer. He said he flew at least two domestic flights on the B-727 with Molin. Captain Marinaro said he later transferred to the international flying on the B-727. The rest of the time they flew together was on the A300.

Captain Marinaro described Molin's personality as upbeat, happy and he loved life. He loved aviation and was very happy doing what he was doing and felt very lucky being able to fly for American Airlines.

Molin never indicated to Captain Marinaro where he learned to fly. He knew that he did not fly for the military although they never discussed his background. Molin never indicated to him what his prior flying experience was prior to becoming an American Airlines pilot. He thought Molin had been with American Airlines about two years when he met him and had flown as a flight engineer on the B-727 prior to becoming a first officer on the same airplane.

When asked about Molin's flying abilities, Captain Marinaro said they seemed fine. Fairly average. He was a very bright guy, always ahead of the airplane, thorough, and paid attention to detail. He recalled one time that he told the captain where to turn on the taxiway as he was keeping track of where they were during the taxi. He had good situational analysis, was cooperative and made good, normal landings. He was always aware and in the loop. It was fun to work with him. Everything flowed very smoothly.

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The next time they flew together was on the A300 in the spring of 1999. The gap from 1994 to 1999 was due to Captain Marinaro's transfer to B-727 international flying while Molin stayed on B-727 domestic flights. When they met on A300 they were both new on the airplane.

There did not seem to be any personality changes since last flying together. Molin seemed upbeat as he remembered him. He was generally happy, liked to fly turn-arounds, and was happy with his schedule. Captain Marinaro did not know why Molin liked flying turn-arounds as opposed to going on flight that had layovers.

He said Molin's piloting skills on the A300 were good. He was happy doing what he was doing, was confident and liked the airplane. His systems knowledge on the A300 was very good. He was up on it. Molin was a very bright guy, and he liked getting into systems issues. Regarding Molin's differences in flying skills on the A300 versus the B-727, Captain Marinaro said he flew as he was trained and flew like everyone else. He was confident. Everyone pretty much flew the airplane the same way. He could not remember anything remarkable or different about Molin's flying.

He said he attended the AAMP road show in 1995 or 1996. It was a special all day class that was given by Captain Vanderburgh, who had developed the program. After the presentation, it was followed up with training at a later date.

Regarding the AAMP presentation, he said it was well done, informative, and educational. Something he needed to think more about (upsets). It was not complicated or different than what he had learned before in aviation. It was basic aerodynamics and was in line with earlier training he had received. To practice on a recurrent basis would lead to better skills. He said he had not received prior training in the area of upsets.

Regarding the use of flight controls, he stated that rudder was to be fed in with the aileron. Nothing different was taught to him about flight controls than he had been previously trained. Recognizing upsets was emphasized during the training. The recovery techniques were consistent with what he had already learned. He was told to use coordinated rudder, and to lead with aileron. He felt like the training given in the AAMP presentation did not put anything additional in the show, but did not leave anything out either.

Captain Marinaro did not recall if he had ever discussed the AAMP training with Mr. Molin.

During the AAMP road shows there were many conversations among pilots and everyone liked the fact that the subject was broached and expanded upon recognition and recovery of upsets.

Captain Marinaro's recalled only one encounter with wake turbulence. It was over the North Atlantic on a flight in an A300. He was flying behind a B-747 with

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RVSM and the B-747 was 1000 feet above him and about one mile in front of him. He knew the airplane was there and when they encountered moderate turbulence, he knew why. They encountered light to moderate chop, and the airplane was on autopilot. He did not recall any rolling or yawing of airplane nor did he remember disconnecting the autopilot during the encounter. The B-747 was traveling faster than they were so the spacing was increasing.

Captain Marinaro said he kept his feet on the floor if he was the pilot not flying. He had not felt rudder inputs by other pilots and had not experienced yawing in the A300.

He did not recall Molin being an over or under aggressive pilot. He did not recall ever having flown with Mr. Molin through any wake turbulence.

He stated that the last time they had actually flown together might have been about 9 months prior to the accident. The last time he saw him was about 6 months prior to the accident; in August of 2001. Regarding anything significant in Molin's life he said that he hadn't talked to or seen him in about a year. Molin had a flight attendant girlfriend. He had broken up with his girlfriend, but thought they might get back together. He seemed to be having fun and liked to sail during the summer.

He had received recurrent training and simulator training since the accident. It was in December 2001. He said there had been no change in the simulator maneuvers at that time. Upset training was addressed as always.

Captain Marinaro had never observed any first officer making aggressive inputs on the flight controls that required him to comment or to correct. He had seen Mr. Molin make rudder inputs during crosswind landings. His inputs were smooth, normal, and correct. He never saw him make any inputs or over control beyond what was required for the situation.

He said he thought Molin would hand fly the airplane between 5,000 feet to 10,000 feet before engaging the autopilot. The altitude varied.

He never saw Molin make an abrupt control input that might require his hands to be placed on the controls to correct the situation.

The wake turbulence encounter over the North Atlantic was the only one he could ever recall. He had never experienced wake turbulence with Molin.

He stated that Molin's rudder management and use was normal. He could not recall anything abnormal or that stood out or was unacceptable in its use. He could not remember Molin ever disconnecting the autopilot to hand fly the airplane during any turbulence or abnormal event. He had never seen Molin take over manually to hand fly the airplane due to choppiness.

Molin did not have a "quirk" about the use of rudders.

