Name: **Captain Margaret Flynn – Accident Captain**
Date: **July 30, 2013**
Time: **1500 CDT**
Location: **SWA Headquarters, Dallas, TX**
Present: **David Tew, NTSB; Katherine Wilson, NTSB; Mikal Campanello, FAA; Wiley Moore, Boeing;, Colin Fite, SWA; Guy Woolman, SWAPA**

Represented by: Stephen Walsh (Condon & Forsyth LLP)

During the interview, the accident captain stated the following stated the following:

Her date of hire at SWA was October 12, 2000. She had about 12,000 hours total time, and 7,000 hours PIC time, of which 2,600 hours was on the B737. She checked out as captain on the B737 about 6 years ago. She began flying in 1988 and by 1993 had received her private, instrument and single engine commercial ratings. In 1993 she took a condensed course to get her CFI, CFII and multiengine commercial ratings. In 1994 she worked as a flight instructor and did so for 4 years. She was hired by Ameriflight in 1998 which was headquartered in Burbank, but she flew out of Oakland. She worked there for 2 years and 9 months from January 1998 until September 2000, before being hired by SWA. At Ameriflight she flew the Piper Lance for 2 weeks, the Chieftain and the Beech 99, all as single pilot operations under a 135 certificate flying cargo.

She had a first class medical with the limitation must wear corrective lenses. She was wearing corrective lenses on the day of the accident.

She had no military experience.

She had not had any previous accidents, incidents or violations . Her only failure in training was on a check ride for her single engine commercial certificate.

She had not taken any prescription or over the counter medications on the day of the accident.

The day of the accident was a "long day" but she felt okay.

She had not flown with the accident F/O before and had not heard of him although they flew out of the same base.

The accident crew flew one leg together prior to the accident flight. The flying abilities of the F/O were fine and she had no problems whatsoever. Their CRM was good, they had good conversations and worked well together.

She was on a 3 day trip pairing which started on Sunday, July 21, 2013. The first day she did not fly with the accident F/O because of a conflict with his schedule, so she was paired with another F/O. On Sunday, she flew from Oakland to SAN, SAN to PHX, and then deadheaded to Los Angeles. Her show time in Oakland was 0605 local time and she arrived in LAX about 1430 local time after a delay in PHX.

On Monday, July 22 (the day of the accident), she had a show time of 0545, and she felt like she got a good night's sleep in Los Angeles the night before. The accident crew flew from LAX to Nashville and the captain was the PF. The flight went well and they arrived early into Nashville where they changed aircraft. She took the accident airplane from the other crew and the accident F/O was not there. There were no write ups on the accident airplane. During the handoff they talked about the local weather and the nose wheel shimmy. The handoff crew did not write anything in the logbook nor did they call maintenance. She did not tell the accident F/O about the shimmy because by the time he arrived at the airplane she was caught up in ATC delays and with the passengers, and she had forgotten about it. She did not feel the shimmy on the taxi because they taxied out slowly due to their takeoff time assigned after they pushed off the gate. When the power was advanced on takeoff she noticed the shimmy and that was when she remembered it and it was like the handoff crew had said. She did not tell the F/O about it at that time because they were on the takeoff roll. She did not recall if there was any shimmy after they were off the ground or if the nose wheel hit the snubber. The flight was perfectly normal to cruise altitude and the cruise flight was normal. They had significant weather for the entire approach sequence consisting of mostly a tailwind and lots of rain especially when coming on to the ILS. There were thunderstorms and they received numerous vectors. ATC was vectoring the flight through what they saw as weather on their radar but the jet ahead of them reported no turbulence and the cabin was secured so they continued with the vectors given.

The weather was between them and the airport; it was not at the airport. She thought it went over the airport earlier in the day. She thought the runway was reported as being dry. She did not remember what she put in the OPC, and said she might have entered wet/good because they were coming in through weather, and to err on the side of safety.

They held over Gordonsville (GVE) which was right at the beginning of the RNAV approach into LGA. They only held long enough to go back and forth with dispatch through ACARS about their possible alternate and fuel. The accident crew also discussed what they were comfortable with. At that point they were vectored out of the hold and held for maybe 2 laps. The F/O and dispatch were comfortable with what was discussed.

ATIS was reporting that it was clear at the airport with winds out of the east at 10 or 11 knots, with weather in the area but none at the airport. The flight was vectored around the weather and they were given good vectors that kept them out of the weather. ATC told them to expect the ILS to runway 4 and they were vectored to the Grene intersection on the ILS. She mentioned to the F/O about the distance from Grene to the runway because of the tailwind. The F/O understood and slowed appropriately. She thought the tailwind at its highest was about 30 knots. The F/O was flying on the autopilot and was managing that okay. She saw no problems.

From about 10,000 feet down they were in significant weather. They were on the vector towards the Grene intersection and were in weather. They were hesitant to go in that direction based on what they saw on their radar but they continued because the jet ahead of them did not report anything. They still had a tailwind but the F/O managed it very well. They broke out around 2000' and about the time they were getting passed to Tower.

The airplane was configured for landing, the crew completed the before landing checklist and were passed over to Tower. The airplane was configured with flaps 30 and the landing gear was down. They were on the localizer but she was not sure if they had captured the glideslope yet. Tower cleared the flight to land. She looked out the window and did not think the pitch angle looked good visually. When she looked inside she realized they did not have flaps 40 set which was briefed and what their performance calculations were for. She was not 100% sure but she thought by that time they were on glideslope . It was just a visual look outside and then she came inside to look for something and that was when she noticed they were still at flaps 30. She told the F/O the flaps were only at 30 and that she was going to put the flaps to 40. The F/O confirmed this and she moved the flaps to 40, got the green light and said they were on speed. The F/O confirmed. The flight was on glideslope, localizer and speed at Vref +1 or 2 knots. The speed was set correctly for a flaps 40 landing. It was maybe a couple of knots faster than for flaps 30. The flight was pretty heavy so the approach speed was about 138 knots. She did not remember all of the numbers like Vref as they were calculated earlier in the brief. The speed was right in the parameters. She did not recall at what altitude she set flaps 40 but it was after the flight was cleared to land by Tower and a good time before the 500' call out. She did not remember if they were below 1000', but said the flaps should have been down by then. The flight was on speed, on glidepath and still had a tailwind which she noted to the F/O at the 500' mark. The runway winds were reported as a headwind.

The only advice she gave to the F/O during the approach was they still had a tailwind and the F/O was making the changes. The captain's HUD was down so she had a good look at the wind.

Down to 500', everything looked good. She just felt like they were being pushed down the glideslope. The pitch was probably a couple of degrees nose up, but she did not remember exactly. When they went to flaps 40, the airplane did not balloon or anything like that. She could not remember the pitch after they went to flaps 40. She was looking out visually and not at the flight director. The nose was above the horizon, less than 5 degrees but greater than zero degrees. She loved the HUD and considered herself to be a "HUD cripple".

There was nothing abnormal about the flight from 20,000 feet down to 2,000 feet besides the tailwind and the weather. She made the 500' call out because she was the PM at that time.

PM duties below 2000' included monitoring airspeed, glidepath and localizer, and making a call out if any were outside parameters – airspeed it was +10 or -5 knots, glidepath was a dot above or below or trending tremendously in either direction, and localizer was one dot left or right. The PM would also confirm the airplane was configured correctly.

The before landing checklist was done about the same time they were switched over to the Tower between 1500' and 1000'. The F/O called for the checklist and she performed it. It was a challenge, response, response for all items. The checklist was completed in plenty of time to have it established before continuing on the approach and noticing the flaps. Flaps 30 was the normal flaps setting. After going to flaps 40, the flight was on glideslope and airspeed.

The PM would make altitude callouts at 1000' and 500', as well as 100', 50', 30' and 10' if the airplane did not have auto callouts. It was their first leg in the airplane and she did not remember hearing the auto callouts. There was no way to tell ahead of time if the airplane had the callouts.

The PM would state 1000', and the PF would confirm 1000' and state the airspeed and descent rate. Either pilot could make their respective callout first; it just had to be stated. She did not recall if the 1000' callout was made or if the airspeed and descent rate was stated. She remembered calling 500'. The PM did this callout and there was no required response from the PF. She did mention the tailwind again to the F/O. There was no specific callout required of airspeed or descent rate at 500'.

She was contacted by the attorneys the day after the accident and they asked her to write down notes of what she remembered.

If the flight was outside of the parameters at 500' it was an automatic go around. The accident flight was within the parameters; it was on speed and on glidepath at 500'. She did not recall hearing the auto callouts below 500'. She made the 500' callout and mentioned the tailwind which was a right quarter tailwind. They were right at parameters. The airplane was on glideslope and speed but it felt like they were being pushed towards the runway instead of a nice controlled approach. She remembered verbalizing all of this. When over the threshold, she could visually see they were "groundspeed fast". It was a visual reference she made when she could see the ground. It was very fast and the pitch angle was too low. They were not getting the right sink rate to the ground. It felt like they were being pushed over the ground. She said to the F/O that they needed to get the airplane to come down. The first visual reference she made was when coming over the threshold. She verbalized that they needed to get the plane to come down. At that point she put her hand above his on the throttles but was not touching his hand. There was no standardization for what she did. She just knew that if she had to take control she would be in a position to do it. She was sure it was explained as a technique but not standardized. She had previously made the statement to the F/O that they needed to get the airplane down. She did not get the reaction she needed from the F/O and did not feel that she could articulate what she needed him to do in the time they had. If she tried to articulate that, the airplane would have continued to float and they would have been out of the touchdown zone. She thought she put her hand above his just past the threshold. She thought if she took control that she could land in the touchdown zone. She said she had the aircraft and the F/O acknowledged. She was looking for a nice flat firm landing. She reduced the power. She thought the pitch across the threshold was right at the horizon but did not think it was ever below it. She thought it was closer to zero than 5 degrees nose up. Prior to taking control of the airplane, they were on airspeed. The winds should have shifted at that point. She initially pulled off all power. She was not 100% sure where the pitch was but she knew it was not what it should be for a nice power on flaps 40 landing. She would have expected the pitch to be closer to 5. Most of it was a visual reference for her.

She was increasing back pressure to raise the nose and increasing the throttles. She was bringing a little power back in, but she was not sure how much, when aerodynamically she could not get the nose to come up. That was when it was one "full swoop down to the runway". Everything was going full forward down to the ground; it was a very fluid movement all the way down.

The only impact she remembered was when she could visually see the nose hit the runway. That was the impact that she remembered, when the nose cone hit the runway. The nose descended rapidly. She did not feel the nose wheel hit and had no recollection of which gear hit first. It was a hard hit and they started sliding. She needed to control the airplane with the rudder and brakes. The airplane was going to the right but no more than 10-20 degrees. It was movement in that direction. She remembered grabbing the throttles and putting them to idle. She did not try to use thrust reversers because the airplane was slowing and she was more thinking about controlling the airplane at that point and getting it stopped. It felt like the brakes were working but the rudder was not as much. She did not remember using differential braking to stop the airplane from going right.

The airplane stopped and she remembered being a little dazed. She called the tower and asked for the trucks. She thought the controller acknowledged her. She thought she shut down the engines and then made a PA and asked everyone to remain seated. She asked the F/O if he was okay. She looked out the F/O's window and saw police cars and ambulances coming towards them. The jumpseat pilot had opened the cockpit door and she could see smoke in the cabin. One of the forward FAs said there was smoke and asked if they should evacuate. Between the FA's panicked voice and the smoke, the captain said yes and told her to evacuate off the right hand side. At some point the FA said the PA did not go through which was probably right after they opened the door. After the captain gave the evacuation notice the FA came back and said the rescue workers told her not to open the right forward service door. The captain got on the radio to find out why. She did not hear anything from the rescue workers. The tower reported that passengers were evacuating out the back of the airplane down the slide so the captain told the FA to evacuate. The captain did a rough flow of securing the airplane for a fire. She pulled all of the fire handles including the APU. She flipped a few other switches that she could think of that could cause a fire. She did not use the evacuation checklist and could not give a reason as to why not. The F/O was not participating in shutting down the cockpit. Prior to securing the airplane, the captain had asked the F/O to go outside and help with the passengers. He had previously told her that he was okay.

After securing the airplane and cockpit, the F/O was still there. She asked him again to leave and he did. He was a little dazed. He acknowledged the captain when she asked him to go outside, but it was not until she actually touched him on the second time that he moved. The F/O left the cockpit. The jumpseat pilot was still on board as she was leaving the cockpit and the captain asked him to leave. He wanted to help and was helping the passengers evacuate but she told him to leave. The captain was the last one out of the cockpit. A Port Authority police officer and the captain walked the airplane to make sure everyone had left. The FAs were off the airplane and she thought they might have checked the airplane too, but when she did the walk through, the FAs were already off the airplane. When she and the police officer got to the back of the airplane, there was a fire fighter on board. They walked back to the forward right door and evacuated. The captain was the last off the airplane of all crew and passengers.

The response of first responder personnel was wonderful, they were all there quickly and there were no problems.

After evacuating, the captain joined the F/O who was with the Port Authority police officers. There were 3 buses available for passengers and the FAs were standing with the passengers and a couple of SWA ops personnel. The SWA ops personnel and the captain felt that the FAs should come with the flight crew so an ops person asked the FAs to come with them.

The F/O kept telling the captain that he was fine but he was very quiet compared to how she saw him earlier in the day. He was staring off and she could not see his eyes because he was so tall. The police officers also asked him numerous times if he was okay.

The captain asked the Port Authority personnel about the passengers and they only knew of minor injuries. They made chit chat and asked her if she was ok. At that time she admitted that her back was hurt. Someone got an EMT who did a quick check of her and they decided she should go to the hospital. By then the FAs had come over and were also complaining of injuries. The FAs went to the hospital together in the same ambulance. The captain waited for a second ambulance. The F/O, a Port Authority officer and a SWA ops agent came with her in the ambulance. The captain expressed concern for the F/O to the EMT and ops agent and asked them to watch the F/O. When they go to the hospital, she was admitted, checked out and discharged. The FAs were also admitted and discharged. She asked a nurse about the F/O who told her that the F/O had not been admitted. After she was discharged, she did alcohol and drug testing at the hospital. It was after midnight when they went to the hotel.

She did not think of controlling the airplane after landing with thrust. She remembered having to grab the throttles back. When mentioned that the left engine advanced to 80% after landing, she was not sure why.

Due to the uneven pavement in Nashville, it was hard to determine if the struts were good. The taxi was normal for Nashville.

CRM with the F/O was good. She had no complaints about him and he did not voice any concerns about the airplane.

She had not been a check airman at SWA.

She did not recall if she made the 100, 50, 30, and 10 foot callouts.

There was no rain at landing and the runway was dry.

The HUD would have been set in Primary mode when at a higher altitude and then at lower altitude it would have been set in Instrument mode. She would stop using the HUD as they got lower. She would look through the HUD rather than at the information on the HUD.

She chose to evacuate on the ride side of the airplane so that passengers would have assistance from first responders who were on that side.

She did not remember any aural warnings during the flight.

The accident flight was her 2nd time flying into LGA. The first time was about 6 months prior. They landed on runway 13 and the F/O landed the airplane.

She was concerned about landing on runway 4 because it was a short runway, they had a tailwind, and there was water at the end of the runway.

She did not recall where the airplane touched down on the runway.

When she said she had control of the airplane, the F/O immediately released control. She did not recall the F/O making any callouts after that. She was not sure if the autothrottles were on or off when she took control. There was no distraction by the jumpseat pilot during the flight.

They were given the drug and alcohol test about 2300.

When the captain took over control of the airplane, it was a perfectly stable approach at that point but she knew that the F/O was not recognizing what she was seeing.

When she took control, the nose was very heavy. She did not notice how the trim was set.

By the Ops Manual, changing flaps to 40 under 1000' would have been a required go around.

SWA did not have preferential bidding.

The captain described her activities in the three days prior to the accident. She did not remember specifically but had a typical routine. On Friday, July 19, 2013, she usually woke around 0700-0730. She was at home, had breakfast and coffee, and left about 0900 to work out. She was heading home about 1100. She had lunch and did activities on the computer. She usually ran errands on Friday afternoons and attended to personal matters around 1500. She was back at home early and thought she got in bed about 2000 to read a book and fell asleep about 2230. She usually slept very well.

On Saturday, July 20, she thought she slept until about 0800. She did gardening on her patio and cleaned up. She had breakfast and followed her normal routine. She thought she probably ran errands in the afternoon. If she had an early show the next morning, she liked to be home before 1700 and was usually in bed by 2100 and was asleep near that time.

On Sunday, July 21, she had to drive to Oakland which was about an hour and 20 minute drive from her home on a Sunday morning. She had a 0600 show time so thought her alarm was set for 0315 and she was out the door by 0400 to have a nice leisurely drive. Of all nights, she was most restless when she had to wake early for a flight due to the anticipation of going to work and making sure she awoke in time. She felt fine when she woke up. The duty day was typical and she was at her hotel about 1430. She rested in bed but did not sleep. It was a long day because of the weather in PHX. She worked out, had dinner and read until she went to sleep about 2100.

On Monday, July 22, she left on the 0500 bus to the airport from the hotel so probably set the hotel alarm for 0415. She had slept well and felt fine that morning. She went early to the airport to get breakfast and coffee. In Nashville she was feeling like it was a long day but felt ok to fly.

The trip pairing she was on was not unusual except that she flew with two different first officers.

She was never diagnosed with or concerned about a sleep disorder.

She had not received any commendations for her performance at SWA. She had never been involved in an emergency or abnormal situation.

In the past 12 months, she had not had any major changes in her health, financial situation or personal life (good or bad) that might have affected her performance on the day of the accident.

She thought her health was good. She wore contact lenses and did not have any issues with color vision. Her hearing was good. She drank alcohol socially and thought the last drink she had prior to the accident flight was the Thursday or Friday before the trip. She did not drink during the trip. She did not use tobacco products or use illicit drugs. The only medication she might have taken in the 72 hours prior to the accident flight was ibuprofen.

