

# **Attachment 1**

## **Operations Group Chairman's Factual Report**

**DCA06MA009**

**Interview Summaries**

**Interview:** Bruce Ronald Sutherland, SWA, Accident Captain  
**Represented By:** Dave McCracken  
**Time/Date:** 1300, December 10, 2005  
**Location:** Chicago, IL (Marriott Courtyard)  
**Present:** Kirchgessner, Lemos, Perkins, Timms, Laurenzano

During the interview, Captain Sutherland stated the following:

His date of hire with Southwest Airlines (SWA) was August 3, 1995. Prior to working for SWA, he was an Air Force pilot for 26 years, piloting such aircraft as the C130, B1, Sabreliner (T-39), B-52, and the trainers T-38 and T-37. He was a flight instructor in the C130, similar to what we know as a check airman.

SWA is the first airline that he has worked for. The airline required him to have his type rating prior to starting; he received his at Jet Tech in Phoenix in May of 1995. He was hired with SWA as a First Officer (FO), and after 4 years 11 months he was promoted to Captain. There were no problems with the upgrade. He has never failed a checkride at SWA, and no additional training was ever required for any of his check rides. He has never been a check airman for SWA (it wasn't offered to him, but neither has he applied).

Captain Sutherland said having no previous incidents, accidents or FAA violations. His current medical is Class 1, with the only restriction that he wears glasses. He was wearing his glasses at the time of the accident.

He said his approximate total time to be 10,000 hours or more, and had about 2500 hours with SWA at the time of the interview. The 737 models were the only civilian aircraft that he had flown.

He lives in Buffalo. He was not working for the four days prior to the accident day, including Sunday through Wednesday. The accident occurred on a Thursday. He received a good night's sleep the night prior to the accident. In fact, he slept in late and had to miss an appointment in order to go directly to the airport.

On the morning of the accident, he flew from Buffalo to Baltimore (BWI) on flight 585, which departed at 1125. He arrived at BWI between 1230 and 1240, went to lounge and carried out an assortment of tasks (e.g., checked in on the computer, checked his mailbox and any "Read-Before-Fly" [RBF] letters, picked up other changes, spoke to some other pilots). He met the FO, Steve, on his way to lunch. He believed that he had met him on a previous occasion, although he reintroduced himself. He then returned to the lounge to iron his shirt and get dressed.

The accident flight was the first of a three-day trip, with three legs the first day, ending in Salt Lake City. No one was in the cockpit jumpseat for the accident flight. The FO went up to the gate ahead of him, and they were there 20-30 minutes prior to the arrival of the airplane.

The flight paperwork is usually brought up to the pilots at the gate (not done at operations). They were brought Revision 1 paperwork. He was not sure what changes Revision 1 was associated with, as he had not seen the original flight paperwork. He noticed that the weather appeared unusual. The weather trend from the TV in the waiting area was consistent with the paperwork.

They received a gate hold because of weather delays at the arrival location, Chicago. The reason they were given: Icing and low visibility conditions at Midway (MDW). In the aircraft, he pulled up the ATIS for MDW via the Aircraft Communications Addressing and Reporting System (ACARS). At that time, he recalls the weather showing light snow and low visibility. He called dispatch to find out how long the delay might be, and was informed that it would be a while.

Because of the delay, at 25 minutes prior to original departure, he stopped the boarding process. He explained to the passengers the reason for the delay and let them know that he would keep them informed. He offered for them to get off of the plane, but to stay close to the gate.

He said that he didn't remember whether or not he had previously flown with the FO. The FO pointed out to him prior to the flight that they had met previously, that they had an overnight in the same location as he did on a prior occasion.

His impression upon meeting the FO was "great", based on his demeanor. He said that the FO was "awesome to fly with, he was on top of things", and was "one step ahead at all times."

He and the FO discussed the weather at MDW prior to departing BWI. They didn't have RVR on ATIS, but they kept checking the weather while waiting on the ground.

He said that there was nothing unusual about the pre-flight. There were no MELs, and the FO didn't bring anything to his attention.

The aircraft pushed back at 1650, and the plan called for a 1 hour 40 minute flight.

Captain Sutherland's last checkride was on July 4<sup>th</sup>, and it was a proficiency check (PC). This included a day of ground school prior to the check. He said that the check went well. When asked if the check airman brought up any suggestions, Sutherland said that he had, but that he couldn't remember the specifics of these comments. There were two captains receiving their PC's, and they traded off seats during the simulator sessions.

When asked if anything regarding winter operations was included in the ground school, he said that there was, that they have a sequence of weather topics that are reviewed throughout the year. He didn't recall the specifics of what was covered, but he believed that the information would be tailored to the time of the year.

Two times per year they have a take-home exam covering different weather topics. He believed that this was in April and October.

When asked how many times he has encountered weather of this level, he said that this was the worst, but that he has not encountered it all that often. He has only encountered between one dozen and 15 times where the runway conditions have been bad.

When asked what the worst part of it was, he said that the visibility wasn't that bad, but the runway was short, and everything had to be working perfectly. It was a difficult situation in that the parameters were narrow.

He said that he and the FO had a good feeling about the approach, and that he wasn't nervous. He further said that they discussed everything, and they were feeling pretty good about that.

When asked if anything stood out on one of the previous dozen times he encountered poor weather, he said that in some situations there was ice, with narrow clearings and snow on both sides, or only portions of the runway plowed, or low visibility. There were one to two situations in which the braking action gave him some anxious moments, and where keeping lined up with a crosswind made it difficult. However, there was never a time in which he thought that he wasn't going to be able to stop.

An unknown local party tested him for drugs after the accident at the hotel. He had not yet been given the results of the urine test, although they provided the results for the Breathalyzer immediately (00000.0). He elected to give blood. No one advised him not to have it collected, and he did this last night at 1758 (close to 24 hours after the accident). For this, they had to go to a lab downtown. A union representative went with the crew, who had the blood samples for both crewmembers drawn at the same time. The representative copied the names of the lab workers.

He said that he did not receive any coaching or advising prior to this interview today.