During transition from cruise to descent, Molin would turn the autopilot off, usually below 10,000 feet for the approach. Somewhere between 20-50 miles out and he did not think any higher than 10,000 feet. He could not be specific about where he would turn the autopilot off to hand fly the airplane.

While hand flying the airplane on short final with the winds gusting and choppy, he never saw him over control the airplane or move the controls in rapid manner to counter roll or pitch. He said, "Sten was smooth."

Captain Marinaro said American Airlines used safety belts that have a 5-point attachment. He did not recall how many attachments Molin would use while flying.

He estimated Mr. Molin to be about 6 feet tall and to weigh about 180 pounds.

He thought that Molin made coordinated turns. All the pilots are trained to keep their feet on the rudders while flying. Captain Marinaro said that as a pilot not flying he kept his feet on floor. He thought Molin's turns were coordinated. He could not see the placement of the first officer's feet on the rudder pedals.

Since the accident only positive feedback had been received. They were both good pilots and that something out of their control must have occurred. Molin was a good pilot, and States was experienced.

He could not think of anything else.

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MR. IVEY: And so the briefing prior to entering the simulator covers upset issues, I suppose, nose high and nose low. Do they get specific about that?

CAPT. LANDRY: The worksheet, as I recall, just talks about unusual attitudes, but the word that we give our people is we want them to see one of each somewhere along the way during the simulator session.

MR. IVEY: And that's every nine months now?

CAPT. LANDRY: Every nine months now.

MR. IVEY: So they'll get at least two upset scenarios of some sort during a simulator?

CAPT. LANDRY: They should get at least two, yes, sir.

MR. IVEY: Okay. Off the record a second.

(Off the record discussion.)

MR. IVEY: Back on the record.

So typically, every nine months during recurrent training, a pilot will come in and he'll probably get a segment of upset training that might be covered in the ground school portion, but indeed, when he goes into the simulator then he'll get a briefing before entering the simulator and then experience two at least upset events of some sort or another?

CAPT. LANDRY: He'll experience one for sure. Two, hopefully. And these are listed under the AQP variable maneuvers, so he has to get one. Whether he gets two or more -- generally, all the times I go in as a student I get at least two or three.

And to my knowledge, that's pretty typical of what the instructors are doing. That's certainly the guidance we give them.

MR. IVEY: Is the set-up similar in most periods, or is there a variable that each instructor can use to establish this upset maneuver? You mentioned earlier the vector behind an airplane for wake turbulence. Is that usually or is that exclusively the way that these unusual attitudes are developed?

CAPT. LANDRY: I'd say neither. I'd say it's a tool. It's there as an option. The instructor has some leeway as far as how he gets them into these situations. And individual instructors have their own way of doing it. The results is what we're interested in, so we don't get real picky. We give them some ways that they can do it.

MR. IVEY: Can you give me some examples?

CAPT. LANDRY: Well, real similar to what we did when we were in Air Force pilot training. Close your eyes, pull back, turn left, turn right. Okay, open your eyes and recover. That's one way of doing it. Another way of doing it is to distract one pilot, have him down in his kit bag while the instructor has got the other pilot putting the airplane intentionally into an unusual attitude and then telling the heads-down pilot, Okay, recover.

The wake turbulence encounter is a good one or another method. And I suppose probably limited only by the instructor's imaginations, as far as ways to get into it.

MR. IVEY: In the wake turbulence encounter, it's been stated that the aileron control had been inhibited in order for the airplane -- the simulator to actually get into this unusual attitude, and then at some point that roll control was reinstated so that the pilot can recover from the attitude that he's in.

Do you know if that software is still in those simulators --

CAPT. LANDRY: I believe it is.

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MR. IVEY: -- to do that?

CAPT. LANDRY: I believe it is. And in -- it's only partially inhibited, and the reason that was done -- and you'll have to talk to my sim -- simulator engineer to get the real specifics on this -- but as I recall, since the HBAT -- we thought the list of items in the HBAT on Selected Event Training was a pretty good place to start.

And the question was how do we get someone into this -- one of the issues it called for was rolls beyond 90 degrees. How do we get them into that in a way that's realistic and quite literally takes a guy by surprise? And we thought, What better way than a wake turbulence encounter.

And what we found was that when we put the software in for the wake turbulence encounter, and I don't pretend to understand all this stuff -- it's all I can do to keep up with my Palm Pilot -- but what we found was that a quick-reacting pilot could stop the roll long before it got anywhere beyond 20 or 30 degrees, even with the tough -- the strongest vortex that we were able to insert into the simulator.

And so, of course, we wanted to, like the HBAT said, get beyond 90 degrees of roll, and the method they came up with was to partially inhibit the ailerons. And the reason I say partially is because, of course, if we inhibit them entirely, it would be a waste of time.

But to partially inhibit them in effect in the software world, all it did was make sure that the vortex was strong enough to get the airplane past 90 degrees. The more aileron a pilot put in, of course, the less effect the vortex had on his aircraft.

And as he rolled further and further towards this 90-degree point, finally, that that partial inhibition was washed completely out so he had full aileron control here. So it was a software fix in our opinion to a problem -- a simulation problem.

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MR. IVEY: Have they ever had the symbol generators go out as a result of rapid flight control response of any kind?

CAPT. LANDRY: Dave, I'd have to go back and look, but I think that since that event, that has been introduced into the A300 training. To get specific about that fleet, I'm not the guy to answer that one.