Workload on the day of the accident was high but manageable.

There were no problems with visibility outside the cockpit or with the instruments.

She liked working for SWA. There were no external pressures from the company to fly or continue a flight if she was not comfortable, either for fatigue or other reasons. There were not external pressures from her personal life impacting her performance.

On the morning of the accident, the F/O was in a good mood. They talked about how he was not with her on the trip the day prior and also introduced themselves to the FAs. There were no changes to his mood throughout the day. The F/O was alert. The accident crew got along well. Her observation of the F/O's interaction with the FAs was very short because he came to the airplane later than she did but what she saw seemed good.

She thought the F/O's proficiency compared to other F/Os was fine and for his time at SWA, he was totally average or above average. His greatest strength as a pilot was that he was very conscientious. She could not think of areas in which he could improve. She never heard anything about him, including complaints, prior to their pairing.

Regarding training for transfer of control during critical phases of flight, it was stated in the FOM about verbalizing transfer of control like I did. As for actual training, they probably discussed it in captain upgrade but she did not remember it being touched on again.

She received CRM training during initial training and captain upgrade training. Overall it was good. It was always included in recurrent training although it was not specific. In the simulator,

CRM would come up in the debrief if it was an issue. She did not recall CRM being discussed with her after simulator training or a line check.

It was her training that helped her recognize why she was uncomfortable with the approach. She flew into a lot of short runways such as at Orange County and Midway airports. The flight was within parameters but it did not feel or look right. During the approach they will often go from a tailwind to a headwind. She thought training might want to discuss when the wind should sheer by during the approach.

She did not think of telling the F/O to go around because they were within all parameters and they were expecting the winds to shift. Her initial thought was if she was getting the reaction she thought she could get from the airplane then she would land. By then the approach went from being stable and good to not and she lost the point at which she could go around.

She would not see flare cues on the HUD when in IMC mode. But when it was a visual flight she did not use the flight path symbol for landing.

She would usually trim nose up when the autopilot was kicked off. She thought when she took over that it was very nose heavy. She thought she just reacted to the airplane rather than adjusting trim.

The accident crew both confirmed flaps 30 for the landing checks. The airspeed set was for flaps 40.

She did not want the airplane to float so when she took over she did not want to make any abrupt pitch inputs. She made an initial pitch just to go level. It was just really hard and she did not think it made it all the way up to level.

She was asked about her plan during the approach if the F/O did not do what she expected him to do. Prior to 500' she was expecting the wind to shift. After 500', she was thinking if they were still stabilized, she would try to land the airplane. She knew they were going to have a tailwind landing which was different than what they had planned for. Because she could not communicate that well enough, she did not know if the F/O was seeing that or not. Based on his inputs, for example to power and pitch, she felt that he did not notice it was going to be a tailwind landing. They had a right quarter tailwind of 13-15 knots on the HUD. She knew the tailwind component was "ten-ish" but did not calculate it. SWA maximum tailwind landing was 10 knots. She did not recall taking control from another pilot before. She thought a captain had taken the airplane from her as a first officer but did not remember specifics.

Pilots probably only did a few go arounds a year. She performed a go around the day before the accident flight when flying into PHX because of weather. It was an F/O go around and was the reason they were delayed coming into PHX. They landed on the second attempt. She did not remember the winds for that flight.

She had an eye exam every year in November and had not had a change to her prescription recently.

Whether the FA did not hear the PA or it was not working, the captain did not know. She thought she asked the FA if she had heard her PA and the FA said no. The captain did not use the PA again.

She did not touch the yoke or throttles until she said she had the aircraft.

The F/O's automation proficiency was fine for what she had noticed that far. She did not notice any problems. The F/O was recognizing when talking about the tailwind earlier in the flight and reducing the speed. All of that was fine. She did not remember him not going off LNAV or VNAV to accomplish any of that.

She did not put in descent forecast winds in the FMC. She did not know if the F/O did.

She did not use the HUD for a visual round out.

The call for flaps 40 was made with plenty of time before the 500' callout. By the book, it would have been a go around.

She could perform a go around until about 50' but maybe even lower. She was thinking about it when she could not get the nose up.

She did not remember seeing the PAPI on the approach.

They were being vectored to the Grene intersection and she wanted the F/O to recognize that they had a substantial tailwind for energy management. The Grene intersection was only 11 miles from the airport. They were not given any specific altitude crossing so he was just slowing down. He was reducing the power to slow down. She wanted the F/O to recognize it so he could plan ahead. They were still about 50+ miles out. He acknowledged it and was right on top of it after that. It was what she was thinking about and if she was the PF it would be what she was thinking about. She wanted to make sure he was thinking about that also.

Consideration for use of flaps 40 was because of water at the end of the runway and length of the runway. She did not recall running the numbers for a flaps 30 landing and said the OPC came up with some brackets for a flaps 40 landing.

The airplane was not fast, but the groundspeed was fast.

She was not on reserve a lot and had been flying consistently about 700 hours per year for the last 10 years.

She did not recall what winds were reported by Tower, only what ATIS said.

She could not find the handset to make the PA after landing so she used her headset.

She was talking to the forward FA. After the cockpit door was opened, the FA said the PA did not come through. The FA said there was smoke in the cabin and asked if she should evacuate. The captain said yes. She did not recall telling the FA no as stated in the FA's statement. The captain thought she possibly told the FA to "go".

She thought she told the F/O that they needed to get the airplane to get down. That was all she remembered saying below 500'.

SWA had avoidance bidding. As a captain she could not do that but a F/O could. She had done it as an F/O. People had done it with her as a captain. She did not know who or how many had done so but thought it was usually for a personality conflict.

She could not think of anything additional to add to the interview to help the investigation.

The interview ended at 1800.

Name: **First Officer Andrew W. Mann – Accident First Officer**
Date: **July 30, 2013**
Time: **0910 CDT**
Location: **SWA Headquarters, Dallas, TX**
Present: **David Tew, NTSB; Katherine Wilson, NTSB; Mikal Campanello, FAA; Wiley Moore, Boeing; Colin Fite, SWA; Guy Woolman, SWAPA**

Represented by: Anthony Battista (Condon & Forsyth LLP)

The accident first officer stated the following during a post-accident interview:

His date of hire was January 4, 2012. Prior to joining SWA, he was in the USAF for 22 years. He began flying the F-15C in Okinawa, Japan, flew the F-117 for 3.5 years at Holloman AFB in New Mexico, the F-15C for 2-2.5 years in Langley, Virginia, was a part of the school staff and an instructor pilot on the T-38 for 4 months at Columbus AFB, taught IFF (intro to fighter fundamentals) on the T-38 for 3 years, flew the T-38 about 1.5 years at Holloman AFB, and was the program manager providing red air adversary support for the F-22. He was commissioned in June 1990 and retired on January 1, 2012. He attended the Air Force Academy from June 1986 until June 1990 and participated in the T-41 program and flew about 25-35 hours.

He did not take any medications and was not on any medications during the accident flight. There were no restrictions on his FAA medical. He had not had any previous accidents, incidents or violations. He had not had any failures in training, either civilian or military, and no failures on proficiency checks.

His total flight time was about 5200 hours, 4000 hours of which was from the Air Force and 1200 at SWA. About 3800 hours were as PIC. He had not received any PIC time at SWA. He received his B737 type rating from Higher Power in Fort Worth, Texas.

He was not sick on the day of the accident and felt fine that day.

The original scheduled take off time from BNA was 1355 local time.

He met the accident captain for the first time at the gate in Nashville at their report time. He had never flown with her before.

They were paired for 3 days and he had previously flown a 2 day pairing just prior to the accident pairing. During the previous pairing, the captain he flew with asked what he was doing next. He said he had a 3 day pairing with the accident captain. The captain he was paired with at the time said "Oh Boy". The accident first officer did not ask any questions about the "Oh Boy" and said he did not want to know. He tried not to ask.

He had flown into LGA before. Since the first part of the year, he had probably flown into LGA 3-4 times.

Before departure from BNA, the captain told him to go off and get some lunch. He did not remember seeing the inbound crew. He assumed the accident captain was going to pick up the airplane from the previous crew. He ate out of his food bag. He went back down to the terminal area and sat by the gate and ate and relaxed because they had plenty of ground time. He did not talk to the crew that brought in the accident airplane.

On the flight from LAX to BNA, the accident captain was the PF. He was PM. For the most part, the flight to BNA went well and was uneventful. They had great conversation when at altitude. He was asked if he understood what was meant by "Oh-Boy" and he replied yes and no. He started to get a small inkling feeling that the accident captain was very proactive with "switch-ology". She liked to be one that set everything up. That did not bother him when they were up at altitude. He would run the radios and lower the landing gear. It was just a general feeling. It was not micromanage but just a feeling that she liked to do it her way and that was her style. The accident first officer could not give any specifics at that point.

Asked if the accident captain was different from other captains he flew with, he said it depends. He could not give 1 or 2 examples. It was just a feeling he got. She was doing stuff and wanting to do it on her own; she had a way she liked to do it. It was stuff he would normally do as a PM. He tried to conform with what the captains' style was.

He had never heard anything about the accident captain from other pilots other than when the previous captain said "Oh Boy".

There was nothing out of the ordinary on the flight to Nashville. Her approach and landing were within standards.

He said he did not know if the accident captain met the inbound crew. She did not mention anything that the inbound crew might have said.

They had an 1.5 hour scheduled delay then an extra hour was added. When it was 30 minutes from push time, he went to the airplane, stowed his gear and performed a normal preflight flow in the cockpit. He then performed a full walk around preflight. A preflight was required when there was a change of crew on an airplane. He checked the wheel wells and saw the struts had standard distance and were okay. He said the tires were slightly worn but nothing out of the ordinary.

He was asked what were the duties of PM from 10,000 feet down. He replied the 10,000 foot call was done normally by the captain and the captain would ring the bell for the FAs. The PM would monitor radios and make sure the FAs got their announcement out and would make sure all were seated and they were ready to land. The captain would confirm with the F/O that the FAs got the call. The PM would back the PF up with radio calls, making sure they were on proper headings, altitudes, and airspeeds (250 knots below 10,000'). The PM was kind of a back up. If the PF asked, the PM would set altitudes and airspeeds for him, or pull up the final approach fix and extend the centerline as they were getting vectors. If the PF had situational awareness to do it on his own, that was fine too. The PM would extend the flaps as the PF called for them, lower the gear, and acted as a second pair of eyes. Checklists were called for by the PF

and the PM would run them, including the Before Landing checklist. The 1,000 foot callout can be initiated by either pilot. 9 out of 10 times, the PM would make the 500 foot callout when they were performing an ILS approach. Depending on which airplane they were flying and what type of approach they were on, sometimes they would get automated aural altitude call outs from the airplane. If the PM did not hear automated aural callouts, he would make the callouts of 100 feet, 50 feet, 30 feet and 10 feet, the same as the airplane would. He did not recall hearing the automated aural callouts going into BNA. He said he heard the automated 100 foot callout going into LGA. He said he was "almost positive" he heard the automated 50 foot callout going into LGA but did not remember the other calls.

The PM would call airspeed and sink rate at 1000 feet. This callout was to make sure they had a stabilized approach. Sink rate should be 1000 feet per minute (fpm) or less. By the book, they should go around at 1000 feet if sink rate was greater than 1000 fpm.

He said his sink rate going into LGA was about 800 fpm and was not greater than 1000 fpm.

From 1,000 feet to 500 feet, the PM would back up the PF with monitoring airspeed, glideslope, and localizer.

The airspeed target was normally V_{ref} + 5 knots for the final approach, but could be higher depending on the winds. At a minimum, they added 5 knots to V_{ref}. The speed depended on the numbers they got from the OPC.

He was asked about the PM duties at 500 feet. He replied, at 500 feet, the PM would make a 500 foot callout and was looking at the VASI and the glide slope if they were backing a visual approach up with ILS. The PM would give callouts like deviations . Callouts could be like "slightly high" or "slightly low" for example. Whatever it took to get the PF to recognize the deviation and make a correction. The PM would expect an acknowledgment and correction by the PF. He was not sure if an exact word must be said.

Below 500', the PM would monitor closely because they were getting into a more critical area. He said his tolerances for deviations started to narrow. He would call out corrections if required. If he was uncomfortable, he would say go around. He did not recall the tolerances for airspeed, but he did not want to be slow and did not want to be below V_{ref}. As he saw airspeed trending down, he would call out airspeed getting low. If he did not hear or see a response fairly quickly, he would determine if they needed to go around. They would go around, talk about it, and get set back up for another approach. He did not recall tolerances from the AOM. For glideslope, tolerance was a dot low or high. He was "pretty sure' that was what the book said for tolerances. If he called out a deviation and did not see or hear positive acknowledgement and correction made, he might say it twice but if not, he would say go around. For localizer, as a guideline a dot left or right was the tolerance and he would say something. If there was deviation, he would say to himself, "can they land safely" and if not, he would say go around. That was a "subjective assessment." He would be looking for verbal acknowledgment and positive correction.

He had never said go around on an approach.

98% of the time they were performing a visual approach with ILS back up. Very rarely did they perform instrument approaches. Most pilots stayed coupled to the ILS to 500 feet and then kicked off the autopilot and autothrottles and hand flew the airplane. He said he had not seen the deviations because, at 500 feet, it was tough to get a deviation from altitude, airspeed, or localizer.

Going into LGA, he turned the autopilot off right around the 500 foot call.

The PM would make 100, 50, 30, 10 feet callouts if the automated system was not doing it.

After landing, the PM would determine that the speedbrake had extended and thrust reversers (TRs) were deployed. The callout of "extended – deployed" was made. If they used auto brakes, the PM would call "auto brakes disarmed". He would callout "60 knots" which was when TRs were typically stowed.

They used autobrakes 3 going into LGA. From the approach briefing, he could tell the captain was concerned about landing distance at LGA. When they were talking about the approach and looking at the runway, it was being called wet. When they put the numbers into the OPC, auto brakes 2 was bracketed so they could not use that setting, and the captain was concerned about being high. He had a feeling she wanted a flaps 40 landing and she was concerned about length of runway and being high and did not want to get into the realm of stopping the airplane close to the end of the runway.

If an autobrakes setting was bracketed in the OPC after entering the numbers, they could not use that setting. So they chose autobrakes 3 for the accident landing.

The accident captain made the decision to use 40 flaps. The accident first officer had a "feeling" the captain was concerned about landing distance, runway being wet, and not being high. He could see it elevated her concern about the landing. 98% of the time they used flaps 30. There were 4-5 runways he had flown into where it was standard to use flaps 40. He had landed with flaps 40 between 30-50 times in 1.5 years. He said you had to be on your game with a flaps 40 landing. The B737characteristics in a 40 flap approach were you had more lift and flew slower, but also had more drag which required a higher power setting. He needed to keep better check of airspeed because it was easier to bleed off airspeed. In the landing phase, he characterized it as a power on landing. He said you did not reduce power until established in flare and main gear above runway - maybe 3-4 feet above the runway.

His briefing for the landing was as follows: they checked weather and planned a visual approach to runway 4 backed up with ILS. The captain checked the runway status. The captain did the OPC using a wet runway and showed him the numbers. She then said "why don't they do a forty flap landing". He said that was fine, ok great. The captain said when they go in there they cannot be high. She gave him the feeling of don't land long and don't be high. On the previous flight she said she had been with SWA for about 13 years so he assumed she had been into LGA but did not know for sure. He thought she might not have been into LGA in a long time.

He confirmed the star route into the terminal area. They did not brief the full ILS because it would be a visual approach. They briefed the arrival and approach to include inbound frequency, course, PAPI, and touchdown zone elevation, as well as the expected taxi route to get to the parking gate. He thought the captain may not have been into LGA for a long time but was not sure. He had been there and knew it was a little tricky because they had to simultaneously monitor ground control and tower to get to the gate.

After the approach briefing, they could hear NY Center talking about traffic and weather going into LGA. They initially gave them holding that they had to go to. He did not remember the exact point but they were going to have to hold. The expected clearance time was about 40 minutes. He had only held once and maybe diverted 1 time. As PF, he was interested in making sure they had fuel to hold. They were holding pretty far from LGA and he wondered how much fuel they needed to shoot an approach and then divert. He mostly flew out west and skies were beautiful. They told dispatch they were going to have to hold.

They programmed the hold in the computer. They entered the holding pattern and got a call relatively soon that they would not have to hold for the full 45 minutes. He recalled they did 1 lap and started a 2nd lap in the holding pattern and then proceeded on course. After they exited holding they thought that getting into LGA was going to be tricky due to traffic and weather and that was confirmed by airplanes in front of them talking to NY center. The weather they were seeing visually and on the weather radar and information they were picking up on the radio indicated there were a couple of big cells between them and LGA. They worked to develop a game plan based on what other airplanes were doing, vectors that center was giving and best path with least turbulence based on radar.

There was a path through the cells that other airplanes were taking. They felt pretty comfortable going through those two areas.

Somewhere between 5-10 miles out, probably closer to 5 miles, they had LGA and the runway in sight.

They did the descent check approaching 10,000 feet and slowed to 250 knots. His plan was to keep airspeed on the higher side to help sequence them in with the traffic. He was not going to slow to close to approach speed until he was close to the airport or ATC gave him a directive to slow the airplane.

They were handed off to approach control. He did not remember if they were cleared for the ILS or given approval for the visual but they knew it would end up in a visual approach.

They started the standard flow. He could not give the exact time and distance where they did this on the approach. He would talk through how he configured the airplane as they got ready to approach the terminal area. He called for flaps 5. He started slowing the airplane due to the captain's concerns about LGA. As they got into the terminal area, there were 2 distinct areas that stood out in his mind that led him to believe she was very proactive that she wanted to spin dials. As he was slowing from 250 knots to approach speeds, she was the one spinning the MCP dials without him asking her to set his speeds. As he was about to call for a speed, she would go

ahead and dial it in. It was the standard speeds as they lowered flaps. This was not normal; especially in the terminal area, this was nonstandard. He thought she just did it, and he did not remember her stating she was doing it. He was like "I did not call for that but ok."