He said that there was nothing abnormal about the taxi, take-off, and enroute.

He said that they looked at the weather and continued to retrieve weather updates, and subsequently entered parameters into the OPC to see what the performance numbers would be with different scenarios (e.g., runway conditions, visibility, tailwinds, etc.). They decided what would be a no-go: if runway conditions were POOR, or if the tailwinds reported were at 10 or more, they would not attempt to land. Per his recollections, the winds reported were within the limitations, with a runway condition of FAIR.

He and the FO discussed whether or not to use the autobrakes. He initially stated that he wasn't comfortable with using the autobrakes because they have only had the opportunity to use them in the simulator (not on the line). The FO convinced him otherwise. They

reviewed the procedures for use, and determined that even if the autobrake disconnect light went on, they could still do it.

He said that once in a while they used the autobrakes on a landing in proficiency training (PT). On these occasions, an actual comparison was done of the effectiveness of pilot manual braking versus autobrakes on landing (not just RTO). In the particular demonstration scenario he recalled, which was on a basically clean runway, the autobrakes won. He said that it was amazing how well it worked.

They were given instructions from ATC to hold at LUCIT intersection (that fix is on the BOILER arrival plate). They spoke about the go or no-go decision, the weather. They also discussed alternates.

When asked which SWA approaches the captain is required to do, he said that this would include single-engine, HGS, and minimums of RVR 4000 or ¾ mile or below.

There is also a “company procedures” approach, in which the FO flies and the captain lands. This approach can be used at any time, but that the captain had the option to use this approach if he elected not to use the HGS. They can also use the company procedures approach for non-precision approaches.

Conditions on the accident night were higher than the minimums requiring the captain to land: RVR was initially at 5500, and then at 4500 closer in.

When asked if he would have felt comfortable letting the FO make the landing on the accident flight, if it weren't his leg, he said that he would, knowing what he knows of this FO, and the training that he received. As a captain, he would monitor the approach, and felt that, many times, this is even better. He said that he has not flown with anyone at SWA that he wouldn't have felt comfortable letting fly that particular approach.

He said that the fuel on board was 23,800lbs, that they had plenty of fuel. The landing weight was 120,000 or a little less. The OPC tells you whether you're within the limitation for landing on a particular runway at a particular landing weight.

The FO was very good in terms of checklist protocol. When asked if he, as the captain, was a willing responder to checklist challenges, he said that he was.

When asked to characterize the level of standardization at SWA, he said that it is excellent, that the pilots have a lot of respect for one another.

When asked if he has ever had an unexpected line check, he said that they do get them every once in a while. They usually know that the check is coming, but they don't know when exactly, so in this sense, it is unexpected. He didn't recall the most recent time any FAA person had ridden in his cockpit, but that he has had them do so before. He couldn't recall any specifics regarding what they may have said prior to getting off.

The weather information package that he received for the accident flight was according to what he would have expected. He discussed the weather with the FO and also with the flight attendants (FA). He said that the weather information was not inconsistent with what they eventually found at MDW.

Captain Sutherland was informed that the FO said that he (the captain) gave a very good briefing to the FA's. When asked if this is routine, he said that he tries to give them everything they need to do a good job, and that he usually does this.

On the accident flight, the weather (ATIS at MDW) had been updated about 5-6 times prior to the descent. He said that the information changed very little during that time period, with ¼ mile visibility at the latest update. He'd estimated that they'd be holding for quite some time.

When asked if the ATIS said the runway conditions, he said that there might have been something, but that the better way to do this is through selecting the runway condition report in ACARS. You can select this as an option. When asked if anything in the reports gave them cause for concern, he said that the information was not surprising. They saw braking reports of FAIR/POOR.

When asked if there is anything that reports the level of snowfall, he said that there is not, that it only classifies the snow as LIGHT, MODERATE, or HEAVY. On the accident flight, they never saw HEAVY, only MODERATE and MODERATE to LIGHT.

Their approach briefing was standard. It consisted of their looking at the approach plate, frequencies, height above touchdown at the final fix, decision height (DH), minimum safe altitude, the runway lighting needed, DME, turn-offs, missed approach procedures, NOTAMs, and use of the autobrakes.

When asked if, as a captain, he has any personal limitations regarding when to do a go-around (GA), even if it were legal to land, he responded that he would do a GA anytime that he was not comfortable, such as when the approach was not set up, if they were too high or too low on the parameters at that point.

He said that he has made a few go arounds since he's been with SWA. On one occasion he was too high on the vectors. On another, the FO was flying, with lower visibility and with a crosswind. Although he saw the approach lights, the FO didn't see them, and they had forgotten to talk about the crosswind, so they went around.

When asked if he has ever felt pressure by the company to land, to be on time, he said that about 5 years ago, he would have said "yes", but that the company is not that way any more. They'll back you up if you err on the safe side, so he no longer felt any pressure.

When asked why this has changed, he believed that this is because of the size of the company and the growth. In addition, there were some Flight Data Analysis Program

(FDAP) reports (similar to Flight Operations Quality Assurance; FOQA). He said that the same management was in place throughout the period of these changes.

He said that his seatbelt and shoulder harness were on during the approach.

Other than the two previous aircraft landing, they did not hear any other pilot weather reports (PIREPS). ATC relayed them to the pilots on approach, and they could hear them when on the tower frequency. Based on the weather, he thought that it was a possibility they could end up in St. Louis, although he didn't discuss this with the flight attendants.

While en-route, they were above the clouds, and also while holding at 10,000. During the descent they picked up some icing, although they put on the wing anti-icing before going in the clouds. It was IFR all the way down. The engine anti-ice was turned on before going into the clouds, and was never turned off.

The approach controller relayed the runway conditions / braking action to them. There also were a lot of questions from other people checking onto the frequency. The worst report that they heard was "FAIR first end and POOR at the last end." He said that if it had been the other way around, they wouldn't have landed because you touch down at the first part of the runway, and you would hope to be at a manageable speed prior to going into poor conditions.