MR. IVEY: Yes. In other words, there is an event that as a result of that incident we had or that you all had, I should say, you can create the symbol generators to go out or something similar to that?

CAPT. LANDRY: Well, that's what I'm saying. I don't know. I honestly don't know.

MR. IVEY: We've had discussions about coordinated rudder input. Has there been any discussions at all related to the coordination of rudder since perhaps the letter was sent to Captain Ewell? It may not have all been on your watch, but any discussions in training about the use of coordinated rudder for any of the fleets as well as A300?

CAPT. LANDRY: Well, I'm sure there've been thousands of discussions. I'm not sure what it is exactly you're looking for there. There of course are going to be discussions between the instructors and their students. Those go on all the time.

MR. IVEY: I think I'm still trying to get a handle on air transport category airplanes and the concept of coordinated roll -- coordinated rudder, I should say, not coordinated roll. And we've heard the term used coordinated rudder, but we're not -- I'm not clear as to what it is that is taught to pilots about how to use rudder to make something coordinated.

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CAPT. LANDRY: I think we're talking about two separate issues here. I think if you're talking about coordinated flight, a coordinated turn, I think that's one issue. And that's, of course, the stuff you learn in your private pilot course, and I don't think we get into that a whole lot.

If you're talking about what -- well, I think Warren said it well in his lectures when he talked about coordinated rudder. I think he gave a great caveat right off the bat and said that when he talks about coordinated rudder, he's talking about rudder in the same direction as the ailerons.

If I remember correctly, this is what is on the tape. Rudder in the direction of the ailerons as opposed to, for instance, cross-controls that you would use on a cross-wind takeoff or landing. So my impression of what Warren has been saying about coordinated rudder has to do with rudder in the direction that you want to roll, i.e., the same direction that the ailerons are going.

MR. IVEY: Yes. And I think that's a very accurate answer. I only follow up with one other question, and that is, is there times when this rudder in the direction of the aileron is too much rudder and sometimes too little rudder? And if so, how does the pilot know?

CAPT. LANDRY: Have we got a couple of days?

MR. IVEY: And I think as it pertains to upset training. That's where we're talking right now.

CAPT. LANDRY: I would have to say that my answer to that would be that you attempt to roll with the ailerons first, of course, because they're one of your primary flight controls for roll, after all. And if the airplane's not doing what you need for it to do, then now you add some rudder.

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How much is too much? When you introduce side-slip. The rudder issue for me is maybe a little too simple in that I've flown lots of airplanes that, as you're well aware of, the F4, for instance, that it was rudder only, and other airplanes -- a T38, for example -- you never touched the rudder.

And so for me to give you a really good answer to that, I don't know. I know when I feel like I've got the right amount of rudder and I know when I've got too much and I know when I've got too little. If your question is how do I explain that in an academic environment, I don't know.

I don't know that I could stand here and tell you or anyone else that this is too little and this is too much.

MR. IVEY: I think your point's well made. I guess if you're in an airplane that's dynamic, perhaps you can get that vestibular sensation or whatever's happening as you're sitting in the seat, the seat of the pants, if you will.

CAPT. LANDRY: That's one way.

MR. IVEY: In the simulator, however, how are you able to know it's too much or too little? You don't quite have that luxury of the dynamics of true flight.

CAPT. LANDRY: That's true. That's very true. But once again, it's a simulation. It's what we have to work with. The alternative is to go up and try it in an airplane, and I'm not real big on that one. So I'm not sure what you're looking for.

MR. IVEY: No. I'm just trying to get a sense -- not really trying to put you on the spot either; please understand. You mentioned back in the early days when we learned to fly coordinated flight was turn coordinator or needle involve or --

CAPT. LANDRY: Right.

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MR. IVEY: -- keeping the ball centered. And is it an accurate statement or fair to say that perhaps coordinated rudder should involve the ball? If the ball's centered, you're in coordinated flight.

CAPT. LANDRY: If you're talking about coordinated flight, that's --

MR. IVEY: That's a basis --

CAPT. LANDRY: -- normally the case.

MR. IVEY: -- yes. That's a basic thing we learned many years ago where new pilots associate part of their flight training with. But how much -- in reality, how much ball is really taught in air carrier training?

CAPT. LANDRY: Very little. Very little.

MR. IVEY: Precisely. I agree. Let's see. In upset training, has there been any one common theme that seems to have been a problem that instructors have brought up that there's been a modification to that sort of helped the students along in the simulator?

Anything there, or has it been pretty well set in place back in '96, I guess, and as you say, the learning curve has come along to where people are doing fine now, but have there been any tweaking of that to try to help students in their understanding of recovery?

CAPT. LANDRY: I'm sure there was during that time. As I say, we kicked this program off and shortly thereafter I was gone. I'm sure the program evolved during that time when I was gone. Since I've returned we've made minor changes to the program.

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CAPT. SKUPEIKA: I just have one question. When you get the pilots on these excursions and wake turbulence upset, and I might be asking the wrong person here, but what do you base your data on when you reach those over 60-degree bank or 90-degree bank or 130-degree bank?

When you're outside the realm of normal parameters, what does your simulator programming base that on? Since I know Airbus does not produce any of that at all, what do you guys use?

CAPT. LANDRY: It's extrapolated data, I would assume. Well, yes, you apparently are asking the wrong guy here, Ron, because I don't know once -- I do know that the flight test data is only valid to certain ranges of pitch bank, and once you get past those, I don't know what data we're operating on, to be honest with you.