One other instance occurred as they got coupled up to the ILS with localizer and glide path; he confirmed it, and their procedures were to set zeros in the altitude window in the MCP as the airplane went down glide path. With his pacing, it bothered him because she did it as he was about to call for it. They will set 3-4 airspeeds as they slowed the airplane down. He did not know if it was all of the speeds or if he called for one of the speeds, but she did it. He could either set speeds or as PF ask the PM to do it. She just did it. He had rarely seen another captain do this. Most of the time a captain would say hey I'm going to do it for you and he would say ok. Zeros were rolled by the captain before anything was said; she might have said something after but not before.

He was asked if anything else jumped out regarding CRM. As a F/O, all captains had their style, and he would gladly mold some to fit their style. If something was way "out of whack" they would talk about it. Nothing out was "out of whack" yet on the accident flight. Good CRM depended on phase of flight. At altitude during the approach briefing, her CRM was excellent. The feeling he got was that her style was she liked to be in charge. During the descent profile, there was a way she liked to do it. He was positive that one time she was directing/coaching him on how to do his descent. He got a feeling she was the one who wanted to be flying the airplane.

Nothing stood out in his mind about the pacing of getting the airplane configured. As they hit the final approach fix, they had gear down, flaps 30 and speed brakes armed. The next point was the 1000 foot call. The autopilot was still coupled up so his hands were lightly on the controls but he was letting the computer fly the airplane. As they approached the 1,000 foot mark, they had not set flaps to 40 yet. The captain called out flaps 40 and reached over and set the flaps to 40. He said oh thank you because they had forgotten they had planned for 40 flaps. He did not know which side of the 1,000 foot call the flaps were set. It could have been prior to or after but it was close to the 1,000 foot call. They made the 1,000 foot call and he thought he said sink rate was 7-800 fpm. By the book, they should have been fully configured by 1,000 feet. At that point he was working pretty hard. Part of the problem stemmed from the initial approach briefing. The captain set the flaps and he was perfectly fine with that. On a 5-6000' runway, he was okay with a flaps 40 landing. Nothing stuck out in his mind that they had to do flaps 40. He believed this factored in out of habit. He did not catch the flaps having to be 40 since there had been about a 1 hour delay from briefing the approach to when they actually flew it.

He knew he had to get in the game here with airspeed, altitude, etc. now that it was a flaps 40 landing. The autopilot was coupled up and they were flying to the 500' mark. When he got the runway in sight, he was thinking aim point and airspeed. He checked the winds and remembered there was a slight crosswind on the tail. He thought the tailwind was at about 11 knots. He knew he would have to put in some crosswind controls. At 500 feet, he kicked off the autopilot and autothrottles and took over manually for the approach. He put the wing low on right side and put in a little bit of left rudder. He was starting to crosscheck and picking up visual cues with the cockpit. His crosscheck was the runway, 2 red and 2 white PAPI lights, and airspeed. He felt comfortable with airspeed and with crosswind corrections. He used the PAPI as the

primary reference and every 3-4 crosschecks, he would check glideslope to tell him if he was getting high or whatever. He knew with a flaps 40 landing, he had to use some more power. The airspeed was bouncing between V_{ref} and V_{target} and favored V_{target} range. He thought there was 8 knots of correction between the two. He did not recall if airspeed got to V_{ref}, maybe it did momentarily.

As they started to enter the runway overrun he felt comfortable with the approach. The hairs on his neck were not standing up. Out of the corner of his eye, the captain appeared a little uncomfortable and was sitting up in her chair and doing a little twisting and turning in the chair. Below 500 feet, he was concentrating 99% on being lined up with the runway and that the airspeed was good. He was concentrating on landing the airplane. As they crossed over the runway overrun, he took a look at the PAPIs. He knew he saw 3 white lights and 1 red light. That was his last check of the PAPIs. So he was slightly high and needed small minor adjustments to land the airplane in the standard touchdown zone. From there, he was keeping his process going of where the runway was and what was his airspeed. He felt her hand go on top of his hand on the thrust levers. No other captain had put their hand on top of his. He had seen a captain put their hand behind the throttles to guard throttles but not on top of his hand. He looked and saw she was pulling the thrust levers to idle. There was a large power reduction by the captain and it felt like she went back to idle. He was asked if she said anything before, during or after she reduced power and he replied that he did not recall anything being said. He had never had a captain pull back throttles on him on an approach. He had never seen that in training either. When she reduced the power, they were just over the runway overrun with the PAPI indicating 3 white lights and 1 red light which required a minor correction and her hand on his. The altitude was in the 25-30 foot range. He heard an auto call out of 50 feet. He did not recall a 30 foot auto call. The airplane was calling out altitudes so she was not required to call them out.

The accident first officer did not recall the captain saying anything/doing coaching/saying or putting in corrections during the approach. She would have been required to make callouts of speed, glideslope and localizer as PM.

The accident first officer said he was shocked when the captain reduced the power. He knew he had to keep flying the airplane and looked out front to see what he needed to do for the landing. Momentarily but almost instantaneously after her pulling back the throttles, he heard "I have the aircraft" from her. That was what she was supposed to say when she wanted control of the airplane. He had to immediately release all power and flight control surfaces. That was what he did. And he would back it up with a verbal "you have it". The correct statement to make was "roger you have the aircraft/airplane." After he released control, he immediately tried to come in the cockpit and check the altimeter and airspeed to increase his situational awareness (SA) of what happened to the approach, why did she take it, what was wrong and how do they get the airplane safely on the ground. He was unable to complete that "sample". He was instantly drawn out the front of the airplane with ground rush of rapidly approaching runway. All he could think was brace for impact. There was no time to say anything.

They were well established into the sink rate. If he had time he would have said power, power, power.

Nothing seemed out of ordinary in the cockpit. He did not think he had time to make a pitch control adjustment to the PAPI indications before she reduced the throttles.

The airplane was trimmed up on his approach, he was working the PAPIs, watching his airspeed, and descending. In his last sample he was trimmed up, he did not remember doing anything with the control stick prior to her taking control of the airplane.

He was not sure of the normal pitch but the flight was on a 3 degree glidepath. He did not tune in on the "whiskey line." He relied on the aim point, airspeed, PAPI or ILS. He did not think it would be normal to have a negative pitch, but only if they were excessively high and were trying to correct.

After the captain took control of the airplane, he tried to do a sample but was instantaneously drawn outside, so he did not notice any pitch or power control inputs made.

The airplane landed firmly; he would characterize it as hard. He felt like they landed nose first. He did not remember if they bounced and hit twice. The airplane started to slide down the runway, skidding. He felt like they lost the nose gear. They veered off slightly to the right before coming to a stop.

The airplane came to a stop. They started the evacuation of passengers. He was in shock so he only recalled pieces. They had a jumpseater who was an AA 757/767 F/O. He was in the way of us getting out of the airplane. He remembered first responders coming very soon after they came to a stop. There was smoke in cockpit; some, not dense. It was not like something was burning. The jumpseater started to get unstrapped. The accident first officer opened up his cockpit window to clear the light smoke. He distinctly remembered a first responder pointing a fire hose at him so he closed the window. The jumpseater had the belt and jumpseat stowed. It was not an easy process in the B737. He remembered the captain grabbing him and telling him to help passengers evacuate.

The jumpseater went down the slide and the accident first officer was not far behind him. The accident first officer helped the passengers as they were coming down the slide. He was not sure what the door was called but it was the front right door.

He was met there by first responders, port authority and police officers asking him how he was doing, if he needed medical assistance, did he want to call his wife, etc. He stood between the buses, the captain came and an ambulance came. The FAs came over. The EMTs were trying to assess how the crew was doing.

He said he was fine and was not hurt; he felt alright. The accident captain hurt her back and 1 or 2 of the FAs were hurt too. They got an ambulance for the captain, put her on a stretcher and loaded her in the ambulance. He remembered meeting the LGA SWA station manager and assistant station manager. He went with the captain, and the assistant station manager, to the hospital.

He was asked if he wanted to be checked out; he said he was fine. He knew the process that was about to start. He was given a room/back office and offered water. Very shortly after, a captain came who was supposed to take the airplane from us. He said he was the on-scene SWAPA rep. Then a SWAPA lawyer showed up and they waited. He called his wife to let her know he was okay. He was in shock and was in the mode of "tell me where to go and what to do." He let the lawyer run the show from there. He used the bathroom after the Port Authority made sure it was okay for him to do so. He came back into the office and drank water until people came to do a breathalyzer and urine test.

The chief pilot from Baltimore showed up. He met him and waited there until taken by car to a hotel. The accident crew rode in a car together to the hotel. He grabbed a bite to eat and went to bed.

He was not sure if the captain used the thrust reverser after landing. He was looking out to see where the airplane was going and what it was going to do, like roll. He did not remember if either engine increased power after the captain idled on short final. After the captain took control, he did not recall any inputs and was pretty sure it stayed that way until they stopped.

The gear struts felt okay on taxi out. There was no shimmy on the nose wheel during taxi. There was nothing out of the ordinary on takeoff out of BNA.

The taxi, takeoff and cruise parts of the flight out of Nashville were normal. He did not look at the maintenance log book in Nashville and did not see any MEL stickers in the airplane. The captain would have looked at the maintenance log book.

The crew was initially told that they would have to hold for 45 minutes when approaching LGA. While holding he wanted to take the time and have a definitive decision as to when and where they were going to divert. He asked the captain a lot of questions about it. When they came out of the hold early, he felt more comfortable with the approach and more comfortable if they had to do a go around.

He did not think his speed got above 250 knots when below 10,000' and if it did, it was only momentarily.

When in the terminal area, the PF would ask the PM to set the speeds for him and he would visually confirm them. He did not remember if he made a verbal confirmation after the captain set the speeds without him asking. If she had not have set the speeds without being asked, he would have asked her to do so and she would have verbalized what she was doing.

He did not have any concerns about landing on runway 4 at LGA. He had flown into LGA before. He recalled a 4 day trip around March 2013 in which it was an odd pairing because the crew overnighted in Milwaukee and flew between there and LGA. They almost always landed on runway 31. On another trip, the crew did a visual to runway 22 and it was the first time that he or that captain had done that approach. There was some coaching going on with both pilots due to the stadium visual approach.

The accident captain made the required callouts during the accident flight.

The standard touchdown zone was the first 1500 feet of the runway.

Some airplanes had automated callouts and some did not. He would wait until they were at 99 feet and if there was no automated callout he would make it. Whether there were automated callouts depended on the type of approach programmed.

After disconnecting the autopilot, the force required on the control column was normal. He cross checked the crosswind component and was cross controlling the airplane. He used normal trim.

When the captain said it was her airplane, he was taught in the military to put his hands in the air and that was what he did. He did not have his hands on the controls after that.

He did not make any callouts after landing regarding the thrust reversers deploying. As PM, as soon as the airplane lands he would make sure the speedbrakes and thrust reversers deployed. For the speedbrakes he would make sure the handle went back. The thrust reversers would get 2 green lights and he would call deployed. He did not make any callouts after landing.

He did not recall where the airplane touched down on the runway.

There was no distraction from the cockpit jumpseat pilot.

After landing, as the airplane was sliding, his concern was where were they going and what were they going to hit. He was in shock. He assumed the captain shut the airplane down. He was trying to assess if the airplane was on fire and what was going on. He thought they needed to get out of the airplane. He did not think about using a checklist. He did not know what actions the captain took but he knew the engines were shut down. He did not have any interaction with the FAs. He remembered the captain talking to them as the jumpseat pilot was trying to get out. The captain was discussing with the FAs about what side to go out.

The drug and alcohol screening occurred about 2300.

The F/O described his activities in the 3 days prior to the accident. On Friday, July 19, 2013, he had a PM (afternoon) pairing with another captain. He travelled to Oakland on Thursday, July 18, and took the Bart to the hotel. He thought they arrived about 2100 local time and stayed at the Red Lion hotel on Thursday night. He thought he awoke on Friday about 0700, went to the gym, had breakfast and had a check in time of 1200-1300. He did not take a nap and felt ok. He did not remember the legs flow but it was an easy 2 day trip. He arrived in Minneapolis that evening and did not recall getting in late. He thought they arrived near the scheduled time. He went to the hotel but did not go out to eat because it was late. He ate out of his food bag and went to bed between 2300 and 0000. He had no problems sleeping.

On Saturday, July 20, he did not have to report until 1530. He got up in the morning he thought between 0800 and 0900. It was not far from where he lived. He went to the gym, had breakfast and went shopping around 1000 for about 2 hours. He wanted to be back to his hotel before

1300 to prepare for work. He hung out in his room, got ready and met the captain in the lobby. They reported at 1530 and were scheduled to deadhead to Midway airport. There the airplane was late and they pushed about an hour late. They flew from Midway to Oakland. It was an uneventful flight. He knew he was close to his time for required rest. As soon as they landed in Oakland and got the airplane taken care of, he checked his schedule to see if anything had changed. It had and he was scheduled to deadhead the next day from Oakland to LAX. He was scheduled to report at 1130 and departed at 1200 or 1300 local time. He stayed at the Red Lion hotel, arriving there about 2200 and was asleep between 2300 and 0000. He had no problems sleeping.

On Sunday, July 21, he slept in until about 0800-0900. He had breakfast and waited to work out until the evening when the hotel would have a nicer gym. He reported at the scheduled time. They were a little delayed from Oakland to LAX and got in a tad bit late. He was awake throughout the flight. He walked to the hotel and took about an hour nap around 1500 or 1600. He went to the gym about 2000, ate dinner out of his food bag, and cooled down. He called his wife about 2200 and they talked for about an hour, until 2245 or so. He showered and got ready for bed and was asleep between 2300 and 2330. He had no problems sleeping.

On Monday, July 22, he awoke about 0500, walked to the airport around 0525 and arrived by 0540. He went through security and was at the gate by the report time of 0545. There was nothing of concern to him. He felt well rested. The first flight was from LAX to BNA. The scheduled departure was 0615 local time. The flight was blocked at 4:10 and they arrived a little early. From the time they pushed it was about 3:40-3:50 flight time. They arrived about noon in BNA and were scheduled on the ground for 1.5 hours. Early on they had an extra hour delay he thought due to weather or traffic delay going into LGA.

When not working and at home, he usually went to bed about 2245. He averaged 6-7 hours per night. During the school year he would wake about 0600 and after the school year he would wake around 0700. He would wake up feeling rested.

The most recent trip pairings were a little unusual in that they cannot normally bump 2 trips together but it worked out that he was being assigned a light 2 day trip.

He lived in Minnesota and would commute to his base in Oakland the day prior to a trip. He would stay at a hotel which he paid for.

His food bag typically had sandwiches, yogurt, fresh fruit and "grandma's banana bread."

He had not been diagnosed with a sleep disorder. His wife did not tell him he snored or kicked at night while sleeping.

He did three combat tours and received multiple air medals and multiple meritorious service medals. He received one "atta boy" at SWA the previous fall for helping a passenger get on and off the airplane.

He had experienced minor emergencies in the airplane and they both occurred at altitude.

In the past 12 months, he had not had any changes in his health, financial situation, or personal life (good or bad) that might have impacted his performance on the day of the accident.

He rated his health as excellent. He did not have any vision problems. He had standard minor degradation of his hearing from flying airplanes but did not require a hearing aid.

He did not take any prescription medications.

He thought he last had an alcoholic beverage 10 or so days prior to the accident flight. He did not use tobacco products or use illicit drugs. In the 72 hours before the accident, he did not take any prescription or over the counter medications that might have affected his performance.

The workload on the day of the accident was "nothing out of the ordinary." They had a 4 hour flight from LAX to Nashville. There was a pretty good amount of down time in Nashville and by the time they left LAX until they were taxiing out at Nashville, it was about 6-7 hours of work. The work was not strenuous but it was work. The takeoff out of Nashville and up until the approach briefing was nothing out of the ordinary. It was not a handful but they had to spend some "brain bites" and were working pretty hard. That was taxing. As they came out of the hold, they thought about what do with the weather, and it was a pretty good workload on them.

He loved working for SWA. There were no external pressures from the company to continue a flight. If a pilot was fatigued or was not 100%, there was no problem to cancel a flight. There was zero retribution if a pilot was not fit to fly. There was no retribution if they were to go around. There were no pressures from his personal life; it was just the normal "day to day" things.

The captain was friendly, jovial and professional on the day of the accident. She was alert and proactive about taking care of the flight attendants.

The captain's greatest strength was that she was very good about making sure the passengers and flight attendants were being taken care of. An area where he thought she could improve was related to what he had discussed before.

SWA did not have preferential bidding but pilots would bid the lines. There was avoidance bidding and first officers could list up to 3 captains they did not want to be paired with. He did not know how the process worked as he had never used it.

SWA had a robust CRM training policy and procedures and how they interact as a crew. He remembered spending almost an entire day on it during initial training. The crew consisted of the captain and FAs. Training discussed how to interact especially as a new pilot to SWA. They emphasize that as an F/O he was vital and an important member to the crew. If the F/O did not see something he liked, he had the authority to speak up and say go around. CRM was an important topic and was also a block in recurrent training. He did not remember specifically being observed for CRM in the simulator and there would be no comment if CRM was good.

Transfer of control at a critical point was not something they got training on. He did not think they needed training on it as they had procedures to take care of that. It might need to be looked at.

He had no concern about the landing. He knew the correction he needed to make and felt that he could do that. Either pilot could call for a go around and he could have called for it if he felt he could not correct the approach.

His Air Force flight time did not include taxi time; it was just from takeoff to landing. For the conversion, he would add 0.2 hours to his sortie time to account for shutting the door and taxiing.

There was no impact up at altitude with the captain doing stuff in the FMC and he knew what was going on. He felt that there was good CRM up until in the terminal area.

He was involved in a go around in a Part 121 operation during IOE; it was his first day in the airplane coming in to Dallas Love Field and the captain did the go around. He had never been instructed to do a go around.