He said that the type of aircraft making the report is significant, and that the last report given was by a civilian aircraft with FAIR/POOR. He recalled hearing a report from an earlier SWA that had landed, and it was reported as FAIR all the way.

When asked what the procedures are when the conditions are NIL, he said that if any portion of the runway was NIL, they would not be allowed to land.

He did not recall the final wind check from ATC. He thought that the FO might have asked for one along the way. He had the readout, and it was within parameters.

Vref was 125-130kts. When asked what the special requirements were regarding when to add to this number, he said you would add 10kts with ice. When asked why he didn't use 10kts extra that night, he said that he didn't need to with the flaps set at 40. They were landing with the lowest speed they could, and the extra 10kts was not required.

The engine anti-ice was turned on and left on (it was less than 10 degrees). The ignition was on continuous (CONT). The APU was off, and the autobrakes were set at max.

When asked to comment on what he bases his decisions and comfort factor in regards to the OPC, he said that in this particular case, the max autobrake setting was showing 500' remaining. The previous selection for medium (3) autobrakes was showing 350' feet remaining. Because of the additional runway, and the fact that another SWA aircraft had landed, he didn't have any apprehension. The FO didn't seem apprehensive, nor did he express any apprehension.

The autopilot was on until he disconnected it at about 700'-800'. AIII was selected on the HUD. At the FAF both the autopilot and the HUD were selected. When he disconnected the autopilot, he was on glideslope (GS), airspeed (AS) was on, and they were centered with no deviation callouts from the FO. He disconnected the autopilot when he saw the runway lead-in lights and wanted to get a feel of the aircraft prior to the last minute. He has flown with the HUD many times. He was comfortable with the HUD, but wanted a good transition period.

When asked about company guidance regarding use of the autopilot, he said that it is up to the pilot's discretion, although you must disconnect at a certain point on the approach, perhaps no lower than 50 feet. He doesn't believe that there is written guidance on this, although it could be in the manual.

They were clear of clouds from 700-800' to touchdown. The runway environment was in sight. He saw the lead-in lights and bar. He couldn't see to the end of the runway right before touchdown. It was a black hole. He could see perhaps half of the runway. He didn't see any touchdown markings. He was just following the HGS down and the FO was giving the callouts.

When asked to comment on what the definition of a stabilized approach was he said that for an ILS approach, at the FAF you should be on airspeed and configured. After that, they make callouts for deviations on glide slope and airspeed.

When asked if there was any mandatory guidance for a GA, he said that if you are 1 dot high or low on the GS, on final approach, that this would call for a GA, and that either pilot can call for a GA if they feel uncomfortable. He believed there to be no guidelines for AS deviations for a GA, you just continually correct for this. He continued to say that the FO can call for a GA without giving any reason, and that if the FO calls it and the captain doesn't do it, the FO can take over the plane.

When asked if the FO gave any deviation callouts during final approach, he said that just after he (captain) called "Landing" (right around minimums; after the accident, the FO told him that he thought it was called earlier), the FO said, "I got you a little high." He then adjusted, and the FO said that he was 1 dot high (at about 50ft). He brought it back to idle and landed at that point. That close in, the GS is not that accurate.

He called that he had the lights right around minimums, but he didn't call out that he was going visual. He left the HUD down all the way to the runway, on setting AIII, which was the correct procedure and based on the lowest CAT III approach. AIII gives the narrowest parameters to go by. Once set down, the runway comes up, to show you where it is.

On the HUD, the energy bar is for AS, and there is a trend setting. There is an airplane symbol, which is a circle, and another circle that you have to keep centered. This provides the guidance. The point is to coordinate the pitch and energy.

He said that on the accident approach, at all times his dot was in the circle and the energy was where it should be. He usually calls out that he's correcting at any time he adjusts airspeed.

When asked if the HUD provides runway length information, at first he thought that there wasn't, but then thought that there is now. He wasn't completely sure.

He said that he used the HUD the last time he was in the simulator. When asked what the philosophy was regarding the HUD, he said that it is a great tool, that on takeoff it gives you everything you need to fly with an engine out. It makes you the pilot your mother thinks you are; it gives you good information.

When asked if the company encourages its use, he believed that they do, but that its mandatory only on low visibility takeoffs and CATIII. Otherwise you can use it as you wish. He believes there is guidance in the FOM regarding use of the HUD, for example, it recommends that you do not use AIII mode with strong crosswinds (too sensitive), but to use the IMC/VMC mode.

He believes that MDW is available in the simulator, and that MDW Z is not the only reduced minimums approach. He wasn't sure where the other ones are.

When asked if there was anyplace where the captain is required to make the landing regardless of the weather, he said that he didn't believe so, outside of new pilot requirements.

When asked about the speedbrakes, he said that he makes sure it is armed prior to landing, and he checks the gears and the flaps.

When asked what he is taught in the simulator regarding speedbrakes, he said that you're taught to check that they've deployed; that you hear them. If you don't, you look to see if they're up. You're taught to put your hand over there to check, and if they're not, to pull back. Well, no. He usually leaves his hand on the throttle to feel for the reverse thrusters to come back up.

When asked what to do if the spoilers don't deploy, he responded that either the captain or the FO could manually deploy them.

There was no turbulence the night of the accident, but perhaps a little up at altitude.

When asked if they were monitoring the winds while being vectored, he said that they did, that they weren't real significant, maybe around 10-20 and out of the west.

He also monitored the wind readout in the HUD, which was a tailwind around 5-6 . At 1000' there was a 12-knot tailwind, which he based on seeing the sink rate of 950 fpm.

The tailwind subsided as they got lower, and was about 7-8. They got back to a 500 fpm descent between 800' and touchdown (TD). He was on target airspeed within 2-3kts.

When the FO called "a little high," he (captain) said he was within AS limits, and that his circle (on the HUD) was centered the entire time. When asked what the AS was after making a correction, he said that he gained about 1kt as the nose was lowered. When asked if it was fair to say that he was at 130kts until the flare, he responded that it was.