CAPT. SKUPEIKA: Then if the guy recovers from that and he assumes the airplane is going to be responsive the same way, how can you say he's trained to proficiency when you don't have data?

CAPT. LANDRY: I don't think that we've ever said that the airplane is going to respond the same way. I think you have to go back to the genesis of this program and realize where it came from.

This started, at least in my mind, with the Roselawn crash where we had some pilots who got into this upside down situation --

CAPT. SKUPEIKA: Right.

CAPT. LANDRY: -- and didn't have -- it appears, at least -- that they did not have the basic knowledge they needed to know that what they needed to do was roll that airplane right side up. They did what was instinctive to them, and that was -- and

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of course I'm not the expert on this, but it appears that they did the instinctive thing and pulled themselves right into the ground.

CAPT. SKUPEIKA: Yes.

CAPT. LANDRY: And so based on that and the fact that we might have pilots who couldn't -- who, given this situation, would end up the same way, I don't care where the data came from because the goal there is to teach that guy that what he needed to do was this.

And whether the simulator responds exactly the way the airplane did or not is a moot point, because we have no other way to teach him that.

CAPT. SKUPEIKA: Would you say you'd disable the aileron inputs for a while?

CAPT. LANDRY: No. I'd say we partially inhibit them.

CAPT. SKUPEIKA: Partially inhibit them, yes, so he's got roll spoilers. The only reason I'm bringing that up is because we've heard testimony from your pilots earlier the first week in November that stated that they were inverted, and they expected the airplane to respond exactly the way the simulator was, and we have that documented. So that's why I just bring it up to your attention.

CAPT. LANDRY: I'm sorry. We -- statement -- we had pilots that were inverted?

CAPT. SKUPEIKA: That's what they told us. Well, some of the comments were that they got into an upset and were on their back and they recovered from it.

CAPT. LANDRY: In a real airplane?

CAPT. SKUPEIKA: No, no, no. This is a simulator. Strictly simulation. All simulations. That's why I just brought up the subject. And then they thought --

CAPT. LANDRY: Well, I don't think pilots --

CAPT. SKUPEIKA: -- we asked them that question. Did you think that the airplane would respond that way, and they answered, Well, yes, I guess so. An airplane's an airplane. That's all I'm bringing up at this point.

CAPT. LANDRY: Yes. Yes.

CAPT. SKUPEIKA: And it's just going -- you know.

CAPT. LANDRY: I don't think your average pilot has any idea how a simulator works --

CAPT. SKUPEIKA: Right.

CAPT. LANDRY: -- or what the limitations on a simulator are. And so that's probably valid.

CAPT. SKUPEIKA: That's all I have. Didn't mean to put you on the spot there.

CAPT. LANDRY: That's okay.

MR. IVEY: Captain John Lauer, Allied Pilots Association.

CAPT. LAUER: Captain Landry, just got a couple, three or four things. Has your department or has American Airlines received any information in any form from Airbus at any time in the past that you're aware of referencing the use of or the limitations to the use of the rudders in the A300?

CAPT. LANDRY: -- structural failure?

CAPT. YOUNG: Right.

CAPT. LANDRY: No. I've not seen anything that caused me any concern along those lines.

CAPT. YOUNG: Okay. You've flown a lot of different types of airplanes. Has there -- of the airplanes that you've flown in reference to the V_a, have you ever been concerned about control movements bending or breaking the airplane if you were operating below that maneuvering speed?

CAPT. LANDRY: It's never been a concern to me personally. No.

CAPT. YOUNG: I guess the last thing I have -- well, we're talking -- there were some questions on the other side there about the simulator software issues and how it was programmed and this, that and the other. Was the sim designed to teach procedures or exact replication of the airplane primarily? I mean, now, is that how we use it?

CAPT. LANDRY: Are those the only two choices?

CAPT. YOUNG: Well, I understand there's some techniques and things thrown in there, but primarily as it relates to unusual attitudes.

CAPT. LANDRY: As it relates to unusual attitudes? Call it procedures, knowledge, whatever you want to call it. I'd go that way as opposed to -- what was the other thing you said -- you asked --

CAPT. YOUNG: An exact replication of the airplane.

CAPT. LANDRY: No. No, we know it's not. We know that a simulation is a simulation. I mean, it's never going to be an exact replication in any regime. It's good, getting better all the time.

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CAPT. LANDRY: Well, that's a lot of anys, John. Let's see if I can give you a fair answer. Other than the letter that we've already discussed here, I'm not aware of anything else regarding that subject.

CAPT. LAUER: Okay. So from the manufacturer, as best as you can remember or know, nothing in a training form or any information that can be used in a training scenario to help with the training of rudder management or to alert pilots to rudder limitations have ever been received or conveyed to the company?

CAPT. LANDRY: Not that I'm aware of. Once again, with the exception of the letter.

CAPT. LAUER: In your opinion, and you were an instructor pilot at one time, I'm assuming an instructor pilot in the simulator as well as --

CAPT. LANDRY: Yes, I was --

CAPT. LAUER: -- out on the line?

CAPT. LANDRY: -- doing both. I was an "X" type.

CAPT. LAUER: Because of this unique condition that is programmed into the simulator where the ailerons are partially inhibited to help get the aircraft up to a bank angle to effect the training, is there any possibility or chance that because of this software as it is designed, would it lead the pilot to utilize or to rely on the utilization of rudders to get out of this scenario?