SWA had an automation policy. If there was a question, he would look in the manual. Flying was style oriented. As a F/O he tried to determine captain style in the first leg or 2. The SWA automation policy was that the PF had control of the MCP. It was up to the PF to ask the PM to make changes to the MCP or make them himself if not in high intensive area. The PF did everything but the radios. When guys were flying the airplane, they were flying the airplane. When flying airplane, you were not touching the dial. PM would be doing that.

Above V_{target}+5, he would feel uncomfortable on the approach. He would be not as confrontational as the book unless they were under 500 feet; otherwise he would be more coaching.

He thought he disconnected the autopilot around 500 feet.

He thought they were around 1000 feet when flaps were set to 40. His impression was that as they were going down, she says" oh they need flaps 40". He was concentrating on the approach. He thought they were a little lower than 1000 feet. He did not know if they met the stabilized approach criteria.

When they went to flaps 40, he thought they were going to have to add a bit more power and the nose should pitch up some. If not careful, the airplane would start to climb.

When coming over the threshold, all PAPI lights would go white. That was one piece of puzzle they would think about. They also had altitude call outs. He was preprogrammed to know what he needed to do; on the accident flight he did not know what he needed to do yet. He did not feel high at the threshold, but the first piece of the puzzle told him 3 white. He did not feel high over the threshold and thought he was going to make a normal landing.

He was expecting the airplane to pitch up ever so slightly when they went to flaps 40.

The autothrottles were turned on as they took the active runway in BNA and were turned off at 500' when the autopilot was disconnected going into LGA. The autothrottles made the necessary correction when they went to flaps 40.

He did not notice the jumpseat pilot on the approach. The jumpseat pilot was on the headset listening but the accident first officer did not remember him saying anything.

He did not remember any call outs being made by the captain about deviations. He did not remember any coaching or call outs made. Her taking over control surprised him. It would not have surprised him if she had told him to go around.

He was not on reserve prior to his trip pairing.

When asked if he started the approach "in the green" per the Risk and Resource Management chart, he said yes, it started in the green. He thought it was looking fine. The flight momentarily went into the yellow around 1000' when they went to flaps 40, but very quickly came back into the green. They caught it and it was not perfect. The autopilot kept them going down. Everything was okay especially from 500 feet down.

SWA's automation policy used: verbalize, verify, and monitor. That was the policy no matter who was flying the airplane.

The airplane came to a stop and very quickly the cockpit door opened up. There was light smoke in the cockpit. He was not sure if it was getting worse. He thought about whether they would have to go out the window. He opened his window and looked outside. Then he saw the fire fighter's cannon pointing at his window so he shut it.

He felt that the jumpseat was stowed and had no problem egressing from the cockpit.

His experience with airplanes on most approaches was that the airplane trimmed a little nose light and he would have to do a few trims forward to keep the airplane coming down.

He did not make a PA announcement to evacuate. When the cockpit door opened, the captain was talking to the FA. It was obvious that they needed to get out. Smoke was in the airplane. It was readily apparent that they needed to get out of the airplane.

The evacuation checklist was on the control wheel but it was not authorized because it was a little different than what was in the QRH. What was on the control wheel was mostly right.

He did not remember if the captain was working the dials when she was hand flying on the previous flight.

He did not hear the FA say they had smoke in cabin or ask if they could evacuate and the captain saying no to evacuation.

He did not remember the captain saying “get it down” during the final approach.

The interview ended at 1445.

Name: **Keith Wayne Griffith, Captain, SWA**
Date: **September 30, 2013**
Time: **1500 EDT**
Location: **Phone interview**
Present: **David Tew - NTSB, Katherine Wilson – NTSB; Colin Fite – Southwest Airlines; Guy Woolman – SWAPA; Mikal Campanello – FAA**

Capt. Griffith was represented by Morgan Campbell.

During the interview, Capt. Griffith stated the following:

His date-of-hire was February 15, 1990. His total flight time was about 15,000 to 16,000 flight hours. His pilot-in-command time was about 12,000 flight hours. His total flight time on the B-737 was about 12,000 flight hours which included 8,000 flight hours as PIC. He received his Private pilot certificate in 1979. He flew corporate aviation before SWA, starting in 1985 working for multiple companies in multiple airplanes. He had been a part time assistant chief pilot (ACP) for 6 years at the Dallas Crew Base. He probably worked ¾ of his time as ACP. He also performed check rides in the simulator. He had been a check airman for a little over 7 years.

He had no previous accidents, incidents or violations.

He did not know the accident crew. He had never heard anything about them. When he heard about LGA accident, he called scheduling and was told their names.

Each year captains received a proficiency check, proficiency training, and a line check. They received only one line check a year. That would change because the airline was going to AQP. FOs took a proficiency check one year and then had a proficiency training period the next year. No line check was required for a FO but he could be a crewmember with a captain getting a line check.

He performed required line checks to stay current. He tried to perform 2 a month, but it evened out to about 4-5 a quarter. Current hot topics to discuss during line checks were crews taxiing across runways, keeping minds on task, sterile cockpit, correct lighting during taxi, crews working together cohesively, and using automation as they were supposed to.

If the autopilot was engaged, the PF would manipulate the MCP. The PM would verify the correct modes were selected. The PF could direct the PM to do something on the MCP, but the PM should not reach up and do it on his own. Pilots he flew with did things the way they were supposed to. On checkrides, pilots used the MCP panel the way they were supposed to. If a PM reached over and changed something on the MCP, that would concern him if he was PF on autopilot or was performing a line check.

SWA pilots used a “pretty standard” transfer of control. A Pilot would state “I have the aircraft”, and the other pilot would reply “you have the aircraft”. He said he had taken control from an FO but it happened rarely maybe 2-3 times in 24 years. He often flew with new pilots which was when it would be more likely to take over control. One time he took over after landing on a

snowy runway and the PF did not put out the reversers. He said no reverse and the PF did not respond. He said "I have the aircraft." A pilot always had to say "I have the aircraft." There cannot be any confusion as to who has the aircraft.

SWA's stabilized approach criteria was at 1,000 feet – airplane fully configured with gear down and landing flaps set. Airspeed within plus 10 to -5 knots of target airspeed, sink rate no more than 1,000 feet per minute [can be briefly exceeded], and within 1 dot of glideslope and localizer. More than 1 dot deviation off glideslope or localizer requires a callout on glideslope. On visual approach with good tailwind, sink rate might be more than 1000 fpm on the way down but it would typically be briefed that beforehand. If the PM said "sink rate", the response from the PF should be "correcting." If it was a vertical speed approach, the airplane had to be configured by the FAF.

If landing flaps were supposed to be at 40 and when passing through 1,000 feet you were at 30 flaps and then selected 40 flaps, that may be okay. Selecting 40 flaps at 800 feet would not be acceptable so a go-around would be required.

He would explain the difference between landing with flaps 30 and flaps 40 during IOE. He would expect a person who had been at SWA awhile to know. For a flaps 40 landing the nose would not be as high as flaps 30. You had to fly the nose to the runway. Pilots might pull power off at around 8-10 feet with flaps 30. With flaps 40 you did not pull power till just before touchdown because the airplane was going to come out of the sky. The technique was to hold deck angle and just prior to touchdown pull the power.

He was asked if it would concern him if someone pulled the power at 100 feet with flaps 40 and he responded "Yes, that's one time I would say I have the aircraft."

Majority of captains used the heads up display (HUD) during a line check and in the simulator. He had never noticed any difference between the ILS and HUD displays.

Regarding CRM, he was looking for crewmembers working together and having respect for each other.

Asked about training on when/how to take an airplane, he replied they discussed it in training. It was not a normal briefing item but he might discuss it with a pilot he had not flown with before. Sometimes when he gave a new captain a PC it would come up and they would discuss it then.

Name: **First Officer Dale K. Johnson, American Airlines - Jumpseat Occupant**
Date: **July 31, 2013**
Time: **1000 CDT**
Location: **Allied Pilots Association (APA) Headquarters, Dallas, TX**
Present: **David Tew, NTSB; Katherine Wilson, NTSB; Mikal Campanello, FAA; Wiley Moore, Boeing; Colin Fite, SWA; Guy Woolman, SWAPA**

The first officer was represented by Mr. Ray Duke (APA).

During the interview, the jumpseat occupant stated the following:

His date of hire at AA was October 25, 1999. He had about 12,000+ hours total time. He flew as a captain on a Jetstream and Saab, but had not flown as captain at AA. He lived in Nashville and was commuting to New York for a trip out of JFK that evening.

He arrived to the terminal about 45-60 minutes prior to the accident flight departing Nashville. He went to the podium at the departure gate and signed up for the jumpseat with the gate agent. He saw a SWA captain walking towards the gate door and asked if she was going to New York. She said yes, he explained he would be riding in her jumpseat and she checked his license and medical before going to the accident airplane.

The jumpseat occupant went to the cockpit after the passengers boarded.

The conversation he had with the captain in the terminal was for 2-3 minutes. The accident captain looked fine and appeared to be in a good mood. They talked about the ground stop but that they would get out a little early. He later saw the accident captain on the flight deck. She did not look tired and looked fine.

The accident F/O was in his seat when the jumpseat occupant got to the cockpit. They exchanged names and shook hands. The accident F/O looked fine too. The accident crew was in a good mood and was joking. They seemed normal, he saw no one yawn, and they were all making pleasantries.

The flight was full in the back so he remained on the jumpseat.

He had never flown the B737.

Nothing seemed abnormal on the ground at Nashville. He recalled the accident crew doing the checklist. The captain asked if he was familiar with the jumpseat and he said he was. He put the jumpseat down but the captain wanted to look at the gear pins and the hole to see them was under the jumpseat. He had to get up and put the jumpseat up. The captain verified the gear pins and he put the jumpseat down. He was not paying close attention to what checklists the crew was completing after that. It seemed normal when the accident crew was doing the checklists. The accident crew interacted fine, CRM was good and they had good attitudes.

The accident crew started the engines after pushing back from the gate and before the tug disconnected. He noted this because it was different from what they did at AA. After that he did not pay attention to the crew's checklists, procedures, etc.

Once the flight was airborne, both accident crewmembers were very personable. They talked shop and he did not see any issues personality-wise. The captain occasionally gave the accident F/O guidance and he would say ok. The jumpseat occupant did not see any issues in that regard. He thought the accident F/O might be new, based on how the captain was guiding him. The accident F/O made small procedural errors like one time forgetting to push the LNAV right away. During the descent, the captain was giving the accident F/O small instruction tips.

He did not hear any noises or feel vibrations in the nose but was not familiar with the B737. What occurred seemed normal. Takeoff, gear retraction, climb and cruise were normal.

The flight had to hold pretty far south of LGA, but he was not sure if that was due to traffic saturation or weather. The accident crew had a long discussion about fuel and diverting to alternates. He thought 6,500 was the bingo fuel discussed. The crew also discussed that they would normally hold closer to the airport but would still use that fuel number. The alternate discussed was Islip. He seemed to recall that one of the crewmembers came up with 6,500. He thought the accident captain dialed dispatch on ACARS and the numbers came back pretty close to what they had "ballparked". The accident crew discussed it back and forth and both were comfortable. He thought they could get almost to EFC time and be at bingo fuel. The flight did not have to hold for very long so it was not a factor.

He thought the flight got vectored north after holding which took them around some weather. They were doing the KORRY 3 to runway 4. He thought the vector took them around some weather and then they re-intercepted on the arrival. There was some additional weather on the arrival and the crew was debating back and forth about going around it. The airplane ahead of them reported a smooth ride and just moderate rain showers which was different than what was being painted on their radar. The crew took that into consideration in their decision. The controller said to continue and then they could make a change later when closer. When closer they saw it was just moderate rain. He thought they were deviating between the KORRY and ROBINSVILLE waypoints. Once they cleared the weather they popped out and it was clear visually the rest of the way. He did not remember how far they were from the runway when they popped out, but it was about 20-30 miles out; they were not close to the airport on the arrival.

The jumpseat occupant was paying attention to the weather during the descent. Before that point, the crew did an approach briefing. They discussed runway 4, the F/O selected autobrakes 3 and they discussed flaps 40. From that point forward the crew was doing checklists items and configuring the airplane. He thought the airspeed was bugged in the mid-130 range for Vref. He could not see the entire instrument panel but he could see the F/O's airspeed tape. The jumpseat occupant was watching the airspeed because of the recent Asiana accident. As far as primary instruments, he could not see well.

He did not remember the specific speeds discussed in the approach brief, but he recalled the laptop being pulled out and thought it was the captain that used it.

He remembered a discussion earlier in the flight between the crewmembers that the captain had only been to LGA once before and the F/O had been there a few times. There was a little discussion about going into LGA, but he did not recall much. He thought there was a concern about the length of the runway and the water. He did not remember a discussion about not being fast or high on the approach. He was not paying that close attention.

Asked how his perception of how the accident F/O was managing descent, he recalled the captain suggesting to the accident F/O that he use vertical speed; the jumpseat occupant thought they were in flight level change and "she suggested and hit vertical speed and spun it down." He thought she said something about it being better to go to vertical speed when trying to get down. That was all he remembered her suggesting to the F/O until getting to the final approach segment.

At AA, the PM would only select the altitude clearance in the window unless the PF asked for a change in command on the MCP when the autopilot was on. When hand flying the airplane, the PF could ask the PM to set the MCP as he wanted. As a PM, he did not touch anything unless asked to by the PF as far as aircraft control. When hand flying, the PF would typically ask the PM to make changes to the MCP, but the PF could also do it himself. If on autopilot, the PF would take care of it. He thought AA's procedure was to ask the PM to make changes to the MCP when hand flying the airplane. The PM always set the altitude and the PF confirmed it. In practice, the PF might change the MCP when hand flying.

If a PM started changing things on the MCP when he was the PF without being asked, he would be aggravated. He did not recall if the captain made changes without being asked by the accident F/O during the flight besides the one instance he mentioned about vertical speed.

The flight seemed normal from 24,000 feet down to 5,000 feet.

Regarding whether he thought the accident F/O was ahead or behind the airplane, he noticed one time that the accident F/O forgot to hit the LNAV right away and the airplane started to turn to re-intercept. The captain asked where it was going and they realized it was not engaged and corrected it. This occurred during the weather so he did not remember much.

The flight was cleared for the approach and at about 2000 feet, the captain made a comment about the tailwind. The jumpseat occupant looked at the ND and saw a right quartering tailwind at 11 knots. The captain said they would need to check the winds when they got lower. He could not see the cockpit instruments and was focused on the airspeed and looking outside.

The flight was configured with the gear down and flaps 30.

He did not recall at what altitude the flaps went to 40 but just before that he had thought that the crew had briefed flaps 40 and they were set at 30. He had used the lav during the flight and was not sure if the crew re-briefed it. About the same time, the captain said they should be at flaps 40 and reached to change them. She said it had been about 40 minutes since they talk about it. She reached over and changed the flaps. He did not recall a comment from the accident F/O.

The jumpseat occupant remembered the power coming up after the change of flaps and was not familiar with the B737 but he thought the nose seemed kind of low. He could not see the attitude indicator; it was just his visual that it was low. He thought they went to flaps 40 around 1000 feet.

He did not recall when the autopilot came off. There was an attitude change after changing the flaps but the airplane settled down after a few seconds as the power came in.

He was looking outside and referencing the airspeed. The trend indicator showed a few knots up and down but the airspeed was staying near the bug.

On final, the airplane seemed nose low. The jumpseat occupant was looking at the airspeed. He looked up and saw the PAPI had 2 whites, 1 rose colored and 1 red light. While looking at the PAPI, the third light went white. He saw the accident F/O move the yoke forward with a correcting action. He thought the captain said to not get high between 400 and 200 feet. There was no comment from either crewmember about the PAPI. He did not recall if there was a power change at that point. If he remembered correctly, the accident F/O may have had both hands on the yoke. His left hand was not on the power levers. The fourth PAPI light started to turn rose colored. The captain said get down and the statement was forceful. The jumpseat occupant saw the last PAPI light go full white. The captain then reached over and retarded the throttles to idle. The jumpseat occupant was looking outside so he did not know where her hand was before pulling the throttles back to idle.

The airplane was low; he was thinking they were low and the nose still looked low. He was not familiar with the airplane and was seated in the jumpseat, but it did not look right. He thought the altitude was in the 150-200 foot range. There was a 2-4 second delay after the throttles went to idle and then the captain said my aircraft and the accident F/O lifted his hands up in the air. He did not notice what the F/O did when the captain pulled the throttles to idle.

The jumpseat occupant was concerned about the pitch being low so he was looking outside the airplane. After the transfer of control, he seemed to recall a pitch down at that point. The airplane pitched over further down. He became tunnel visioned on the cement and he did not look back inside. The ground was coming up quicker than he thought it should have.

Asked if he knew what the actual attitude of the airplane was, he said he "knew the standby was right there" and he did not have a clear line of sight to the primary flight displays from where he was seated. He could see the engine instruments fine and the F/O's airspeed indicator was easiest for him to see.

After the captain took over, it seemed like the airplane was pitching down to try to get to the runway. He felt that they were at a lower pitch than they should have been. From the outer marker in, he did not remember the sight picture of the ground and sky out the window. He remembered when they transitioned to flaps 40 he looked outside and it seemed to him that they pitched "kind of low" and then he heard the engines coming up. He looked at the engine settings

and remembered seeing them come up. Because the engine noise was so loud he looked at the power settings but he did not recall what the outside attitude picture was.

He did not recall if there was power movement after the captain moved the throttles went to idle.

Coming over the fence at the airport property, he recalled movement back on the yoke. He was thinking they needed to get the nose up. All of a sudden it seemed like the nose pitched over. He remembered seeing movement back on the yoke out of the corner of his eye. Where he thought they should flare, he remembered seeing movement back on the yoke and then it seemed like all of a sudden the nose pitched over toward the ground. The captain made an expletive and then "bam". The yoke movement seemed like 6-8 inches back. He thought the captain was still pulling back when the nose pitched over. It did not seem like the nose was doing what the he thought it should be doing. It seemed like the captain was still pulling back on the yoke. The last 2 seconds of the flight was a good nose over until the point of impact. He recalled seeing aft movement on the yoke. It was maybe a 4-5 degree nose over.