When asked if the RVR was about 5000, he said that he would agree with this, from breaking out until touchdown.

The touchdown was not hard, but firm. When asked if he had any way to estimate the touchdown point, he said that he couldn't really discern the runway side markers, although he felt as if he was between 1000 and 2000 feet, perhaps around 1500. He didn't really know. The runway remaining markers were not visible, either because they were snow covered or he didn't focus on them. He didn't recall hearing the FO call them out.

He heard the spoilers deploy so he knew that they were out.

He did not make any control yoke inputs after touchdown because the airplane was tracking real well. He felt the anti-skid cycling continuously and felt as if it was working.

He didn't feel the reversers come out. He tried to move them with his hand, and they wouldn't move, and then the anti skid stopped cycling. He went to the brakes and started to apply them, which took his attention away from the reversers. At this point the FO came on the reversers. He doesn't recall FO knocking his hand off, although, afterwards, this is what the FO told him that he had done. He said that it took the FO a little work to get the reversers back, but then he finally got it back. The cycling stopped at that point.

He's not sure exactly when the autobrakes came off; he's not sure if he knocked them off when he re-adjusted his seat (re-set too high). He never saw the autobrake disengage light under the glareshield. Perhaps it was because of his seat position.

He then heard the reversers. It seemed like forever before they came in. They could see the end of the runway at that point and he knew they couldn't make it.

When asked if there are any requirements for the pilot not flying (PNF) to monitor the speed brakes, he said that there is, but that he didn't recall the FO saying anything that night.

When asked about guidance regarding the use of autobrakes, he said that you use them until you feel like taking over manually.

When asked why he switched to manual brakes if the autobrakes and anti-skid were working, he said that after putting on the reversers, that he no longer felt the anti-skid, so he went to manual braking at that time.

When asked if it was possible that they weren't feeling the anti-skid because they were no longer skidding, he said that it is possible, but that they weren't slowing down. He didn't check the AS.

The FO was calling "brakes, brakes, brakes", but the captain said he was already on the brakes. He doesn't know if he had any reaction from application on the brakes. He didn't stomp on them. He thinks that he was on the brakes though.

The FO got on the brakes because he felt they weren't decelerating after the reversers were put on. The captain didn't feel the FO push them down any further, so he thought that this must have meant that his feet must have already been down far enough.

He wasn't sure when the FO put his feet on the brakes. He thinks it was before the reversers kicked in, but perhaps after the lever was brought back.

When asked if he held the reversers at the interlock, or if he was fighting it, or if he was trying to get them out with re-application, he responded that he didn't know. He felt that he was not decelerating.

When asked what the company guidance is regarding deploying reversers, he said that they are automatically deployed on touchdown, and that if they do not, then you deploy them.

When asked to explain how the reversers are normally deployed, he said that from idle you go back up into interlock and then back to the reversers, which you have to wait for. On that night, initially he could not even get them up.

He got on the brakes because he wasn't decelerating. He doesn't recall trying to fix the reversers again. He worried about the brakes, looked outside, and noticed that they were close. At this point the FO got on the reversers. Captain Sutherland said that he made only one attempt to get the reversers out.

When asked why, looking back, he made only one attempt on the reversers, he responded that he was very concerned that they weren't stopping, and his entire attention went there. He was focused on the fact that they weren't stopping. The FO knocked his hands out the way, according to what the FO told him later, although he didn't remember this.

He said that when the reversers kicked in, he could only see the red barrier at the end, perhaps about 1000 feet to go. They were both on the brakes, and they were sliding straight away. There was no anti-skid at that point.

When asked at what point he figured that he was going through the barrier, he said before the reversers went on. The only communication between he and the FO was when the FO said something, and he responded, "I think that you're right". At that point they were along for the ride. They went through the barrier and blast shield, and he saw the car. He thought, "Oh no, a car". He saw a telephone pole, and wanted to avoid that, kicked in rudder and slid away from the pole.

When asked what he did right after stopping, and if he was coherent, he said that he was, and that he shut the engines down right away, as he was thinking about a fire. The tower called to see if they had cleared the runway, and the FO called that they had gone off the runway. He believes that the emergency crew was called by ATC. The FO did the checklist while he went to the back. The flight attendant gave him the megaphone.

He told the passengers that it's OK, keep your seats, just relax; we just went off the runway. He said that he opened his window when he came back to the cockpit from the cabin.

A fireman came up to the window. He then saw the man from the car, with blood down his face who was holding a child and yelling at him. Obviously, it got his attention and he looked at the car. The fire marshal brought him back to reality and told him not to worry about the man, and asked where he wanted to go. He was looking for a good spot, and thought perhaps by the traffic weather box on the left side.

The FO was saying that they have to get the people off, he said this several times. He then went back to make his plans, and he decided they should go out the front because the nose was low. He told the FAs and the passengers to relax, to grab their coats, that they're going to walk out the front door. He remained calm so that the passengers also would be.

The FAs were yelling to KEEP CLEAR to those on the ground. People started coming by. He stood there and helped the FAs direct them out. The passengers in the back couldn't hear him very well.

The first 30 people came out with coats and purses, and he was at the door. One woman was 9 months pregnant. Further down the way people came with their roller bags. He took them and put them aside prior to the passengers going down the slides.

At some point the FO got up, and the captain asked the FO to help the passengers. The FO was perhaps the third person or so off the plane.

A pilot who was deadheading told him that everyone was off. The captain wasn't aware at that point that 35-40 passengers had gone out the back down the airstairs.

He went back up to the cockpit to see if he could see if the checklist was completed, but he was told by the fire people to get off the aircraft. He was the last one to get off at the

back of the aircraft, and went through the cabin to check and make sure that no one was on the plane. He brought the people to the back towards the runway.

There were a lot of people other than passengers, and they were trying to get a count, but it was too difficult. There were 98 passengers. One passenger said that he left his insulin on board, and the captain addressed the fire marshal. They went back in to look for the bag but he couldn't find it. He directed him to the ambulance if he needed anything immediately.

When asked if he opened the window before getting out of the seat, he said that he wasn't sure, that he couldn't remember.