CAPT. LANDRY: I believe -- first of all, something you said about the inhibitions. I'm not really sure -- I think I need to clarify that -- I'm not really sure how they did that -- how they effected that. Once again, you'd have to talk to my chief engineer on that, and he'll go on for days on what they really did.

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It's my layman's terms, if you will, that we partially inhibit the ailerons. That's my understanding of the way it works, so I want to make sure that's very clear. The engineers are going to have a whole different explanation for how they did it.

Did that -- and the rest of your question was did that in any way give a guy the impression that he needed to --

CAPT. LAUER: Use the rudders.

CAPT. LANDRY: -- use the rudders.

CAPT. LAUER: Would that lead him to use the rudders because the ailerons had been partially inhibited?

CAPT. LANDRY: I think in a lot of cases it would lead them to use at least some measure of rudder.

CAPT. LAUER: Is it -- is the pilot left, upon leaving the session, is the pilot left with the perception that in the real world, real airplane, if he were to find his airplane in that same scenario where, let's say, he's up at 80, 90 degrees bank, that he would have to use his rudders instead of rolling it with just aileron only?

CAPT. LANDRY: I think the message that we try to get across and I think it's very clear in Warren's lectures is that you do everything you can with the ailerons and then you use rudder as necessary if the airplane's not doing what it is you want it to do.

And particularly in a case where the airplane's gone beyond 90 degrees of bank and the nose is going to be following quickly now. Ailerons are not getting you where you need to be, then some measure of rudder is called for, certainly.

CAPT. LAUER: Okay. For those of us that are flying blind, we were hired -- in this case, this company with regards to myself and for others, other

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do it, we'll commence the problem; If not, stop me right there, and we'll talk about it so when you do it, you'll know what you're at least trying to accomplish.

MR. IVEY: And I think that we've had an earlier testimony that it's not a graded event; it's something to learn, and if you need to repeat the item, then do so, so that you get the proper learning transfer.

MR. COOK: That's correct.

MR. IVEY: In your experience, which is extensive, do most of the students seem to catch on, on the first go-round, or does it sometimes take a second event? Or on average, is there two or three during a period, or three or four, or four or five? I -- give me a sense of --

MR. COOK: You're talking what type of maneuver?

MR. IVEY: Oh, just the upset maneuver training.

MR. COOK: It's almost always done properly. The nose-high unusual attitude in the simulator -- the A-300 simulator is a little bit unique in that it's programmed such that when I put in the event, it will then -- it rolls in an up -- nose-up trim, and it lifts the nose of the aircraft regardless of what inputs the pilot puts in.

It gets them to a certain deck angle -- and I can't tell you what that is -- and then it releases the aircraft, at which point -- then he has control over it. I think that's probably not the best. I tell them that happens.

And then, of course, as I told you, I teach, Use coordinated aileron and rudder and start a bank angle until the nose naturally starts to fall; In other words, decrease the lift vector. That simulator doesn't -- you can increase the bank angle to an extreme amount, and the nose won't fall until you put in more rudder than would probably be required on the aircraft.

MR. IVEY: And that tends to get the nose --

MR. COOK: Yes, sir.

MR. IVEY: -- coming down then? Okay. And is nose-high, versus nose-low, a little more difficult to comprehend, or do you really see any differences in recovery --

MR. COOK: Well, the other one's --

MR. IVEY: -- success?

MR. COOK: -- not really nose-low. It's just a roll maneuver. Okay? I think the roll maneuver is done more successfully than the nose-high.

And I think what I see is most pilots put in the correct amount of bank angle and rudder that I think the airplane would require, and then I have to -- I'm sitting in the instructor seat, which is right behind the captain, and I just in a very calm voice tell them, More rudder; More rudder. And then I go through again that I don't believe that the aircraft without some type of structural problem would require that much rudder.

MR. IVEY: Sitting in the instructor's seat, is there some indicator or tool that you use to determine whether there is enough or not enough rudder being used?

MR. COOK: No, sir. It's a feeling I have.

MR. IVEY: Do they --

MR. COOK: Now --

MR. IVEY: Do they use or -- not do they. Is the trapezoid talked much about in unusual attitude recovery?

MR. COOK: No, sir. Not by me.

MR. IVEY: Do you know of anyone who really uses that as a teaching tool for that kind of recovery, either?

MR. COOK: No.

MR. IVEY: In --

MR. COOK: It's a pretty small trapezoid during that period.

MR. IVEY: The --

MR. COOK: There --

MR. IVEY: I'm sorry.

MR. COOK: There's another time we get into a nose-high attitude often times, and that's on recovery to GPWS, Ground Proximity Warning. And one of the tools we show them is that on the Airbus, you have the stick-shaker indicator, the SS 1.12 stall, and that you really have all the energy between your current air speed if you need it all the way down to the stick-shaker. And you know exactly where the stick-shaker's going to be.

So we show them that that amount of energy -- speed energy can be traded for altitude. When they do that, they end up with a nose-high low speed situation. And then by doing exactly what we said, the nose falls naturally. And invariably, they do that properly.

MR. IVEY: And that's the learning.

MR. COOK: That --

MR. IVEY: Do you find --

MR. COOK: And in fact, that's the one I prefer.