The nose was on the runway and the airplane was skidding down the runway. His headset had been knocked off at impact but he thought he heard the tower say the equipment was rolling almost immediately.

Asked his impression of what section of the airplane touched down first, he said the nose wheel first. He did not remember how far down the runway they touched down. He did not recall any markings on the runway before they touched down. He was looking "at concrete" but he was looked at the centerline. When they did the pitch over when the nose hit, it felt like "one big jarring moment" and then the nose was on the ground. He did not feel an arresting sensation like the nose wheel touched first and then collapsed. The nose was on the ground and they were sliding and he thought a panel or 2 became dislodged in the cockpit. After a few seconds, smoke entered the cockpit from underneath the floor boards and around the pedestal. It was not much smoke but it was there. He had no trouble breathing. The smoke smelled like fumes and not like fire smoke. He thought it might be hot metal.

As the airplane was starting to slow down, it looked like they would come off to the right which the airplane did and was partially on the grass. The airplane came to a stop. When stopping it was a slow turn off of centerline, about 5-8 degrees initially and as they slowed down they went in the grass. He did not recall the power levers after landing.

The airplane stopped and the accident F/O's shoulders were slumped over and his head was down. The jumpseat occupant thought the accident F/O was injured and asked the crew if they were ok. The accident F/O did not respond and he thought the captain said she was ok. The captain called for the equipment. He thought the accident F/O was hurt so he was concerned about getting the jumpseat out of the way. He asked the captain how he could assist. The captain was talking on the radio and also told the accident F/O that they needed to get the airplane shut down. The jumpseat occupant did not have his headset on so he was not sure who the captain was talking to on the radio. He did not recall if the F/O responded to the captain's comment about getting the airplane shut down.

He thought the captain told him he could open the cockpit door. He stepped out and was half in and half out of the cockpit. The FAs were looking at him when he opened the door. He heard the captain make a PA to remain seated, but the PAs were not being broadcast over the system. Smoke was in the cabin and passengers were standing up. They had shirts over their mouths and some were coughing. He thought passengers were expressing concern. He told the captain that her PAs were not going over. She made another PA that the fire trucks were there. He again told the captain that the PAs were not being broadcast. The FAs were asking him what do they do. He told them to hang on a second. He stepped out of the cockpit and a FA asked him if she should open the 1L door, which looked buckled and he could see daylight. He told her not to open that door. Another FA told him the 1R door had been disarmed. The captain had not talked to the FAs at that point because he was in the way. The FAs asked if they should evacuate and he told them no. He asked the captain what they should do because the FAs were not getting her PAs.

He could see the smoke was getting heavier in the back. He did not recall the FA mentioning smoke to him. The captain said to use the slides for evacuation so they rearmed the doors to use the slides. The fire department at some point had said to not evacuate because they were spraying down the airplane which was why he previously told the FAs not to evacuate. He thought it was the fire department who told the captain over the radio not to evacuate. He was relaying information between the captain and the FAs. The captain then said the fire department said it was ok to evacuate on the right side only and the jumpseat occupant told the FA. He looked to the back of the cabin and the 2R door was already blown so the FA blew the front 1R door.

A FA was making a PA with the handset to talk to the FA in the back of the cabin. The passengers could hear what was being said because it was being broadcast over the PA system. The FA's PA system was working.

When the 1R slide deployed, it knocked into a fireman on the ground and he scrambled away.

The captain told the accident F/O to go outside and assist with the evacuation. He did not recall how the accident F/O looked at that point. There was activity in the cockpit but he did not recall what the accident F/O was doing. The accident F/O got out of his seat and went down the slide. The jumpseat occupant was still in the galley helping passengers evacuate. He came down the slide at the very end and the accident F/O was assisting passengers at the bottom of the slide. When the front part of the airplane was cleared of passengers, the captain told the jumpseat occupant to evacuate. After evacuating, he saw a FA with the passengers and that was the last he saw of the accident cabin and flight crew.

He remembered the captain reaching over or pointing to the accident F/O to tell him to get out and he did.

The jumpseat occupant pulled a muscle during the crash but had no other injuries.

At AA, he flew the B757/767.

During the flight, neither crew member left the cockpit.

The accident crew did not express any concern about working for SWA. They had questions for the jumpseat occupant about the AMR merger and seniority integration.

The only thing the jumpseat occupant noticed that the accident crew did of concern was on approach when transitioning from flaps 30 to 40. At that time, he did not say anything to the accident crew.

When flying at AA, he had had a PM change the MCP without being asked to, but it did not happen often. It was individual pilot specific. Pilots who did that were pilots that would do that all of the time. He would not say anything to the pilot, but other pilots would. He had never had a captain take control of the airplane from him.

When the captain moved the throttles to idle, he only saw her hands and did not see the accident F/O's hand under hers.

He had never been involved in another evacuation situation. He thought the response from the first responders was excellent. He remembered how quickly the LGA Port Authority responded because he had heard they were notoriously slow.

He was wearing a SWA company headset in the cockpit.

Asked if he knew why the airplane got high on the glidepath, he did not know when the autopilot came off and he could not see any primary ILS indications. He assumed the accident F/O was hand flying the airplane in which he got to "a low portion of the glideslope if you were not right on top of it." He thought that was all it was. He thought the F/O was getting a little high because he was not paying close enough attention. He did not notice if the F/O sat up or if his head was moving to try to see better. The jumpseat occupant was watching the airspeed and looking outside because of recent events. He happened to be on airspeed when the captain made her first comment and that was when he looked up and saw the PAPI. He did not see their body movements . He thought the accident F/O had his hands on the yoke. He could not see her hands. He could not see the captain's left hand and the accident F/O's right hand because of their bodies. He seemed to recall both of the accident F/O's hands on the yoke but he was not certain. He did not want his perception to be "weighted" by the fact that he only saw the captain's hands on the throttles and not the F/O's so he could not say with certainty that that was what it was or if he was placing it there because he knew for sure it was only her hands on the throttles.

His perception when the flaps went to 40 was that the nose pitched down. The autothrottles seemed to be on.

There were no unsafe gear indications and he thought he remembered seeing 3 green lights.

He was in uniform for the flight. He did not go to work after the accident flight.

He did not feel he had enough information after one leg about either accident crewmember to say he would not want to fly with them.

He did not recall the altitude when passing over the threshold. He had tunnel vision on the concrete.

Out of the corner of his eye he saw the yoke coming back in the last 4-5 seconds of the flight. He was looking for the airplane to round out and remembered seeing the captain pulling back, but the nose was not doing what he thought it should be doing.

The captain pulled the throttles to idle before she called her aircraft. He thought it was a 3-4 second delay until she said that.

He did not remember if he heard the automated altitude callouts.

During the evacuation, he was holding the cockpit door open because the captain was talking to the FAs and it was bumping into them.

From his perception in the jumpseat, he would have expected the flight to go around probably when the throttles came back idle, there was a delay and then the captain said my aircraft. He thought she would go around at that point. If he were a captain, he probably would have gone around when he saw 4 whites on the PAPI.

He recalled the captain first telling the accident F/O to not get high and then to get it down.

The interview ended at 1215.

Name: **Captain Cathy Bissett Dees, SWA, CRM instructor**
Date: **Sept 30, 2013**
Time: **1200 EDT**
Location: **Phone interview**
Present: **David Tew - NTSB, Katherine Wilson – NTSB; Wiley Moore – Boeing; Colin Fite – SWA; Guy Woolman – SWAPA; Mikal Campanello – FAA**

Capt. Dees was represented by Morgan Campbell.

During the interview, Capt. Dees stated the following:

Her date of hire at SWA was March 4, 1994. She had been a captain for almost 14 years. She was based out of Dallas, TX. She had about 17,000 to 18,000 hours total flight time, about 11,000 of which were as pilot-in-command (PIC). She had about 9,000 flight hours on the B-737. She had never had any accident, incidents, or violations.

She had never flown with the accident captain and did not know her before their training together. She had never flown with the accident F/O. She might recognize him from a picture but did not know who he was.

Regarding the training she gave to the accident captain, Capt. Dees said she was called by a chief pilot in Oakland (Brad Hazelbaker) concerning the accident captain and then she followed up with Chief Pilot John Macpherson. She did not recall what Capt. Hazelbaker said but he asked what kind of leadership training was covered by the CRM department. She thought she then followed up with Capt. Macpherson about topics that she could use to provide extra training for the captain. She did not talk to any of the first officers who had complained about the captain. Capt. Macpherson felt that the captain's communication, personality and leadership skills could use refreshing by some more training. They talked about leadership training for new captains. They thought that what was offered in the refresher training would be beneficial for the captain.

She did not recall what the exact problems were that the accident captain had but thought the captain had a better rapport and communicated better with F/As than F/Os. She knew that the captain had problems with more than one F/O. She also thought one complaint was that the captain was dismissive with F/Os; poor communication processes with her F/Os might be another way to put it. Capt. Dees' role was concerned with leadership and operational issues and she was not aware of any issues with the captain taking control from the PF or changing things on the MCP.

She showed the accident captain the difference between authority and leadership and how those two meshed together. Authority was given and leadership was earned.

Capt. Dees attended the NTSB course on cognitive interviewing skills.

At SWA, she started in the CRM department teaching the F/O class, then the upgrade class. She attended seminars on CRM training to keep up with industry standards. She did not have a master's degree in CRM. There was a group of line pilot instructors that taught the CRM portion for F/Os and captains during training.

F/O CRM training was a part of the new-hire 6 week course. The Flight Operations Training Manual (FOTM) requirement was 8 hours of CRM. F/O and captain CRM training was separate.

She worked in the CRM department for almost 10 years. This work was in addition to her regular line work. She worked in that department from about 2002-2012.

She was not and had never been a check airman.

Topics covered during the accident captain's training included communication skills, briefing skills, attitudes that might be beneficial to a more open input on the flight deck, better ways to ask questions without offending other people, and how to seek input from others and accept that input.

The accident captain appreciated the training and said she got a lot out of it. The refresher course brought her back to center. They talked about tools the captain could use to be more effective in the cockpit and the captain was very open to the training.

She thought the refresher training for the accident captain lasted the better part of a day. The leadership training was an all-day training course but there were no other students in the class. She covered the parts of the course that she thought were pertinent and would help the captain be more effective. She thought the training for the captain lasted about 4 hours.

She thought the accident captain followed up with Chief Pilot John Macpherson after the training. Capt. Dees also made a phone call to the captain about a month or so later to get feedback on whether the training was effective and had helped her at all. The captain responded yes, that she felt better and things were going well with her F/Os and she felt the training was good. The conversation was pretty short.

She had done this type of training less than five times with other captains but it did not happen very often. She would get calls from chiefs who were having trouble mentoring some of their captains. She thought she did this training with one F/O as well. The problems with other captains were very similar to those of the accident captain. Chiefs will rely on the CRM department to help with re-centering basic communication skills of captains.

She was no longer in that training position but she had gotten feedback that the refresher training provided to pilots was successful but maybe not entirely. She might hear if the person she trained was not improving but that was as far as it would go.

Other than the follow up phone call to the accident captain, she had not heard feedback about the training she provided to her.

She thought that feedback on the LGA accident was that the accident captain might have micromanaged the accident F/O's flying. She was not aware of what specifically was being micromanaged, such as the MCP. Micromanaging was a discussion point during the training she gave to the captain.

She did not speak with any of the F/Os who had complaints about the accident captain. She did not know how many F/Os had complained about the captain. It was not mentioned to Capt. Dees that F/Os were using the avoidance bid system to avoid the accident captain. There was only one keeper of the avoidance bid list.

If a F/O was PF and was flying on autopilot, the PF would operate the MCP. If the autopilot was not engaged, the PM would input stuff on the MCP. There was a policy to verbalize, verify, monitor and if necessary intervene for the automation. This policy is in the Flight Operations Manual.

If the accident captain had reached over and started making changes to the MCP, Capt. Dees would say the pilot was to verbalize changes to the MCP and verify before any changes were made to the MCP. If on approach and the PM reached over and changed the flaps, she would say that was not correct according to their procedures.

She was hired at SWA as a F/O, started teaching CRM as a pilot facilitator for the F/O CRM class, then upgraded to captain as a line captain. Several years later she added teaching the captain upgrade class. She developed a leadership class. She became the CRM manager and instructed and checked out other CRM instructors. She was the "keeper" of the CRM PowerPoint and made sure the program was updated. She went to conferences to be sure they were using "best practices". She later returned to line flying full-time. The entire time she was instructing CRM she was also a line pilot.

The CRM training provided to the accident captain was all ground school and facilitated discussion. It was one on one training. The captain was open to discussion and participated during the training.

She was asked about any documentation of the training for the accident captain, and she replied the only documentation was emails between Capt. Macpherson and herself per the chief pilot's request. If she performed additional training because a pilot failed a checkride or training event then yes there would be documentation and that documentation would be a chief pilot issue. The training for the captain did not occur because of a failed PC or failed training event.

The training she provided to the accident captain was more of a facilitated discussion than a lecture. A facilitated discussion contained discussions from each person. It was a "one-on-one" discussion as there was no one else in the classroom. The captain was "open to the discussion" and she participated.

Asked if there was any specific SWA training for late transfer of control, she replied they could transfer control any time there was a safety concern. Either pilot could do it. She said they could get a training scenario where transfer of control occurred at a low altitude. On a Cat III approach scenario, a decision would have to be made at a low altitude to do a go around and also on a scenario where the captain was unresponsive late in an approach.

The topics covered during the accident captain's refresher training were determined by discussions between Capt. MacPherson and herself about what areas of CRM training were

available and would be beneficial. They wanted to provide her with the tools to allow the captain to become a better communicator.

Capt. Dees had never taken control from a F/O, including at a low altitude. She once had a captain take control of the airplane from her when the visibility went below the required 4,000 RVR for her to complete the landing.

SWA practiced go arounds from a low altitude.

ASAP events and hot topics were integrated into recurrent training.

Portions of risk and resource management that were adopted about the time she was no longer involved in the program were covered in recurrent and on-line training.

The refresher training she provided for the accident captain was very similar to the training provided to other captains. The captain's responsiveness to this training was also consistent with others who had received it.

They had a portion of their day where they included the F/As with new hires and captain leadership class. They also instructed a portion of the day to all new hire F/As. There was no coordinated F/O, captain and F/A training together.

They had training instructors from the F/A group that attended the F/O class. The portion of risk and resource management in recurrent was for F/Os and captains but not F/As. It was not a specific CRM class but it was integrated throughout all of ground school.

They would have a classroom of new hires, F/As and upgraded captains in one classroom.

She had never flown into LGA but being a high density east coast airport there were always "gotchas" flying in there. The runways were not super long but not as short as some. "Gotchas" would involve vectoring, ATC issues, density, and radio traffic. They were sometimes crazy like any high density airport. Capt. Dees had no concerns about flying into a high density airport.

The interview concluded at 1300.

Name: **Captain Reed D. Schotanus, SWA, Flew previous flight on accident airplane**
Date: **July 31, 2013**
Time: **1230 CDT**
Location: **via telephone from APA Headquarters, Dallas, TX**
Present: **David Tew, NTSB; Katherine Wilson, NTSB; Mikal Campanello, FAA; Wiley Moore, Boeing; Colin Fite, SWA; Guy Woolman, SWAPA**

The captain was represented by Mr. Morgan Campbell (REPI).

During the interview, The captain stated the following:

His date of hire with SWA was May 19, 1988. He had accumulated about 1500 hours as a T-37 flight instructor, 750 hours as a F-15 pilot, 1050 hours as a F-16 pilot, 120 hours as a T-37 pilot, and 22000-23000 hours as a SWA pilot. He had performed duties as captain at SWA for 20 years-2 months and SWA was the only airline he had been employed by.

He flew the accident airplane the day of the accident on three legs. The flights originated in Denver and transited Raleigh-Durham, Nashville and he completed the three legs in Nashville.

He believed there was an MEL for a flight attendant galley light in the airplane logbook. He flew six consecutive days so he was unsure if this airplane was the one with the MEL. He noted a slight nose wheel shimmy on the accident airplane. He characterized it as a flat spot on the tires that could have resulted from the airplane sitting overnight. His memory was that the nose tires rubbed on the snubber when retracted after takeoff. This shimmy and snubber rub lessened as his work day progressed. This memory was "just in the back of my mind as a little shimmy." He considered it as not worthy of a logbook entry. He later talked with the first officer and they agreed that they both would rate it a three on a 1-10 point scale. He thought it was only a slight issue on the first leg and was not conscious of it on the next two legs. He could not remember any other noise or sensation other than the shimmy during his time flying the accident airplane. He recalled that there were no other abnormal issues on the three legs and did not recall the FAs saying anything regarding the accident airplane. He stated the airplane "flew fine, actually landed pretty good." He and the first officer joked about setting the bar high for the trip.

The captain remembered arriving a few minutes early in Nashville and was happy to see the accident captain there so that he could hand off the airplane and continue to the hotel. He introduced himself and believed he would have mentioned the MEL if there in fact had been one. The discussion included the weather south of the airport and that he was sorry her crew had been delayed. The F/O in passing mentioned the slight shimmy. The captain confirmed the report and agreed the accident captain needed to know the information as a "heads up." He believed she said thanks. Had there been no accident he would not have thought any more of the exchange. The accident captain seemed cheerful, nice and happy to go flying.

He did not remember ever having met the accident captain before. If she had not said her name he would not have known who she was. When asked if he had recognized her name he responded "not specifically." He did not think it strange the accident F/O was not there and

assumed he was out getting food. He did not know the accident F/O. The changeover was "plain vanilla and nothing stuck out in my mind."

The captain was asked if he had done a flaps 40 landing with the accident airplane on the event day. He did not remember "specifically doing that." He was unable to remember any unusual trim or handling characteristics on the accident airplane.