He was asked if he got up and out of the seat when the FO was doing the checklist, and he said that he did. When asked if the FO had gotten to the point on the checklist where it calls for them to advise the FAs, he responded that when he came out the cockpit, the FAs were already on the megaphone. He didn't hear anything that they said. He thought that the megaphone is usually stored in the front of the aircraft.

At the point the passengers were still in their seats.

When he took the megaphone, he told the passengers that they had run off the airport, to stay in their seats, and that they'll get off of the aircraft as soon as they (crew) figure out the best exit.

When asked if the door had yet been opened, he stated that he believed that it had been cracked, but wasn't sure.

He then opened the window up; he thought this was for the second time. He then said that he wasn't sure if he spoke to the injured person on the first opening or the second.

When asked who made the decision as to what door to open, he responded that he did, and that he chose the front door because he thought the right front side would be too long. When asked if he thought that the slide wouldn't reach the ground on the right side, he responded that he felt as if the left forward exit would be the best.

When asked why the evacuation hadn't started before ARFF arrived and why the FAs did not evacuate immediately, he responded that he didn't feel as if they were under a dire need immediately. He didn't smell any fumes, and no one outside told him about fumes. He wanted the passengers to stay there until they had a good plan. He's not sure how much time passed. He took some time to think about it. No one told him that there was a fuel leak.

When asked what the SWA procedures are if the pilots are incapacitated, in a situation like this, he responded that the FAs would likely come into the cockpit, and they can call for an evacuation.

When back at the terminal, the company had a room for them, and Tony Dorsh came by and told them to wait, that they were setting up hotels. Some of the folks called home. He then went to the hotel.

He stated that the company didn't debrief him, nor was he asked to make a written statement.

When asked if he had to perform an emergency evacuation on his last evolution at the simulator, he responded that he probably did, but that he didn't recall.

When asked if there was anything that we haven't covered that would be germane to the event, he responded that there was not.

When asked if he would like to add anything, he said that he felt awful about the tragic situation. He felt that the crew, the FO and the FA's all were very good and did a good job. They had good training. He also felt bad for the company, as they have taken good care of them, that the company had provided a lot of support.

When asked if there was anything he would have done different, looking back, he responded that he would have just gone ahead right after touchdown to manual brakes. He would have overridden them there from the start. He also would have made sure that they had the reversers up.

When asked if there would be anything he'd change in training, if he had the power to do it, based on his experience in this accident, he said that he'd put people in this situation, a marginal situation, to see how much error is built into the model (e.g., reaction time, etc.).

When asked if he feels as if the use of the autobrakes hindered him that day, he responded that he believes his understanding of them may have. Based on the OPC, they were required to use them, although they could have opted out, as it was discretionary. He used the autobrakes because he felt they would give him a head start of a human by 2-3 seconds.

When asked if he believed more experience with the autobrake would have changed the fact that he went with the manual brake, he responded that in his mind, they weren't working.

When asked what the SWA approach briefing procedure is, he said that they are required to give the aircraft to the PNF while doing this.

When asked if there were any other company aircraft that diverted, he said that there might have been one other.

When asked if the OPC allows for entry of runway length, he said that it does.

He said that he went to idle before the flare cue to get the aircraft on the ground.

When asked when to use the symbology versus visual, he responded that you use the symbology until you go visual.

When asked if the HUD takes you further down the runway, purposefully, he responded that it does, that the OPC takes into consideration that he hand flew the approach on the HUD.

He said that the reversers did not work, but that the autobrakes did. When asked why he went to manual brakes, he felt that the autobrakes were not working enough, that he tried to stop the aircraft, to do something.

Several other aircraft on final gave reports of braking conditions for fair, with the entire runway implied.

When asked if with the HGS, is the max tailwind limited, he responded that he did not know.

**Interview:** Steven Thomas Oliver, SWA, Accident First Officer  
**Represented by:** Dave McCracken  
**Time/Date:** 0830, December 10, 2005  
**Location:** Marriott, Chicago, Ill.  
**Present:** Kirchgessner, Lemos, Timms, Perkins, Laurenzano.

During the interview, FO Oliver stated the following:

DOH at SWA was 2-17-03. Current title was First Officer. He attended College at ERAU, AZ, and was also the assistant chief flight instructor for 2 years. He had flown at Mesaba Airlines in the Saab 340. He was based in DTW and was an FO for 2 years and a captain for 4 years. Prior to ERAU, he flew the Cessna 172, 182, and a Beech Duchess (BE 76). He had no incidents/accidents while at Mesaba and he was never a checkairman and had never been a member of the training department. However, he helped a friend put together the systems manual at Mesaba.

He had a first class medical and was required to wear glasses. He said he was wearing them the day of the accident.

There was no jumpseat rider that day. It was the start of a 3-day pairing. The airplane arrived at BWI on time but there was a 2-hour delay due to weather at MDW. Flight was scheduled BWI-MDW.

He lived in Albany and commuted to BWI that morning. He was on reserve and had a 1040 check in time. He arrived ½ hour prior to check in time. He had 8 hours sleep the night before and took a nap the day of the flight. SWA procedure is to report one-hour prior.

His normal duties prior to flight – go to mailbox, get revisions, read before fly book. That was the company’s way of letting pilots know of any changes. Then he waited for the airplane to arrive.

The a/c arrived early from San Diego, 40 minutes prior to their departure; usually they have about 25 minutes. They did the walk-around, and all duties. They were instructed to wait for a sequence time.

The day prior to flight he was off and it was a normal day with the kids. Nothing unusual. He was on his 3 days off in Albany.

He knew Bruce (accident captain) from overnight visits when several crews stayed at the same hotel. He was comfortable with him but he didn’t believe they had ever flown together previously.

Bruce’s demeanor was excellent. His briefing: “If you ever see anything, point it out.” He was a total team player, very open. He was looking forward to flying with him. He made him feel very relaxed. He (FO) did the outside pre-flight, and that was normal. There were no MELs.