MR. IVEY: Do you find that most of the students use aileron as the principal flight control, or do you find aileron and rudder, or is it aileron or pure rudder only? Have you ever seen anyone do a recovery with just rudder only?

MR. COOK: No. I can't imagine anybody doing that.

MR. IVEY: And the term "top rudder" -- does that -- is that a term that you use or are familiar with?

MR. COOK: No, I don't use it.

MR. IVEY: And one last term and one last question. The term "coordinated rudder." When that term is used, explain for me what that means. Or how can a pilot ascertain what is enough coordinated rudder?

MR. COOK: In the simulator, it's difficult, I believe. In the airplane, it -- I think it's easy to determine the amount of rudder necessary to keep the turn coordinated. We all learned it when we first started flying.

I think that one of the points is that when you're using small aileron deflections that you're using in normal flight conditions -- you have a yaw damper, and you have a turn coordinator. And I think pilots get possibly a little complacent with the rudders at times. When you get extreme aileron deflections, then your yaw damper and turn coordinator aren't really designed for that, and you have to follow up with appropriate rudder put-on.

But I never teach, you know, "Put on all the rudder," or anything like that. I always teach coordinated flights. That's the way I learned.

MR. IVEY: Well, thank you, very much, for my questions. What I'd like to do is go around the room and see if anyone else has some questions and follow-up, and I'll start with Dr. Bart Elias from the NTSB.

MR. COOK: Yes, sir.

MR. IVEY: Bart?

DR. ELIAS: Yes.

Thank you for being here today. Just a couple of questions. First, since you've flown both the 75/76 and, also, the A-300, I'd like you, if you could, to give us a sense of a comparison between those two airplane types in terms of rudder effectiveness in those unusual attitude recoveries.

MR. COOK: In the simulator?

DR. ELIAS: Uh-huh.

MR. COOK: The -- it has been a long time, but in the 75/76, if you use less rudder, what I believe would be coordinated aileron and rudder, the nose will fall appropriately whereas, in the Airbus, it would not.

DR. ELIAS: I'm sorry. In --

MR. COOK: The Airbus requires more rudder -- the simulator. Now, that's only during that pitch-up maneuver the way it's programmed. If they get the nose-high in another situation, then it reacts more like I believe the aircraft would.

DR. ELIAS: Do you think that's a function of the way that maneuver or unusual attitude entry was set up in the programming of it? Or is it --

MR. COOK: I would guess so, but other people could probably tell you more definitively.

DR. ELIAS: Okay. But in other situations, are you saying that the A-300 sim. seems to have equal rudder command authority or --

MR. COOK: Yes.

DR. ELIAS: -- rudder requirements --

MR. COOK: Yes.

DR. ELIAS: -- comparatively? Okay. Are you familiar with the concept of cross-over angle of attack or cross-over air speed?

CAPT. SKUPEIKA: Yes.

MR. COOK: -- no, I don't --

CAPT. SKUPEIKA: Okay.

MR. COOK: -- to answer your question.

CAPT. SKUPEIKA: No problem. One other question. Now, how would you know -- since you taught the student how to recover coordinated, how would you know that he is doing a coordinated maneuver during that particular upset? How do you know since you can't see his rudder pedals?

MR. COOK: Well, I can see his legs move. I -- it's a feeling I have.

CAPT. SKUPEIKA: You just have a feeling?

MR. COOK: Yes.

CAPT. SKUPEIKA: Okay. And, last but not least, are you aware that in a 300 simulator, during that upset entry, the flight controls, especially the ailerons, are degraded? Were you aware of that?

MR. COOK: Well, as I told -- I don't know how to answer that. I am aware of what the simulator does during that maneuver.

CAPT. SKUPEIKA: Have you ever been told that this is what we have done to create this upset, by degrading the ailerons so the pilots --

MR. COOK: I don't know what's --

CAPT. SKUPEIKA: -- don't have control --

MR. COOK: I don't know what's done.

CAPT. SKUPEIKA: Okay.

That's all.

MR. GOFF: -- or something like that? Not that I recall.

MR. IVEY: Has the AAMP program changed in its development or its presentation since its initial development in any significant or even minor ways?

MR. GOFF: No.

MR. IVEY: The procedures have remained intact ever since about '95 or '96, when its been in there?

MR. GOFF: Yes.

MR. IVEY: There have been no major changes?

In terms of upset maneuver training, what would you say is the biggest problem that students encounter if they're -- out of all the things that are done by them, what's the biggest problem that they have in upset maneuver training?

MR. GOFF: The only problem I've seen is people try to turn the wrong way, they misinterpret once in a great while. And it's not a big problem. It's just maybe two or three times a year I see a guy try to turn the wrong way to make his recovery.

MR. IVEY: Is that usually because they're in that inverted attitude?

MR. GOFF: Right.

MR. IVEY: And that's the one that becomes more the source of confusion?

MR. GOFF: Right.

MR. IVEY: Uh-huh. That's not typically a problem if you're in the blue-side up regime somewhere?

MR. GOFF: Not usually. No.

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MR. IVEY: In the training is it taught to look to outside references, or what guidelines do you give students, Look outside the windshield, look at your PFD, look at what?

MR. GOFF: Well, usually the visual is going to be probably close to dark anyway, and they're not going to get much out of that, because usually we're going to have the weather set so they won't have any visual cues out there. So usually it's done on the instruments.

And if they're upset and they go upside down and the airplane rolls to the right, usually it's not going to take them exactly 180 degrees worth of turn there, so they're going to have one wing not as low as the other one, of course.