He was asked if he would use flaps 30 or 40 in LGA-runway 04. He remembered the runway was about 7,000 feet long with water at the end. He thought the flap setting would "depend on conditions."

When asked if he had ever experienced a B737 nose-over when pulling on the yoke during landing, he said "no, never in the 737."

The interview ended at 1245.

Name: **Captain Russell C. Howard, SWA - Witnessed the event**
Date: **August 2, 2013**
Location: **via telephone**
Time: **1105 EDT**
Present: **David Tew, NTSB; Katherine Wilson, NTSB; Wiley Moore, Boeing; Colin Fite, SWA; Guy Woolman, SWAPA**

The captain was represented by Mr. Morgan Campbell (REPI).

During the interview, the captain stated the following information:

His date-of-hire with Southwest Airlines was October 7, 1999. His total flying time in the USAF was about 2,600 flight hours. His total flying time at Southwest Airlines was about 11,000 to 12,000 flight hours. His pilot-in-command time on the B-737 was about 4,500 to 5,000 flight hours. He had been a captain at Southwest for about 7 years, since summer 2006.

At the time of the accident, he had taxied out and was parked on taxiway Alpha near the Foxtrot intersection. He was number 20 in line for takeoff. He was stopped about 2,000 to 3,000 feet from where the airplane touched down on the accident runway. He had a "good" view of the accident airplane, but it was not the best view because there were 4 or 5 aircraft ahead of him on the taxiway.

He first saw the SWA accident airplane when it was on short final. He estimated the airplane was at about 100 to 200 feet above the runway when he first started watching it. The accident airplane had not crossed the threshold. The first thing that caught his attention was that ATC instructed an American Airlines airplane to expedite across runway 4 because the accident airplane was on short final. He just happened to be watching the AA flight and saw the accident airplane.

He did not see anything unusual until right at touchdown. That was when he saw the nose gear collapse and he started seeing it sliding down the runway and it was sliding to the right.

The accident airplane stopped across from them at their 3 o'clock position. Capt. Howard and his F/O were watching it. A flight attendant called him up and asked him about it.

The captain's airplane only had one engine running and he shut down the other engine since they were going to be there a while. He turned off the seat belt sign. He made a PA announcement to the passengers and informed them what had happened. They just watched and monitored from that time. He watched the evacuation.

At 200 feet above the runway, everything looked normal until right at touchdown. His first impression was it was a very hard landing. It was hard for him to process or recollect exactly what the sequence was, like what gear touched first. It was a hard landing and then the nose gear buckled and the airplane slid. He did not recall if the nose of the airplane pitched down. He did not recall which gear hit first. He just remembered a real hard landing and the nose gear collapsed. He did not recall seeing a pitch up on short final.

He did not recall any reports of windshear from pilots or ATC.

He said everything looked normal from his perspective when he watched the airplane.

He was asked if he saw any reverser on the engines. He said he did not pay attention to the reversers or spoilers. The first thing he noticed were the sparks coming from under the airplane. He did not notice any increase in thrust after the airplane was on the ground.

The airplane stopped and there were two police cars that appeared pretty quickly on the F/O's side of the airplane. They were the first responders. The airplane sat for about 2 to 3 minutes before there was any movement and then the aft service door slide deployed and the overwing exit opened and they began an evacuation. People started coming down the slide at the aft service door. One gentleman with his bag in hand came out of the overwing exit and came out on the wing, stood there and looked around. He thought the man eventually went back inside the airplane and down the slide. He never saw anyone else come out on the wing.

They watched people coming down the slide.

He heard someone on the radio asking where the fire trucks were. He thought that was kind of premature because it takes time to get there. The person on the radio asking about the fire trucks sounded agitated it was taking so long. Maybe 3 to 5 minutes after the airplane stopped, the fire trucks arrived and they sprayed the nose wheel section. Shortly after that the forward service door slide extended and people started coming down that slide.

He said the only smoke he saw was residue from the sparks. He did not see any smoke coming out of the doors.

The F/O did not see anything until the accident airplane was skidding down the runway. The F/O told Capt. Howard that he did not see the airplane on short final.

After the accident airplane had stopped, they both saw a tire rolling toward them. It stopped abeam the airplane a couple hundred feet in front of them. He assumed it was a nose wheel tire since the mains were still on the airplane. It was a smaller tire.

End of Interview

Name: **Timothy Redder, SWA, Captain**
Date: **August 13, 2013**
Time: **1500 EDT**
Location: **Phone interview**
Present: **David Tew - NTSB, Katherine Wilson – NTSB; Wiley Moore – Boeing; Colin Fite – SWA; Guy Woolman – SWAPA; Mikal Campanello – FAA**

Capt. Redder was represented by Dane Jaques.

During the interview, Capt. Redder stated the following:

He had flown with the accident F/O.

His date-of-hire with SWA was April 13, 2000. His total flight time was about 12,000 flight hours. He spent 14 years in the U.S. military flying KC-135 airplanes. Three of those years were as a navigator and three of those years were as an instructor. He had not been an instructor or a check airman at SWA.

He flew one trip with the accident F/O on maybe the 22nd or 23rd of July 2013, and it was a 2-day trip with three legs on day 1 and two legs on day 2, however, the first leg on day 2 was a deadhead. They had a gate return on leg 1/ day1 due to a minor MEL. They overnighted in Minneapolis, MN, the deadheaded the first leg of day 2 then flew home. They had no problem flying together. They got along great in the airplane. He did not recall having any corrective action needing to be taken for the F/O. He recalled they got along "great". There was good communication back and forth on flying and non-flying issues. He thought the F/O had good CRM. He did not recall any negative issues with the F/O. He did not recall the weather or winds on the flights. He had no issues with the F/O's flying abilities. The F/O "absolutely" followed company procedures and called for checklists. He had no problems with the F/O getting checklists completed. The F/O flew two of the four legs flown.

He knew of the accident captain's name but had never flown with her or met her. He did not have any details but had heard some pilots mention her name saying she had problems getting along with other pilots. What he heard was hearsay and her name did not come up that often.

He had been in the Oakland, CA, base for about 10 years, and lived in Spokane, WA.

Asked if he had ever heard any comments about the accident F/O, he said the first he heard of him was when he met him for the flight. He had not heard anything about the F/O from other pilots.

He did not recall if they performed any 40 flap landings during the trip.

Asked to compare the accident F/O's pilot proficiency (flying skills/abilities) to other pilots, he replied they were "on par" with other F/Os. Nothing about his flying ability stuck out as weak. He did not have to give the F/O any corrective action. Asked what were the F/O's greatest strengths as a pilot, he replied his greatest strengths were communicative skills and being able to

get along with me. He was at ease with the F/O. He did not see any areas in which the F/O needed to improve.

When flying together the accident F/O never voiced any concerns about flying for SWA. He had no concerns about the F/O's use of the FMC or MCP or any automation. He had not seen or spoken with him since accident.

He never thought about how low to get prior to commencing a go around. You could go around after touchdown. He had bounced a landing and performed a go-around. You could go-around until the thrust reversers had been deployed.

The accident F/O's approaches were all stabilized and he did not feel uncomfortable during the F/O's approaches. He did not recall being uncomfortable with any of the F/O's landings. One landing was performed by the F/O in Denver and the landing was in the landing zone and on airspeed. The other landing the F/O performed was in Oakland and there was no problem there. He did not fly to LGA with the F/O.

The accident F/O seemed clear on PF/PM duties and who operated the FMC; Capt. Redder thought he would have remembered if the F/O was not clear on that. He did not recall an issue with the F/O operating the OPC.

He thought all the landings were performed with flaps 30 and did not recall needing to perform a flaps 40 landing during the pairing.

There was no irregularity report required for a go-around and there would be no call from the chief pilot after performing one.

Name: **Captain Keith W. Griffith, SWA Check-Airman**
Date: **September 30, 2013**
Time: **1500 EDT**
Location: **Phone interview**
Present: **David Tew, NTSB; Katherine Wilson, NTSB; Colin Fite, Southwest Airlines; Guy Woolman, SWAPA; Mikal Campanello, FAA**

Represented by: Morgan Campbell

During the interview, the check-airman stated the following:

- His date-of-hire was February 15, 1990.
- His total flight time was about 15,000 to 16,000 flight hours.
- His pilot-in-command time was about 12,000 flight hours.
- His total flight time on the B-737 was about 12,000 flight hours which included 8,000 flight hours as PIC.
- He received his Private pilot certificate in 1979.
- Flew corporate aviation before SWA. He flew corporate aviation in 1985 for multiple companies in multiple airplanes.
- He had been a part time assistant chief pilot (ACP) for 6 years at Dallas Crew Base. He probably worked ¾ of his time as ACP. He also performed check rides in the simulator. He had been a check airman for a little over 7 years.
- He had no previous accidents, incidents or violations.
- Did not know accident crew. He had never heard anything about them. When he heard about LGA accident, he called scheduling and was told their names.
- Each year captains received a proficiency check, proficiency training, and a line check. Only 1 line check a year. That will change because the airline was going to AQP.
- F/Os took a proficiency check one year and then had a proficiency training period the next year. A F/O alternated years getting a proficiency check one year and a proficiency training period the next. No line check was required for a F/O but he could be a crewmember with captain getting a line check.
- He performed required line checks to stay current. He tried to perform 2 a month, but it evened out to about 4-5 a quarter.
- Current hot topics to discuss during line checks were crews taxiing across runways, keeping minds on task, sterile cockpit, correct lighting during taxi, crews working together cohesively, and using automation as they were supposed to.
- If autopilot was engaged, the PF will manipulate MCP. The PM will verify correct modes selected. The PF could direct the PM to do something on the MCP, but the PM should not reach up and do it on their own. Pilots he flew with do things the way they are supposed to. On checkrides, pilots use the MCP panel the way they are supposed to.
- If a PM reached over and changed something on the MCP, that would concern him if he was PF on autopilot or was performing a line check.
- There is a pretty standard transfer of control. Pilot states “I have the aircraft”, other pilot replies “you have the aircraft”. He said he had taken control from F/O, but it happened rarely maybe 2-3 times in 24 years. He often flies with new pilots, which was when it

would be more likely to take over control. One time took over after landing on a snowy runway and PF didn't put activate reverse thrust. I said no reverse and PF didn't respond. I said I have the aircraft. Always have to say I have the aircraft. There cannot be any confusion as to who has the aircraft.

- Stabilized approach criteria: at 1,000 feet – airplane fully configured with gear down and landing flaps set. Airspeed within plus 10 to -5 knots of target airspeed, sink rate no more than 1,000 feet per minute [can be briefly exceeded], and within 1 dot of glideslope and localizer. More than 1 dot deviation off glideslope or localizer requires a callout. On visual approach with good tailwind, sink rate might be more than 1000 fpm on way down, but would typically be briefed beforehand. If someone says "sink rate", the response should be "correcting". If it is a vertical speed approach, the airplane has to be configured by FAF.
- If landing flaps were 40 and you hit 1,000 feet at 30 flaps then selected 40 flaps that may be okay. Selecting 40 flaps at 800 feet would not be acceptable so a go-around would be required.
- He would explain the difference between landing with flaps 30 and flaps 40 during IOE. He would expect person who been here awhile to know. In a Flaps 40 landing the nose is not as high as with flaps 30. A pilot has to fly nose to runway. Pilots might pull power off at around 8-10 feet with flaps 30. With flaps 40 you don't pull power till just before touchdown because the airplane is going to come out of the sky. The technique is to hold deck angle and just prior to touchdown pull power.
- He was asked if it would it concern him if someone pulled power at 100 feet with flaps 40 and he responded "Yes, that's one time I would say I have the aircraft".
- The majority of captains use the heads up display (HUD) during line checks and in the simulator. He said he had never noticed any difference between the ILS and HUD displays.
- CRM: he was looking for crewmembers working together and having respect for each other.
- Asked about training on when/how to take an airplane, he replied we discuss it in training, not a normal briefing item but might discuss it with a pilot he has not flown with before. Sometimes when he gave a new captain a PC it would come up and they would discuss it then.

Interview Ended

Name: **Jerry Ernest Griewahn, FAA, SWA APM**
Date: **October 24,2013**
Time: **1200 EDT**
Location: **Phone interview**
Present: **David Tew - NTSB, Katherine Wilson – NTSB; Wiley Moore – Boeing; Colin Fite – SWA; Guy Woolman – SWAPA; Mikal Campanello – FAA**

Mr. Griewahn was represented by Gary Parks.

During the interview, Mr. Griewahn stated the following:

He was the SWA APM on B737-700 Next Gen fleet. He had been the SWA APM for almost 4.5 years. He had been with the FAA 12.5 years. His FAA employment had all been in Dallas, TX, but not all of it was at the SWA Certificate Management Office (CMO). He specialized in the B737-700, but worked with all airplane models at SWA. Only two of the three SWA FAA APMs were located in Dallas, TX. The 3rd APM came to SWA when SWA merged with AirTran. That APM was in Atlanta, GA, and only worked on the AirTran side of the operation.

He had a little over 16,000 flight hours which included about 13,000 flight hours as PIC. He was type rated on the B737 but did not fly the B737 airplane but did fly the B737 simulator all the time. He had been flying for 43 years. He started flying in general aviation. He flew for a Part 135 operator and was a chief pilot at the 135 operation. He flew air ambulance operations to South America, Central America, and Europe. He flew cargo for Kitty Hawk Air Cargo for almost 10 years and became the chief pilot there. He had been a check airman on every airplane he had flown. At Kitty Hawk Cargo, he flew the B727 and DC-9 airplanes. He left Kitty Hawk Air Cargo and came to the FAA.

SWA was an ATOS [Air Transportation Oversight System] carrier. SWA was a managed risk carrier under ATOS. The Supervisor assigns Element Performance Inspections (EPI) which were used to gather data-check certain items at the carrier and Safety Attribute Inspections (SAI) where you go through the manuals and surveil check airmen and training programs. His main functions were oversight of check airmen, simulators, and training programs which was what he surveiled almost every day all year long.

He was involved in the approval of the Flight Operations Manual (FOM) and the Aircraft Operating Manual (AOM). He sat in on training classes as required in the EPI sections. He observed about 70 proficiency checks a year mainly because he needed to observe check airman for their biannual checks. Because of the number of proficiency checks, he felt he had a very good oversight of the training program and understood what the check airman group was doing and what the pilots were doing on the line.

He thought the training program and the level of check airmen was very good overall. Over the last three years they had come around to what they called the Next Gen check where they really standardized the check airman so they were all in the same area doing the same thing and standardized the training under the more structured program of the Advanced Qualification Program (AQP). Going to AQP was going to give much better structure to training and checking.

He said there were no areas in training program that he could think of that needed to be improved.

He performed about 30 line checks a year.

The current SWA Principal Operations Inspector (POI) had been in that position for about 4 years. He had bid into the POI job from a different office. The POI did not observe training very much that Mr. Griewahn knew of. He said the POI was mainly doing office duties.

He had no problems finishing his assigned work plan last year.

He was not involved in SWA LGA event other than recommending 709 check rides for the FO and captain and coordinated the FO checkride. A 709 ride was recommended if the crew did not follow company procedures or their performance was questioned. He did not observe the FO's 709 ride. Another inspector performed it. He was debriefed and was told the FO passed the check ride. He was not aware of any problems "what so ever" by the FO during the ride.

The accident captain was terminated by SWA and was requested to put her pilot certificate "on deposit" until she could comply with a 709 ride. He said the accident captain's pilot certificate was "in the process" of being put "on deposit". He did not know the reasons for the accident captain being fired.

When asked about Southwest Airline's professional standards committee, he said they have one, but he didn't know much about it.

He did not know the accident crew. He looked at the accident crews' training records after the LGA event and could not find any problems with the crew.

Asked about SWA's stabilized approach criteria, he replied that the airplane flaps and landing gear had to be in the landing configuration by 1,000 feet, the sink rate could not be excessive and should be under 1,000 feet per minute (FPM), and no excessive speed deviation. He thought the manual said an excessive speed deviation was plus or minus 10 knots, but said he would need to check the manual to be sure.

He said SWA crews were trained and checked to go around if the approach did not meet the stabilized approach criteria including having the flaps set at the final landing setting. By his observations in the simulator, he knew that they were being trained to go-around if flaps were not set at 1,000 feet. He also followed-up on go-arounds that were performed and knew the pilots as a group were adhering to the stabilized approach criteria.

He did not know much about the accident. The supervisor had some FDR information. Office talk was that the flight was stabilized according to the FDR but he had not been following it. Knowledge that the flaps were set to 40 below 1,000 feet was part of his decision to recommend a 709 ride.

He was asked if the FO was the PF and the airplane was on the autopilot, who would he expect to make any changes to the heading selector or speed selector on the MCP. He said the FO should be making those changes to the MCP if he was the PF and the autopilot was on. If he saw the PM making changes to the MCP, he would not say anything at that time unless there was a safety of flight issue, but he would say something to the pilot afterward. He was asked if a PM making changes to the MCP without direction from the PF would concern him, and he replied "Oh yes". He said not following company procedures will get you or any pilot in trouble. If he saw any pilot not following company procedures, he was going to step up and say something to them. He said he could not recall ever observing either of the accident pilots in training or on the line.

When he issued a requirement for a pilot to take a 709 check ride it meant he had doubts about their competency. He was required not to allow them to fly until the 709 check ride has been completed satisfactorily. If a pilot was unable to take the 709 checkride, it would be requested to take their certificate to the FAA office until a 709 check had been performed. The pilot's certificate would be held by the FAA until the 709 check ride was complete. This was what was meant by having a "certificate on deposit." This was not a surrender of the certificate.

He was asked about recommending changes and he replied that if he noticed something that concerned him, he would look deeper and check to see if there was a systemic problem or a problem with the pilot. He would make a recommendation if necessary. He had made recommendations in the past. He did not think there were any flagrant problems right now.