Bruce’s demeanor with checklists was excellent. His demeanor with the FAs also is really good, surreal. This whole process they worked together so well. He was proud of how well they covered everything. They had so much extra time. It was really like a good crew feeling. It had a really nice feeling to it before they left. He was also a part of the FA briefing.

When asked if Bruce was different than other captains at SWA, he said procedurally, everybody does things how the company wants them to do it. However, his personality was such that you want to participate.

There was nothing unusual during pushback or taxi other than a 45-minute delay and then a 1.5 hour delay until receiving a wheels-up time.

They boarded people 25 minutes prior to actual departure time. They would not have made the scheduled departure time because they added a bunch of extra people, which was not unusual.

He had about 9-10,000 hours total time and around 3500 PIC time at Mesaba. He had about 2600 hours at SWA so far.

The accident was in a 737-700. They also have –300s and -500s. There are a few more 700s than 300s.

He was drug tested because the company-required a test within a few hours – urine/breathe. Not sure who did it, thinks it was a contractor.

He was blood tested last night. There was confusion as to whether it was required or not. He agreed because they both figured they had nothing to hide. The union set it up and the paperwork is at SWA.

He was due a PC in January. FOs at SWA go every year instead of every 6 months.

He never failed a checkride here or at Mesaba and had no FAA violations.

Every fall they go through an on-line test with regards to weather that is very good. The test is an open-book exercise. He's sure that it's also covered in recurrent, but doesn't now recall what is covered.

At SWA, he had never encountered the weather he encountered the night of the accident. However, at Mesaba, nights like these were a dime a dozen and he encountered them 1000 times.

Last year in Cleveland it was pretty bad. There have only been several instances that its been snowing in his tenure with SWA, speaking only of the amount of snow. During those few encounters, nothing unusual occurred.

He was not coached prior to the interview and wasn't told to avoid answering any questions or what to answer to certain questions.

Bruce was flying that night. That's common for the captain to fly the first leg.

The fuel load that night was pretty high, around 23,000 lbs. It was not an issue. They had two alternates, STL and MCI. Fuel was not an issue.

He reviewed the weather package that the captain picked up in Ops. They knew it would be a nonstandard night. Leading up to departure, he checked wx through ACARS about 400 times (in reality 4-5 times).

He programmed the FMS and the procedure is for the captain to review it. That is on their checklist.

He found the weather package that he got that night accurate but there was a 2-hour delay. They get real-time information from ACARS that is only 1 hour old. They weren't surprised by the weather when they arrived in the MDW area.

The flight was planned for 1 hour 40 minutes. It would have been perfect except they did some holding.

Everything was normal during pushback and departure.

Enroute they talked about the new FOM procedures and the use of auto brakes. This was their first trip where they would be using the auto brakes. They read the procedure thoroughly because of this. They did this as soon as they were leveled off. They looked at the instrument approach procedure, the landing weight, and performance computer. They knew that they would have to use the auto brakes for this landing because of the conditions and runway length. They couldn't have covered it any better than they did. They have never previously used them (according to company policy). They just received this new revision. This is the only thing different about the entire flight. They beat the horse dead during the entire flight.

Previous to this, they used them for takeoff (RTO) but not for landing (so its not as if they were disconnected).

They plugged into the OPC winds, weight, and runway conditions, and arrived at the conclusion that autobrakes had to be used. They then had a discussion about the use of autobrakes.

When asked if they were apprehensive regarding using auto brakes, he said it was discussed. Bruce thought they shouldn't use them. He (FO) said that it was required and the numbers work out such that they need to use them. All the boxes were checked. He said he would support Bruce if he felt strongly that they shouldn't use them. The captain agreed to use them. There was some apprehension until they talked about it further.

He hadn't before used them because of SWA policy, which is why they spent so much time reviewing the procedures in the FOM. He was told not to use autobrakes until the FOM revision.

Checklists at SWA are all challenge/response.

The descent checklist was performed during the initial descent and the approach briefing was given as usual. They were vectored to LUCIT intersection and told to expect holding. They had to scramble to find the fix because it was not on the arrival they were going to fly. It was on the BOILER arrival. They were told that after LUCIT, they would be vectored for the approach.

During the approach briefing, they went over the steps of a missed approach, because of the fact that they don't go through them very often. If necessary, it would be max power, TOGA, flaps 15 and not just go over the charted missed approach procedure. It was nice to refresh.

They received the ATIS via ACARS and got R, S, T, and U. Winds were pretty steady at 090/11 throughout the reports. Snowing, wind out of east at 11kts, between 4000 and 5000 RVR (ACARS ½ mile). The minimum RVR for the approach was 3500 and it was above those minimums.

There was no braking action report on the ACARS. Field condition report can be plugged in, but the plane ahead of you is always better than the report. They planned on using that.

He doesn't recall if ATIS said snow/ice on runway, but assumed there would be snow with reports of ½ mile visibility with snow. There was no conversation about snow on the runway exceeding SWA limits. No specifics were given about the amount of snow on the runway.

On the OPC they plugged in ATIS information, which asks for icing, visibility, and braking action, and they ran the numbers for FAIR and GOOD, and also ran POOR. They were heavy for landing, 119,700 lbs. Using max auto brakes, the airplane would have had over 500 feet remaining when it came to a stop using FAIR.

When POOR entered, max braking would leave 30 feet remaining. This would have been outside of their limits and they would not have landed even though there was a positive stopping distance.

Two aircraft were in front of them. RVR 5000 was reported. Braking action from the first airplane was first half GOOD, second half POOR. The second airplane reported first half FAIR, 2<sup>nd</sup> half POOR. They didn't discuss it, they were low enough, and they figured it was above their cut-off as discussed previously.

At 800 feet they could see ground, and at 500-600 feet they could see lights.

Procedures are 10 knots max tail wind; and with 4000 RVR it is 5 maximum. They have a quick-reference card. The OPC gave a tail wind of 8kts. They knew that if visibility were less than 4000, they would have to change plans.