And its just if it rolled to the right, top aileron and top rudder to get the thing righted again, if that was the case of their upset.

MR. IVEY: The top aileron, that's a term -- in other words, top aileron meaning counter to the roll?

MR. GOFF: Yes.

MR. IVEY: And top rudder, that term, what does that mean?

MR. GOFF: Well, if it rolls you to the right, probably the closest direction to the sky pointer is going to be back to the left. So in that case it would be the top or left rudder and aileron to make your recovery on.

MR. IVEY: Uh-huh. And those are terms, top aileron and top rudder, is that part of your teaching style and --

MR. GOFF: If they can recognize that that's what happened to them. Yes.

MR. IVEY: The term, coordinated rudder, what does that mean?

MR. GOFF: That means try to use as much aileron and rudder in conjunction with each other so it's a smooth flight, smooth roll-out, and the trapezoid stays lined up with the triangle on top of it.

MR. IVEY: Is that trapezoid something that's pointed out in the airplane but not really a reference to flight, is it? Isn't it more the attitude reference, but that's available there --

MR. GOFF: Yes.

MR. IVEY: -- for them, too?

MR. GOFF: It's available to them. Yes. It's not something that, you know, if it was going --

MR. IVEY: You teach them to fly by --

MR. GOFF: Right.

MR. IVEY: -- like an ILS needle, if you will?

MR. GOFF: Right. It's there to use.

MR. IVEY: Yes. Well, thank you, Mr. Goff. I'd like to go around the room here. And Bart Elias, Bart, do you have any questions?

DR. ELIAS: Just a couple. First, you talked a little bit about the scenarios in terms of setting up those two upsets, the nose-high upset and, then, the roll, too, nose-low.

Are you aware if the effectiveness of either the ailerons or rudders or both are either disabled or degraded as that maneuver is entered?

MR. GOFF: I'm not aware of it.

DR. ELIAS: So if I was really aware or had good situation awareness, I might not get into as large of an unusual attitude as compared to maybe if there was a delay in recognition. Is that correct?

MR. GOFF: Right. You'd probably recognize it earlier, you'd probably react earlier, and you'd probably recover earlier.

DR. ELIAS: Okay. Are you familiar with the term at all of crossover angle of attack or crossover air speed as it relates to rudder effectiveness for controlling roll?

MR. GOFF: Not in relation to the rudder effectiveness. No, I'm not.

DR. ELIAS: How are you familiar with it?

MR. GOFF: Well, just the, I guess the definition of the corner speed. It's the lowest speed at which you can get the maximum G Forces without -- when you still honor the stick shaker. And if you're not right at that speed your turn radius is going to be greater. If you're faster or slower it will be greater, your turn radius will be greater. That's about all I know about it.

DR. ELIAS: That's corner speed, so not necessarily crossover speed.

MR. GOFF: Not so. That's corner speed I was talking about, that's it.

DR. ELIAS: Okay. So it's sort of a different term that you're talking about?

MR. GOFF: Yes. That's right. And that's -- yes. Right.

DR. ELIAS: Okay. But crossover speed is not a concept --

MR. GOFF: No. We don't get into that. No.

DR. ELIAS: -- and crossover angle of attack is not a concept you talk to students about?

MR. GOFF: Generally not.

CAPT. SKUPEIKA: Okay. So there probably would be a different feeling, I would assume, at heavy weights versus light weights?

MR. GOFF: I would imagine so.

CAPT. SKUPEIKA: So there might be some consideration as to how a pilot recovers from heavy weight versus light weight?

MR. GOFF: There could be.

CAPT. SKUPEIKA: Okay. How would you teach a coordinated recovery from an upset maneuver, how much like rudder input, aileron input? What do you give a general sense for the pilot coming in first time around? What do you tell him?

MR. GOFF: Put some aileron in, try to follow it with some rudder that feels about right. And then, if you have the trapezoid up there, check the trapezoid.

CAPT. SKUPEIKA: When you say, Feels about right, what is that, half rudder?

MR. GOFF: You've got to feel it. You know, you've just got to do it to feel it, that's it.

CAPT. SKUPEIKA: Does the simulator offer any side loads, any motion side loads or any G Force?

MR. GOFF: Well, it depends on how rough or smooth the pilot is.

CAPT. SKUPEIKA: Would you feel that the G loading and the senses he gets in the simulator are the same as the aircraft?

MR. GOFF: I have no idea.

CAPT. SKUPEIKA: Okay. So therefore, maybe the procedures that you're teaching may not be correct, because we don't have good data?

MR. GOFF: I --

CAPT. SKUPEIKA: Because we're teaching by feel. We don't have a feel on the simulator, as far as I know.

MR. GOFF: I can't answer that for sure.

CAPT. SKUPEIKA: Okay. Going back to AAMP training, are you happy with this training American has set aside as special training? Are you happy with it personally?

MR. GOFF: It's fine.

CAPT. SKUPEIKA: Okay. If I gave you the latitude right now today of making changes or developing a better program or changes to the current one, what could you offer me as suggestions?

MR. GOFF: As far as the training itself goes, I probably wouldn't change anything.

CAPT. SKUPEIKA: Not change anything?

MR. GOFF: There may be something to be done about the simulator and the way it -- probably the feel of the sim when it goes into a pitch-up.

CAPT. SKUPEIKA: Okay.