He had sat in on CRM training during Recurrent training in the last 30 days. It was very good. The lady who oversaw the CRM program for a long time was very good. SWA really preached and practiced it in the simulator. They talked about it on every PC check.

He was sometimes involved if there was a need for remedial training. He was not aware of any CRM remedial training for the accident captain in the past.

There were no changes yet as a result of the LGA accident. He thought the procedures worked well and the problem was with just one crew. At that time, he did not see what they could change to prevent similar events besides saying "follow your procedures."

SWA was still about a year or 2 from AQP being fully implemented.

He was not aware of any training where SWA said if you go past this point, you could not go around.

He had been involved 4 or 5 times where the approach became unstable and the crew did not hesitate to go around.

There was not a threshold that he was aware of where SWA trained there was a point where you should not go-around.

He e felt that there should not be a transfer of controls at 50 feet and then do a go around. If the approach was unstable, the pilot should command a go around earlier in the approach if he was uncomfortable. Mr. Griewahn could only see taking control if the other pilot lost control and you were going to crash. If nervous, the pilot should call for a go around earlier in the approach. Accidents were caused by not calling for a go around earlier.

SWA did not stress transfer control and land the airplane. They stressed if unstable go-around. He wound not stand for or approve training that stressed take control and land late in the approach. He would say that from what he had observed that SWA would not be in favor of transferring control and landing late in an approach.

The interview ended at 1248.

Interview: **Dominick Paul Fano, SWA FO, flew with accident captain**
Date: **August 14, 2013**
Time: **1500 EDT**
Location: **phone interview**
Present: **David Tew – NTSB; Wiley Moore – Boeing; Colin Fite – SWA; Guy Woolman – SWAPA**

FO Fano was represented by Morgan Campbell.

During the interview, FO Fano stated the following:

His date-of-hire with SWA was November 30, 2005. He had about 18,000 total flight hours. He was a corporate pilot for 20 years before coming to SWA.

On July 15-16, 2013, he flew a trip with three flights with the accident captain. His trip was originally scheduled for four flights, but due to an operational problem, they deadheaded home instead of flying. The captain was the PF for one of the flights. He had never flown with her before. The captain had flown into Las Vegas, NV, with another FO who got sick and FO Fano was the replacement FO. She offered to let him fly the first leg. He was based in Las Vegas, NV. He had never heard her name before he flew with her.

The accident captain seemed "very normal" during the trip and was "very personable". She did all the required checklists. Her CRM was excellent. There was nothing out of the ordinary during their flights. She did not make any suggestions or comments to him. She did not give any input. There was nothing abnormal about the flights. She did not move any controls or dials when he was flying. She did not adjust flaps without him asking. She did standard policy.

The trip they flew consisted of 3 flown flights:

- Las Vegas, NV to Albuquerque, NM – a flight of 1:20
- Albuquerque, NM to Portland, OR – a flight of 2:39
- There was a layover in Portland, OR
- Portland, OR to Albuquerque, NM – a flight of 2:37
- They deadheaded from Albuquerque, NM, to Oakland, CA, due to an operational decision to use our airplane.

He did not know the accident FO.

He was a civilian flight instructor about 30 years ago.

He was not "coached" by the captain when he was flying with her. The captain was competent and knowledgeable in her flying. She did not seemed nervous when landing. All of their landings were made with flaps 30. He recalled the weather was good during the flights. He did not recall seeing any interaction between the captain and the F/As. He did not recall much about her landing and said "nothing stood out". He did not recall anything that concerned him about her energy management.

Interview: **First Officer Jon Thomas Tanner, SWA, flew with accident captain**
Date: **August 15, 2013**
Time: **1000 EDT**
Location: **phone interview**
Present: **David Tew – NTSB; Wiley Moore – Boeing; Colin Fite – SWA; Guy Woolman – SWAPA; Mikal Campanello - FAA**

FO Tanner was represented by Dane Jaques.

During the interview, FO Tanner stated the following:

His date-of-hire at SWA was February 9, 2011. He had about 6,000 total flight hours. He had been in the U.S. Air Force and was part of a joint exercise with the U.S. Navy. He was based in Houston, TX. He did not know either of the accident pilots.

At the time of the accident, they were parked on the inner LGA taxiway, he said he could not recall if it was "A' or "B", abeam taxiway foxtrot and was facing the approach end of the landing runway. When he first saw the accident airplane on the runway, the nose was on the ground and sparks and smoke were coming out from beneath the airplane. The sparks had gotten his attention. He did see the accident airplane when it was " still a little ways out" on final approach and nothing looked abnormal at that time that he recalled.
As the airplane was going down the runway, the nose had already collapsed and there were flames and smoke visible. The airplane stopped abeam their position. Shortly after the airplane stopped, two police cars appeared almost immediately at the accident airplane. Shortly after the airplane came to a stop, the smoke and flames dissipated and the airplane did not appear to be on fire. Shortly after the rear exit on the right side [FO's side] opened, the slide came out, and passengers started coming down the slide. There was a comment from another airplane asking where the fire trucks were. The fire trucks appeared shortly after that and began "hosing down" the nose area.

The overwing exit opened and one guy came out on the wing. He walked about on the wing then FO Tanner "assumed" he went back into the airplane. After passengers started coming down the aft right rear slide, the right front door opened and the slide popped out. People started down the front slide. There were emergency personnel at the bottom of the slides assisting the passengers as they came down. Everybody evacuated out the right side of the airplane. More responders showed up and gathered the passengers together.

The controllers asked him to contact the company about buses. Three buses showed up. Ambulances appeared. He could see three crewmembers were helping boarding the buses. He could not see the rest of the crewmembers.

He asked the company if they should go back to the gate or continue to Chicago to Midway Airport. There was a lot of chatter on the radio as some people were having to go back for fuel.

He did not know if the spoilers were extended or the reversers were used as the airplane was sliding. He saw the airplane was sliding "straight" on the runway, then slid to the edge of the

runway. The slides were extended onto the grass. He could not tell if there was power still coming from the engines.

He did not recall the captain mentioning anything about what he saw before FO Tanner saw the airplane on the runway. He saw a nose wheel rolling toward them and saw it stop before it got to them.

He said the PF took care of the MCP when the airplane was on the autopilot. The PM could set altitude if he asked him to, but if he was the PF, he would "pretty much" operate the MCP functions. When he was the PF and on autopilot, he had never had a captain move switches on the MCP without saying anything or FO Tanner asking him to set something. It was against company policy for the PM to just change something on the MCP if the airplane was on autopilot. He had never heard of a PM change something on the MCP without communication when the airplane was on the autopilot. The PM should ask or be told before changing the MCP.

He had not had a captain take the airplane away from him.

The stabilized approach criteria was by 1,000 feet above touchdown, the airplane should be on glideslope or on VASI/PAPI, speed within +10 to -5 knots of set speed, gear down, and the flaps in the landing position. He was asked what indication would indicate on glideslope and on localizer and he replied within one dot in his opinion. A VASI would indicate an unstable approach when the lights were all red or all white. Three white lights and one red light or three red lights and one white light would still be acceptable for the VASI he thought but said he would have to check company procedures to be sure.

He said if the flaps were not set to the landing flap position by 1,000 feet, he would not land because that did not meet company criteria and he would consider it an unstable approach. He had never seen another pilot land if all the stabilized approach parameters, including flaps set at landing position, were not within the stabilized approach criteria at 1,000 feet above touchdown. He could not say there was any "bending room". Last time they went below 1,000 feet and the speed was too fast, they went around.

On a visual approach, he kicked off the autopilot early and if on an instrument approach, he would turn the autopilot off when they broke out of weather. That was just what he did.

He personally had no problem with performing a go-around if needed and in the time he had been at SWA, he had not observed any reluctance in pilots to perform a go-around. There was no negative stigmatism attached to doing a go-around.

He made contact with the company after being asked to check with company concerning buses for the passengers. The company knew something had happened but was not sure exactly what had happened. He gave the company a brief rundown of what had happened on the accident flight and said that ATC was asking about buses for the passengers.

He only saw a couple of small pieces of debris on the runway but did not know what they were. He thought there was only one other SWA airplane on the taxiways.

Most people called for the landing checklist when they called for landing flaps. The checklist should probably be completed before the 1,000 foot point. The checklist could be delayed past 1,000 feet due to numerous things including talking to ATC, but the landing flaps should be set before 1,000 feet.

When asked what did he think was the latest point that he could make a go-around, he replied that once he was on the ground with the reversers out, he would not make a go-around.

The visibility had to have been at least 4 or 5 miles.

Name: **Wendy Lynne Hales Mora, SWA, First Officer**
Date: **September 5, 2013**
Time: **1405 EDT**
Location: **Phone interview**
Present: **David Tew, Katherine Wilson – NTSB; Wiley Moore – Boeing**

FO Mora was represented by Dane Jaques.

During the interview, Capt. Mora stated the following:

Her date of hire at SWA was September 17, 2008. Her total flight time was about 13,000 hours, of which about 4,000-5,000 hours were as PIC.

Before being hired by SWA, she worked for Skywest Airlines from October, 2001, to September 2008. She was a FO at Skywest from 2001-2005 and then a captain from 2005-2008. She flew the Brazilia, Embraer 120, and CRJ at Skywest.

She had no previous accidents, incidents, or violations. She had a warning letter in 2002 for an altitude deviation but it was long gone.

She flew with the accident captain the week before the LGA accident. She also flew one other 2 or 3 day trip with the captain about a year or so ago, possibly in July 2012. She did not recall the number of flight legs they flew during the trip in 2012. She said it was a pretty unremarkable trip. She was very involved in the SWA volunteer program "adopt a pilot" and the only thing she recalled about the 2012 trip was that the captain offered some material for the program she had that a friend gave her and she sent it to me a couple of days after the trip. As far as actual flying, she did not recall anything about the trip. She said you remember the really good trips and the really bad trips but not always the other trips.

On the most recent trip just prior to the accident that she flew with the accident captain, they were scheduled for a 2-day trip, but FO Mora became sick. They flew only three legs of the 3-day trip. They overnighted in New Orleans, LA., and she woke up with laryngitis on the second day. She got laryngitis a couple times a year. She could communicate with the accident captain and the crew. They were doing one leg from New Orleans (MSY), LA, to Las Vegas (LAS), NV. She thought she was fine to go to LAS so they did not leave everyone stuck but she called in sick to the company and got off in LAS. They flew two legs on the first day and one leg on the second day. The accident captain flew the leg from OAK to LAX on the first day and FO Mora flew the leg from LAX to MSY. On the second day, FO Mora flew the leg from MSY to LAS.

FO Mora got along with the accident captain. The captain's CRM was "average." She was asked if accident captain did anything that was not SWA standard procedures and she replied "nothing stands out." When FO Mora was the PF, she used the autopilot. If the autopilot was on during a flight, the PF controlled the MCP and the PM verified the inputs. She did not recall the captain operating panel without saying something to FO Mora. The accident captain did not change altitude or speeds that she recalled.

FO Mora was currently based in Oakland and was going to Denver in October. She had been in Oakland since she got hired.

Rumors or people have said that the accident captain was not easy to fly with and some had said her skills were not great. That was not what FO Mora experienced. She had heard those statements from a handful of people. FO Mora did not know if those people had actually flown with the captain.

She would say the accident captain was an average pilot. She had seen better and worse pilots at SWA and Skywest. The captain performed via standard operating procedures and company procedures. She was not the type of captain that flew through you. She did not tell you how to fly. You had some captains that would ask "do you want flaps 5?" FO Mora thought when she wanted them she would ask for them. The captain did not prompt or lead you, she did not fly through you.

If there was a decision that needed to be made, FO Mora would say she was going to do it this way wanting the accident captain to agree or state her opinion. Sometimes it would be difficult to get response out of the captain. At times there was no distinct command ability. Sometimes when there was a decision to be made and the options were choice A or choice B for example, FO Mora wanted to know if the captain wanted A or B and there was no decision made. FO Mora would say she wanted to do A and the captain would not say anything. The captain did not give a lot of input either; she did not even acknowledge FO Mora's decision. She had difficulty understanding whether the captain was okay or not with the choice she made because there was not a lot of back and forth discussion. An example was when they had some weather. FO Mora was looking out the window, and said she was going to deviate a certain way. She would be looking at the radar and then there was no real input to her decision from the captain.

Asked about the accident captain's "stick and rudder skills," FO Mora said she thought the captain was an average pilot.

Asked if there was weather during the approaches that they flew, FO Mora said she did not remember the approach into LAX but the approaches into LAS and MSY were not in significant weather.

She did not recall making a flaps 40 landing with the accident captain.

She had never done an avoidance bid. The company paid her to show up 3 days a week. It was not that hard. She was aware that people did avoidance bids. She did not recall ever hearing someone say they did an avoidance bid for the accident captain.

She was asked what was the tone during the briefing and replied it was a pretty standard brief. The accident captain did not make her feel uncomfortable. The briefing was "by the book' and covered all four of the items in the book. Asked what the captain did right, she replied our procedures say the captain should brief the F/As. The captain made sure she briefed all three flight attendants. That did not always happen but FO Mora thought that was good of the captain to do that. She made me comfortable about speaking up if necessary.

The only transfer of control of the airplane that occurred was just standard transfer of control on the runway.

There was guidance in the FOM on how to transfer control and it was also covered in the simulator. Transfer of control happened a lot in the simulator because they were shooting approaches. There needed to a be "positive" exchange of controls. Whoever (PF) had the controls would say "you have the aircraft" and the PM would say "I have the aircraft". In the simulator, that happened 5-7 times a session. In the simulator world, they spent a lot of time in the pattern in the arrival phase. In the real world, change of control could happen if she turned to get something out of her bag.

She could not recall a captain taking over control of the airplane on short final from her.

During her flights with the accident captain, they did not perform any go arounds.

The accident captain's greatest strengths as a pilot was that she appeared to FO Mora as if she was trying to be kind or a good person. The captain was very empathetic to her when she was sick. She did not know of any areas in which the captain could have improved.

She never heard the accident captain ever complain about flying the airplane or the company.

There were absolutely no repercussions for performing a go-around. She had never had anyone question her about a go-around. There was no paperwork to fill out because of a go-around. They might call you after the FDAP [which was SWA's term for FOQA] team looked at the data but they were not wondering why you did a go-around, they were just gathering information to see if something could change to make it better.

She did not know the accident FO and had never heard the name.
She had flown into LGA and she had no concerns about flying into LGA; it was just busy.

She had performed go-arounds. She had performed a go-around herself and been part of a crew that performed a go-around. A go-around was just standard operating procedures.

She had used flaps 40 for landing and was comfortable with it. They typically used flaps 40 on short runways, for brake temperature issues, and for a heavy landing. Performance data "predicated" which flaps they used.

She would feel comfortable flying into LGA runway 4 at a 30 or 40 flaps setting. The flap setting would depend on weight and conditions. She agreed that the airplane would fly differently at flaps 30 or 40. She would be prepared for the different power settings for flaps 30 or 40.

If a flap configuration change happened below 1,000 feet, she would not like it and would direct a go-around. She would be comfortable doing a go-around up until the thrust reversers were deployed.

Asked about stabilized approach criteria, she replied: (1) the airplane needed to be completely configured by 1,000 feet, (2) must be within airspeed range and she believed the range was +5 knots or -0 knots off approach speed, but it might be +10 and (3) no more than 1,000 fpm descent rate. She said 99.9% of SWA pilots followed stabilized approach criteria on the configuration requirement. The rate of descent compliance was in the high 90% range, airspeed was in 50% range; but compliance was probably within 10 knots. The 1,000 foot callout was 1,000 feet, airspeed 135, for example, sinking 700, for example. She had never seen the airplane not fully configured; it was a hard and fast rule.

The interview concluded at 1500.

Name: **Richard Craig Shaw, SWA, Simulator Instructor**
Date: **September 30, 2013**
Time: **1345 EDT**
Location: **Phone interview**
Present: **David Tew – NTSB; Katherine Wilson – NTSB; Colin Fite – Southwest Airlines; Guy Woolman – SWAPA; Mikal Campanello – FAA; Wiley Moore – Boeing**

Capt. Shaw was represented by Morgan Campbell.

During the interview, Capt. Shaw stated the following:

His date of hire at SWA was August 6, 1996. He was former military, in the USAF for 20 years. He was an instructor pilot and he flew the KC-135. He had about 5,000 hours total time, and close to 4,000 hours as PIC. He got a type rating in the B737 in August of 1996 and had about an hour to an hour and a half of time in type. He got his type rating when hired by SWA.

His title was Manager of Training Standards and Quality Control. He still did some simulator training although not as much as he used to. On average he did one PT a month, and also did takeoff and landing currency. He did not train a pilot from beginning to end anymore. He provided the guidance and leadership to instructors doing that and worked with them on any issues. It had been about 5 years since he worked as a simulator instructor.

During the simulator part of training, CRM was not different for the FO or captain. It was integrated in how they ran their procedures and checklists. It was not broken out, it was imbedded. The way they accomplished things was their CRM training. They were looking for the captain to provide the leadership. The captain would call for the appropriate checklist. Then they would determine how to best approach a problem. They would pair up two captains or two FOs for training.

They looked for captains to take the lead, acknowledge that they would be contacting the F/As and the company, and take care of business beyond the cockpit during the emergency. They used the challenge and response method but expected the two pilots to work together.

He reviewed all of the training records as training progressed. CRM was not an issue that was typically documented as being a problem. Occasionally leadership would be documented as an issue. If a captain was not showing good leadership, it would be addressed.
Regarding management of the MCP panel, any time he would make a change, he would announce it and get acknowledgment from the other pilot that he made a change. Also, he would make sure that the reaction he got was what was intended. Typically when on autopilot, a PF would make changes to the MCP. There was allowance where a PF may direct the PM to change something. One accomplishes and one verifies that it was done. With the autopilot engaged, he would make his own input and selections and he thought that was the norm. In the simulator if on the autopilot and a PM reached up and changed the MCP, he would sit back and wait to notice if the PF would take notice that the PM did that and would say something. If the PF never

noticed the change, he would intervene and would ask the PM why would you do that without coordinating it; why change it without being directed to do that and why did you not verbalize it?