There was no discussion that they might want to use an alternate because they had a tailwind. The discussion was only if the runway went POOR. They decided that if they didn't hear POOR for whole runway, they would go. Someone may have raised the question as to why they were not using runway 13. He didn't recall whom, but said it's common at Midway to land on 31 with a tailwind.

The captain would traditionally land if visibility less than 4000 and poor conditions. There were no "captain only land" airports in the SWA system.

When asked if in addition to the actual limitations for landing under various conditions, there was more captain go-no/go guidance information, he said the final decision is the captain's, and doesn't believe that the company would have had a problem if they chose the alternate.

Of course they were concerned about the approach, especially when the weather was like that, but they felt as if they were within limits. The OPC doesn't take into account thrust reversers, etc. – so they felt they had additional room.

He diverted 2-3 times while at SWA. On a CLE leg, they started towards an alternate, but ended up being able to land at Cleveland. That time, and at least one other time, they diverted to another airport.

When holding over LUCID, they told the company, and looked at the weather at the alternates, and they looked good. Dispatch provided updated figures for the alternates. Dispatch said 9500lbs, 500 more than their bingo, to go to their alternate. They had 14000 pounds of fuel so there was no urgency at all in terms of fuel, none at all. They had a long time that they could have held.

He rated other SWA captains as generally pretty good with regard to CRM. Looking back, he's proud of how well they did in terms of the en-route and planning phases of the flight. Bruce was a perfect partner, a team player. He would pick him again if he had to. It was working the way that it was supposed to. With most other captains, it's the same way. Once a year they have a CRM day. It was separate from recurrent.

His seatbelt and shoulder harness were on and the descent checklist was performed.

They were given vectors from the holding pattern down to the approach. They were holding for plowing the runway. They felt good about that. They were 3<sup>rd</sup> for the approach.

They spoke with dispatch via ACARS regarding holding information and their location. They decided STL would be the best alternate. They received a diversion report that suggested a time to leave the FAF. They accepted the report and they felt glad that their pre-calculations turned up the same choice.

There was no turbulence enroute or on approach. It was a relatively smooth night.

There was normal communications with the FAs prior to the approach. Bruce made a PA to tell passengers that they were in holding. There was no extra talk.

The METARS on ACARS were calling for "REGULAR" snow (not LIGHT or HEAVY), just Snow.

The PNF enters data into the OPC. The captain reviews the information.

Vref was 125 and 130 the target airspeed. There is a standard 5 knots of AS added to Vref. They are supposed to add 10 of AS if there was ice on the airframe. They didn't do this. He just recalled that.

When asked if there were other speed additives besides the two he just mentioned, he said that wind is another issue, but it wasn't that night. It's only if there is a headwind component that you add to the ref speed. This information is found in the FOM. OPC gives the angle of the wind, head or tailwind, with crosswind component. He recalled 8

on the tail and possibly 5 on the cross (doesn't recall because they were focusing on the tailwind).

When asked what the winds aloft in the FMS were, he recalled 160kts headwind enroute and a 25-knot tailwind on approach. It subsided prior to touchdown, but he's not sure when it did. It got down to around 10-11 when he checked the final time prior to landing. He was happy as soon as he saw something around 10. It perhaps got to 9 and he felt OK with this. He didn't focus on this, but he recalled checking on it. It didn't concern him, as it wasn't inconsistent with reports on the ground.

They used engine and wing anti-ice enroute. When they were clean (free of ice), they turned off the wing anti-ice but still monitored the wings. They landed with engine anti-ice only.

They were within limitations for the entire approach, plus or minus 10 and less than a 2 dot deviation on the glide slope.

Continuous (CONT) ignition was on as is standard during final approach.

The APU was not on. It's allowed but usually not ON since it burns gas and wastes money.

The auto brakes were on MAX as required by the OPC during the landing, which was required to get the 500 feet remaining stopping distance.

He was pleased with the touchdown, it was firm, and no float, and the nose-wheel came down very fast and firm. He felt they were working right away and well. When asked if he felt the anti-skid cycle, he said that it didn't seem different than a normal landing. As far as he knew, when the nose wheel came down, it felt as if they were slowing down. After that, it didn't seem different than a normal landing. At first, it seemed to do what it was supposed to do.

When asked when the captain applied manual brakes, he said he did not see the autobrake disengage light because he was looking outside.

He said he was monitoring the distance remaining. When he noticed they were not stopping, as they should, he grabbed the overhead handle, repositioned his seat and slammed on the brakes as hard as he could. He noticed that the speed brakes were up but the thrust reversers were not. He knocked the captain's hand away and deployed the thrust reversers. He felt it took about 5 seconds for them to deploy.

He tried to say "Brace" to the passengers but was on the tower frequency when he said it.

When he got on the brakes, he said he would be speculating to say his intention was to assist the captain. He knew the auto brake system isn't supposed to deactivate until the pilots do so manually. He couldn't say at that time whether or not they were still on.

He evaluated the rollout and noticed that they weren't slowing down as much as he would like. He did not believe that Bruce was making any comments at that time but can't really recall. He jumped on the brakes, saw the thrust-reversers down and was surprised. He could not believe it. So he grabbed the reversers. Initially, he had difficulty bringing the reversers up, but he was finally able to. He felt as if he was pressing so hard on the levers that they might have bent.

The HUD was enabled after the FAF and the captain had the autopilot on. The captain always flies HUD approaches.

Auto-throttles are not used as per company policy.

The radar was on and in the turbulence mode. However, it was showing green.

SWA stabilized approach criteria was fly the target airspeed, fly the glide slope with appropriate approach speed and sink rate limits.

As they descended, the procedure is for the PNF to call out altitudes, 500, 400, 300, minimums, 150, 30, 10. At about 600 feet they still had not been cleared to land. He made a GUMP check then they received the clearance. He may have missed the 500 callout, and did so at 400. Normal sequence would be 400, approaching minimums, minimums.

Bruce saw the runway between 3-400 feet. After autopilot disconnect, he went 1-1.5 dots high on the GS but he made a quick correction. He (FO) was in go around mode, although they made the correction. The nose wheel came down quickly, then he transitioned to stop mode. He went from feeling a little nervous to OK now that the captain put it down fast. It seemed right where it should be.