MR. GOFF: But other than that, I wouldn't change anything.

CAPT. SKUPEIKA: Can you enlighten us on what you feel would be a little bit better, going back to what you were saying about the pitch feel?

MR. GOFF: Just so it doesn't -- it just feels like it's -- once you push the button to insert a pitch up, it holds it in there a little bit too long. It takes a little bit of time and a little bit of effort to get it out of that nose-up attitude. And what causes that I don't know. Somehow they do it, enter it in the sim.

MR. GOFF: Well, yes. It would be considered their next sim period. It may not be the next day.

CAPT. GOACHEE: Okay. Let's say you were training me, and if this happened it probably would happen the way I'm going to talk to you about, is that I'm not performing that day very well with the AAMP upset maneuvers, and you do not have sufficient time to give me additional training. Would I advance to the next stage, into Day 6, under that scenario?

MR. GOFF: In the transition program? Yes.

CAPT. GOACHEE: Without showing proficiency in that particular --

MR. GOFF: Right. And we would write it up that the student wasn't proficient in this particular thing.

CAPT. GOACHEE: Okay. Thank you. That's all.

CAPT. YOUNG: I might add one other thing, because Ron brought up a little something.

You said you teach them to feel the rudder input for the recovery from the unusual attitude, whatever it is, in the sim. How do you know, or how do they know and how do you know if they put too little or too much rudder in that in relation to the rudder there?

MR. GOFF: Usually it's the smoothness of the recovery or the lack thereof. If they don't put enough, it's very rough or it's very sloppy on this recovery.

CAPT. YOUNG: Okay. Can you feel side loads in the sim when that happens?

MR. GOFF: Up to a very small point. It moves a little bit, but not a whole lot.

CAPT. YOUNG: Okay.

MR. GOFF: You just get the indication that there are side loads there.

CAPT. YOUNG: Okay.

MR. GOFF: But it's not, you know, it's not a full feeling of it.

CAPT. YOUNG: Right. Okay.

MR. IVEY: Well, thank you very much. I appreciate you coming in this morning and sharing your insight and providing answers to some of these questions. This will conclude the interview.

MR. GOFF: Thank you.

(Whereupon, the witness was excused.)

(Whereupon, a short recess was taken.)

MR. IVEY: Good morning, Captain VanderBurgh. This is an interview that's based on the accident of American 587.

EXAMINATION

j. Captain Warren M. VanderBurgh

MR. IVEY: And if you would, by way of introduction, please give me your full name, your present title and status with American Airlines, and an overview of your history, including aviation and type ratings, total flying time, just a general nature.

CAPT. VANDERBURGH: Okay. I'm Captain Warren M. VanderBurgh. I'm a Boeing 777 international captain with American Airlines.

In the way of an experience overview, I have fairly extensive experience in general aviation. I have 25 years mission-ready in one of four different jet fighter aircraft in the U.S. Air Force, to include the F100, the F105, the A10, and the F4.

CAPT. LAUER: Hence, the authority given to the captains to execute or to escape the maneuver and the procedures to be executed at his discretion?

CAPT. RAILSBACK: No, I don't agree with that. I mean, we have a recommended procedure here and I have to trust Boeing to have given us proper procedure, and I do.

CAPT. LAUER: Okay, I don't have any further questions.

MR. IVEY: Thank you. Captain Ron Skupeika, Airbus.

CAPT. SKUPEIKA: Yes, good morning. Just one question. We noticed in the simulator that the co-pilot had no tiller wheel, and the question was posed to one of our sim pilots, and he said to forward that question to management and why it was removed, because it's the same way on the airplane, so I'm posing it to you.

CAPT. RAILSBACK: I'm sorry. You're telling me that the standard A-300 has two nose-wheel tillers?

CAPT. SKUPEIKA: Right, and you had it removed.

CAPT. RAILSBACK: Those airplanes were bought before I was in management, so I can't answer that.

CAPT. SKUPEIKA: Okay. Just thought I'd throw it out there.

CAPT. RAILSBACK: And I don't know.

CAPT. SKUPEIKA: That's all I have.

MR. IVEY: One last question from me. As a pilot, going back as far as you do, have you ever encountered wake turbulence in a large transport category airplane?

CAPT. RAILSBACK: Yes.

MR. IVEY: What has been the greatest influence on the airplane that you remember?

CAPT. RAILSBACK: Turbulence, rolling motion.

MR. IVEY: Do you remember about the maximum amount of bank that you ever encountered in a wake turbulence encounter?

CAPT. RAILSBACK: I've never been in a severe wake turbulence; basically every wake turbulence I've ever been in has been pretty much in and out within a couple of seconds, not requiring any particular control input other than just some ailerons to keep it straight.

MR. IVEY: And in light of the accident and what you might have heard about a wake turbulence encounter, in discussions with your pilots has anyone discussed a wake turbulence encounter that was of a greater significance than what you just described?

CAPT. RAILSBACK: No.

MR. IVEY: And my last closing question is is there anything -- and we made mention of this earlier -- is there anything that you think that the Safety Board should look at to try to help solve this accident, any ideas?

CAPT. RAILSBACK: Other than what you've already got or looking at, I have no further questions to add.

MR. IVEY: Well, thank you very much for coming in this morning, Captain Railsback, appreciate your comments and participating in the interview process.

CAPT. RAILSBACK: Thank you.

MR. IVEY: This completes the interview.

(Whereupon, a recess was taken.)