Go around training scenarios included when the crew got to minimums and they had to go around, and the other was more visual and they would direct a go around prior to getting to the concrete. They used the HUD cat III approach down to 50 feet to make a landing decision. At 50 feet, the captain would make a go around if necessary. The FO would do a Cat 1 typical ILS to 200 feet. This was training during recurrent. They saw it more frequently in initial and upgrade as well. Each pilot was also given a rejected landing at about 50 feet and had to make a go-around.

Transfer of control had not changed much in all his years of flying. If one pilot said my aircraft, the other pilot would say your aircraft. Or a pilot could say you have the aircraft and would keep flying until the other pilot said I have the aircraft. They PF would keep flying until the other pilot acknowledged that they had it or had given it up. They were looking for positive transfer of control. Transfer of control would take place at appropriate times, such as during seat adjustment and during briefings.

The majority of landings in the simulator were 40 flaps. If landing down near minimums, it was highly recommended to use 40 flaps, if minimum landing distance was bracketed in the performance computer, or braking action was less than good, a crew was supposed to use 40 flaps. In the simulator very rarely was it good weather so company policy would be to land flaps 40. A single engine approach required flaps 15.

The difference between flaps 30 and 40 was discussed mostly in initial training especially for pilots not familiar with the B737. They would cover pitch, drag and power requirements and how you pull power off during landing. Most captain upgrades that came through had probably been an FO for 10 or so years so they would be talking down to them if they discussed that. With captains it was typically not an issue.

For a 40 flap landing, pitch was about ½ degree lower than when using 30 flaps which gave a better view during lower minimums. Flaps 30 would put them just a little bit higher. When using more power with flaps 40, the airplane would respond more quickly due to additional drag. When using 40 flaps, if you reduced power the airplane would slow faster and the nose would drop quicker. If he was aware he had a drag issue, it may change the rate at which he reduced power. They never wanted to chop the power in a half second type thing but flap setting could make a difference in how he retarded the power. A quick power reduction would result in the nose falling. A pilot needed to control power to control the pitch of airplane. Power management was different when using 40 flaps versus 30 flaps. An overly aggressive power reduction would cause the nose to fall more rapidly. They had charts in their performance books, now in the QRH, where he could show them the fuel flow required when using flaps 30 versus 40.

Stabilized approach was a hot ticket item. By 1,000 feet, the requirements were gear down, flaps in landing configuration, on speed or within 10 knots, and checklist complete. It should be a normal glidepath at that point so the assumption would be the power was correct. It was always one of those things of interest. The secret to a good landing was a good approach. The airspeed

range was 10 knots high to 5 knots below. He hoped it would be that the closer you got to the runway; you want to be closer and closer to speed to meet the stopping performance he planned for. He was going to fly on the glideslope. If wake turbulence was expected, you can fly slightly above it. He thought a dot high was acceptable. There was a cross check call from the PM to alert the PF when starting to go left to right. When he was below 1,000 feet, if he was not stable he should go around. One dot at 500 feet versus 1,000 feet would require some pilot judgment. He did not recall if 1 dot left or right required a go around especially in a visual environment.

SWA procedures said they should be in the landing configuration at 1,000 feet or it was a go-around.
He did not know accident crew and until the morning of the interview and did not know their names. To the best of his knowledge he did not train them. He had been at SWA for 17 years and may have crossed paths with the captain. The FO was only at SWA a year and a half so if they crossed paths it was just incidental.

He had heard the accident FO's name more because he arranged follow on training for him. He assumed the training was based on the event itself. He was not told what to train him on. Training for the captain was not mentioned. He was told by his boss, Kirk Menard, that they would probably be bringing the FO in for training. He was told to think about who would do the training and what to do. They typically did table tops, FTD, and an academic flight training day. That was probably the footprint they would follow.

He did not look at the accident crew's training records yet.

He had done a demonstration on downwind where he showed the pilot how the airplane flew with flaps 40 and a slow reduction in power versus a rapid reduction in power.

The guidance would be to aim for power off at touchdown. For flaps 40, he would guesstimate probably closer to 30 feet above the concrete you would start to make a power reduction to idle. A power reduction at 100 feet would get his attention if using flaps 40.

The interview ended at 1345.

Name: **Margaret Flynn, Captain, SWA Flight 345**
Date: **December 30, 2013**
Time: **1100 EST**
Location: **Phone interview**
Present: **Katherine Wilson – NTSB; David Tew – NTSB; Keith Griffith – SWA; Guy Woolman – SWAPA; Mikal Campanello – FAA; Wiley Moore – Boeing**

Captain Flynn was represented by Anthony Battista, Condon & Forsyth LLP.

During the interview, Captain Flynn stated the following:

Avoidance bid systems were used in most major airlines. There were some people that should not be in the cockpit together. At SWA, it worked from the FO's point of view. A FO could avoid a captain, but a captain could not avoid a FO. The system should be anonymous but it was not; at SWA it was a tool "to label and hurt certain people." That was where she fell in the avoidance bid system.

Oakland, where she was based, was a junior base. When a FO started at Oakland, he was handed a list of pilots he should not fly with. She was on that list. How she got on that list started when she was an FO. In 2003, she attended the Women in Aviation conference in Dallas and asked for 5 minutes to talk with the "then VP of flight ops" to talk about women in her department. SWA was about to start hiring after September 11th, and the number one reason she had been told for there being few women and minorities in her department was "we weren't qualified enough." She was not 100% sure what that meant so what she wanted to express was that they had "qualified minorities in the pool." For that reason she asked for 5 minutes to speak. She was given a time and date to show up but when she did, the VP of flight ops was not due in for another hour. When he showed up, he showed up with 4-5 senior staff management, including "the pilot in charge of hiring" and a woman from the "people department." They went into room and made introductions. She did not ask for a meeting like this so she was not prepared for it. She explained to them that if the issue before was not getting enough qualified candidates, there were now and this was an opportunity for SWA to make a difference and interview "these types of people." Her boss was annoyed with her and made some comment that females were not always nice to fly with, but she was not sure what the context of that was. He told her he was under no legal obligation to do anything. She agreed and left and believed she was then labeled for fighting for minority rights and the line pilots did not like it very much. They pushed her buttons and she pushed back because things they were saying were not true. SWA probably had the least amount of females in the industry. There was a lot of mixed information and she tried to stand up for that right.

As a senior FO, the training department pushed for FOs to speak out in the cockpit, so Captain Flynn did – for issues such as unstable approaches, taxiing without clearances, and not completing checklists. She got called to the chief pilot's office and she was told that captains complained about her and was told she had an attitude. She was not sure what she was supposed to do; she did what she thought SWA wanted her to do, and she got "called on the carpet for it." She was told she would be going to upgrade training soon and she needed to change her attitude. Six months later she went to upgrade training and the training department pushed

standardization. As a new captain on the line she pushed standardization, particularly pilot flying/pilot monitoring duties especially when the autopilot was not on, use of checklists, and descent planning. "They berated me." FOs were aggressive and hostile, or if not that they were quiet and unresponsive. FOs complained that no other captain made them do those things, she was told no one liked to fly with her and she got ugly notes in her box. This went on for about 2 years; it would go away and then come back. She knew she was put on the avoidance bid list and she knew there was nothing she could do to change that perception.

After about 2 years, she got called in to the assistant chief pilot's (ACP) office and he told her that there were complaints against her, she was a terrible captain and he investigated her. She asked to read the formal complaints but he said there were none. He did not give her any examples of how to change but said if she did not change this could greatly affect her career. He gave her the option to go see one of the CRM captains. She jumped at the opportunity because she was another female captain. The CRM captain was unsure why Captain Flynn was sent to her because it was vague as to why they sent Captain Flynn there. They talked about the issues Captain Flynn was having. She learned that other female pilots were having the same problems and there was not going to be support from flight ops management. She was going to have to learn to deal with it on her own. She went back to line but did not feel comfortable.

About a month or so later she spoke with the chief pilot about her discussion with the ACP and he told her what the ACP did and said it was under his direction. She told him that once a minority pilot was labeled on the line it was difficult to lose that and he told her whatever she got was because of what she had done. She told him there were huge diversity issues on the line and that the flight ops management should pay attention to that. He strongly suggested to her that she should be careful and change her ways. She felt that as a female in that department, if you turn anyone in, all of it was brought to the line. All pilots on the line would find out about it. "As a female you're told about everybody else's problems and they do it was a means to control you to not go forward with any complaints"; she believed it was very effective. She knew about all of the other problems or complaints that female pilots had tried to bring forward.

It can take her a few days to figure out what kind of FO she was flying with – aggressive and hostile or quiet and unresponsive or a nice guy. She would start questioning everything she would say and would overthink so her judgment at best would be cloudy. Thinking back to the accident, one of her huge triggers into overanalyzing was a quiet and unresponsive FO because she did not know what they were thinking. It compromised her decision making. She did not like the type of captain she had become but she did not know how to move forward without the support of flight ops management.

The list of captains not to fly with that was passed around the Oakland base was made by the FOs, not an official SWA document. FOs would be told to avoid these people. But that was not the purpose of the avoidance bid system. Its purpose was for a FO to fly with a captain and if the environment was not a good fit, then as a professional the FO would not fly with that captain. It was not supposed to be an "unpopularity contest" but unfortunately was what it evolved into.

The avoidance bid system is supposed to be anonymous regarding who had an avoidance bid against them. It was made sure that she knew and she did not think she was the only female on the list in Oakland.

SWA was not supposed to use avoidance bids against pilots, but there were rumors that SWA had. She did not know if it was used against her. Her termination letter was just one line indicating that she was terminated due to the investigation of the accident flight.

She had no way to know how many avoidance bids she had against her. That info was supposed to be only in the hands of senior flight ops management. She did not know the reasons given for avoidance bids against her.

She was terminated from SWA on September 26, 2013.

She was given no other reasons for her termination. She was asked to come to Dallas. The meeting lasted about 10 minutes, including the 5 minutes they gave her to resign if she wanted to and then she was given the letter. There was no further communication.

Culturally it was known on the line, if a pilot did what flight ops wants them to do or say they would protect you and support you. There were numerous male pilots involved in incidents and accidents and involved in sexual harassment cases, but she knew when she was in the chief pilot's office that she did not have that support or protection.

Captain Flynn was asked if there was any information given to her by SWA regarding the accident prior to her termination. She said there was one day of inquiry with her and the accident FO in late August 2013 and the only other inquiry was the day she was terminated. Prior to her termination, her phone rang off the hook by people wanting to support her. Since her termination, she has received no phone calls. She believed this was because pilots were scared and if they wanted the support and protection of flight ops management they needed to "play the game."

She was not aware of any changes being made at SWA since the accident.

Regarding something that could have prevented the accident from occurring, she thought the big issue was the culture. She did not think the line pilots were against having the culture changed but there was no leadership to support the change. She hesitated in the cockpit and she wondered if the FO was going to turn her in to her chief pilot. That threat would be in her mind until she could figure out who her FO was. She felt that the accident FO was quiet and unresponsive and pilots like that were the result of confusion over rumors and not retaliation against her. As an assertive female captain, "I'm the b word". An assertive male captain was a "good captain." They needed to get away from that. She thought the training department was trying to push that issue through standardization, but what happened in the schoolhouse was not what happened on the line. She had only flown with SWA so she did not know if it was that way at other airlines.

Asked for an example of how what happened in training was not what happened on the line, she said pilot flying/pilot monitoring duties which required pilots to speak up in the cockpit. She did

not believe that speaking up in the cockpit was culturally accepted at SWA. SWA talked a good talk about trying to change it but she tried to speak up in the cockpit and was called out for it. She thought there was confusion on the line. Captains did not like to correct FOs and FOs did not like to correct captains. FOs told her that she should not tell them how to fly but she felt that she was explaining the standardization that SWA wanted in the cockpit.

Before meeting with her ACP, no one mentioned to her that there were complaints against her. The first she heard of it was when he called her to say he wanted to meet the next day. She had not heard about any complaints from management but in the cockpit FOs told her that pilots did not like her or like to fly with her. Her ACP and CP told her the complaints were mostly personality issues but people thought she was a good pilot. Her CP had flown with her.

Her ACP that called her was Brad Hazelbaker, but he was no longer an ACP. She did not know why he was no longer an ACP. He called her about 2130 when she had a 0530 "lobby time." She asked him if he knew what time it was and he laughed at her. She pushed to know why they were meeting and the ACP told her it was about complaints against her. Her mind went crazy and she hardly slept. She told her FO what happened and to watch her because she was not thinking about what she should be thinking about on a cross country trip back to Oakland. Her FO was a very nice guy and she thought he was "probably more worried about me than he knew how to help me."

SWA had about 7000 pilots, a little over 200 of which were female pilots. Oakland probably had 40 female captains and FOs and a total of 600-650 pilots. SWA consistently had about 3% of pilots who were female and she was the 97th female pilot when hired in 2000. The first female pilot was hired in 1984.

She had heard rumors before meeting with her ACP that she had avoidance bids against her, but she did not know how many.

Being a member of the union (SWAPA) was voluntary but all pilots were members; she was a member. When she first heard about the rumors about her, she did not ask the union for help for two reasons – 1) as a female you are told not to retaliate because it would work against you and 2) she received numerous articles from the union about how the CP was your best friend. From the union's point of view, she did not think they would be much help in this particular situation. This all happened 4-5 years ago. She felt that more recently SWAPA was stepping back from the position that the CP was a pilot's best friend.

She did not take a union representative to the meeting with the ACP because she had not had enough time to process the whole thing. She was not 100% sure of what was going to happen. She concentrated on getting the flight that day done safely and trying to think of where this was coming from. She assumed it was the start of something rather than that they had already done everything. She was not involved in the beginning and was brought in at the end. She was more focused on speaking with another female pilot than dealing with the union. She was not sure if SWAPA would have helped her because she believed this particular issue was highly political.

She got the union involved since her termination.

After the meeting, she did not contact SWAP or get any council involved because she was concerned about retaliation on the line. She believed that it would not have just affected her but other female pilots as well.

Other female pilots had told her only in confidence that they have had similar problems.

She had not seen the list handed to FOs of pilots not to fly with. As a minority, even as a FO, you were not brought into that confidence.

When she expressed an interest as to why there were not more female pilots, she was told that there were not enough qualified minorities for SWA. SWA did have higher qualifications than other airlines, which was 1000 hours of turbine time before completing the paperwork, so it made some sense to her.

She was warned by multiple female captains to not go through with the meeting with the VP of flight ops when in Dallas in 2003. She was told not to ask for or attend the meeting. It was more about protection for her and it would not be in her favor. She found out the open door policy was not true.

She asked to see notes from the investigation done by the ACP but he said no. When she asked to read the complaints about her he said there were not any. She asked to read the notes on his desk and he said no. She asked where he was going to file them and he ignored her.

The meeting with the VP of flight ops was in March 2003. She upgraded to captain in 2007. She met with her ACP in January 2010, but she did not know when the investigation into her was done.

The schoolhouse was trying to make pilots fly the way they trained but on the line the culture dictated a different situation.

There had been changes on line since she was hired and she thought that was because the pilot base had accepted those changes. That did not mean that pilots were always comfortable with following the schoolhouse mentality. She thought it was more about who a pilot was flying with and what their perception was rather than coming in and doing the same thing every day.

The first time she flew a crew airplane was at SWA. She thought training had greatly changed from when she went through new hire training. She did not think there was a lot of emphasis placed on flying a crew airplane when she went through initial training but there was improvement when she went to upgrade training. She thought the training department had tried to make those changes.

She learned to be a FO from the line and learned from whom she was flying with. Some pilots were good and some were not so nice. She learned how to “process and survive.” From a female point of view, she learned if you were perfect you would be protected. She thought the thing to do in the cockpit was standardization at that time. She also had to do what the captain wanted.

Some captains had no problem with her doing what she was trained and others said that was not how they did it on the line. You would learn the ins and outs of flying with a captain.

She thought what she offered when she became a captain was a situation she did not have – to fly very standard and when a FO would stray from that she would try to bring them back. FOs mentioned to her that if they did it standardized with another captain it would be a problem. Some FOs were aggressive and hostile about those issues, and some would say it in a nice way.

She was asked what her reaction would be if a pilot was flying a technique that was different than how she would fly but was still within the bounds of the regulations or procedures. She said at the beginning she was more inquisitive about it especially if she did not know what they were doing, but after everything happened, "I was quiet because those are the things that they didn't like."

Her CP told her that she was on the avoidance bid list. She did not recall if the ACP told her that also. They did not indicate that they had the list of pilots to not fly with.

The additional CRM training she received was appropriate because it gave a minority pilot an opportunity to talk to another minority pilot. They went over the standard things that could be used on the line and they talked about what worked and what did not work on the line. She was more than happy to go to the training because it was difficult for her to understand what they wanted her to change without having the knowledge of what the complaints were about. Asked if after the training she felt like she had new tools, ideas, feelings about where she fit into the system and how she could work best, she said she had "new enlightenment" on those issues.

As far as she knew, no pilot went to professional standards about her. She did speak with one female from professional standards. She worried about retaliation because when a female pilot went to professional standards, it was leaked. As a female, you had to be very conscious of what you do and who you spoke to about certain things.

Regarding her use of the term retaliation, she was asked how she felt she was retaliated against. She said the big thing was the avoidance bid list and being turned into her CP. While issues would be addressed in the cockpit, no FO told her that they were going to the CP. That was all done behind her back. She tried to find out why the pilots did not go to professional standards. Her opinion was that pilots did not go to professional standards because they were not interested in changing themselves or the situation but they were interested in hurting her.

Asked if there was another avenue for her to go down regarding these issues, she felt that for her as a female going to another female captain was her only avenue.

During her tenure at SWA there were only two minorities in a management position. When she was having her issues when upgrading and after, there was no minority to go to. CPs thought they were appropriately trained and she disagreed with that.

She could not think of anyone else the investigators should talk to.