They went down to 500 feet and even to 400 and 300 feet everything was perfect. It was natural to stop the descent when transitioning to outside. That is what happens in the simulator and they're told about it. He called out a dot high inside minimums and there was an immediate correction. The airspeed may have increased when they made the correction.

The HUD is required when flying the ILS 31Z approach. Other than that, it's used during a CAT III approach. HUD approaches are not given to FOs in the simulator but they get about an hour of basic familiarization.

The gear and flaps 40 were put down well prior to the FAF.

He saw ground shortly after 1000 feet. He could see straight down and a little out the front. He saw a few lead-in lights. By 600-700 feet, could see the airport and runway. There were visibility obstructions from that point on.

The speed brakes were armed and they did come up. There is no procedure for the FO to do anything if they deploy. They immediately deployed.

He did not get a final wind check on short final since it didn't change over the period of time they had monitored.

RVR on short final appeared to him to be more like 5000, more like 7000 or 8000. It makes it more difficult when you cannot see the touchdown zone markings. It's difficult to know how far down the runway you are. So although visibility was good, it did complicate the situation.

He estimated that the airplane touched down in less than 2000 feet from the approach end. They would have had to be in the touchdown zone. There was no float. He was comfortable with the touchdown location.

The airplane was straight and did not seem to skid. There was no side load. The nose wheel came down and they were tracking in the right direction. He did not think that runway centerline lights were installed on that runway.

As he recalled, the procedures at SWA to handle a skid or hydroplane was to not fight the brakes. Keep brakes applied instead of off then on.

He described the runway conditions as white, moderate snow falling, and a loose depth of snow on the runway. It was less challenging than other snow approaches that he had made, but he didn't feel uneasy about the conditions. The worst part about restricted visibility landings is that you can try to feel for the runway. This was not the case here, as they touched down firmly.

He could not speak for the tiller or the rudder pedals, but he saw no major control inputs. They were on the centerline the whole way down. It did not seem as if control inputs were required.

Company procedure is 65% reverse when there is no weather. This night, the minimum was 85%. Typically at 80kts, the pilot comes out of reverse. They are taught to apply reverse immediately and 99.9% of the time it is almost instantaneous. As soon as reverse is available, it is used. The PNF does not make a callout when the speed brakes deploy.

He was surprised when he noticed that the reversers were not out. As PNF, it is his job to make sure they're done right. He did not know why he just deployed the reversers and did not tell the captain to do it. He was so surprised that he felt it would have taken more time to tell Bruce. He just did what he had to. He just acted quickly.

He did not call out any runway remaining signs on the side of the runway. His first priority was to slow down the aircraft. He went from being a helpful pilot to doing what he had to do to stop the aircraft.

He said brakes, brakes, brakes to make sure that Bruce was on them.

Brakes and speed brakes occurred prior to the runway edge red lights. He is not sure when he saw the amber runway lights. But he (FO) had the brakes on prior to amber. He estimated he was on the brakes by about the ½ waypoint.

He was not sure if they were in the amber or red zone when he heard the reversers spool up. He was too focused on getting the airplane to stop. He estimated there was close to 2000 feet remaining.

He wishes that he had been faster.

A few seconds after putting on the thrust reversers, he knew they were going off the runway. He felt a big deceleration from the reversers but it became very clear that it wasn't going to be enough.

During this time in the cockpit, he told Bruce "they were screwed" and Bruce said to "just keep it straight, keep it straight." He (FO) had his hands on the reversers, the glare shield handle, and his feet on the brakes.

When they stopped he still had his earpiece in. He was not sure who cut off the engines. There is an evacuation check on the yolk, and he ran through that. When he started that, the starter was already off. He ran through the rest of the steps. He did the checklist. He was talking on the radios, and ATC asked if they needed help.

Bruce was talking out the window but not sure who he was talking to, someone from the car. Tower controller said that help is on the way. He asked Bruce if this is something that needs an immediate evacuation.

He saw a man with a child outside of Bruce's window screaming at Bruce. He must have hit his face on the car because it was bloody. Bruce saw the man with the child and someone on the ground said that there was fuel leaking. He told Bruce several times we need to get the people out of the plane.

Bruce told the passengers to stay seated initially, and then after the news of the fuel, Bruce went into evacuation mode. 2 FAs then came up front. They were going to go out the front left door and it was opened immediately. The FAs were awesome. There were 3 emergency people standing right by the door and the FAs saved their lives by making them get out of the way before the slide was deployed. Bruce told him to get down and help people come down the slide.

The slide was relatively flat to the ground. It seemed fast that everyone was off.

It did not seem as if Bruce was out of it, just stunned for a while, but when he opened the window, both of them thought about their family at home. He (FO) heard the person speaking that there was fuel leaking, and it took them both back to reality.

He's not sure why only the left exit was used. The plane was leaning to the left, so perhaps they thought the right side wouldn't be long enough. It seemed a better option, as it was closer to the ground. When the crew didn't come down, he didn't know that a ladder truck was pulled up to the back right door. 40 or so passengers plus the crew went out that door.

He said when the slide was out, he may have been the first out.

He saw the car and assumed the man with the child was in the car. They saw a baby being pulled out, moving, which made him happy. He realized then that there was still someone in the car. He's not sure what portion of the airplane was pushing on the car.

The police were great. They took everyone and put them on the side of the airport grounds and a bus came. The police collected his license, and was asking for information. Contact with the passengers ended at this time. Crew was put on a shuttle bus to Ops. The Chief Pilot said that he would take them to a hotel.

After the accident, he talked with Bruce about his disappointment but not any specifics.

He did not get debriefed by the company or provide a written statement. He made his own personal notes so that he didn't forget anything. He was instructed not to talk to the media by the incident response team.

He said there was nothing in his notes that we had not talked about and we could have a copy of them.

The union did not debrief him but they were supportive. They asked what he needed.

Emergency Procedures are trained every year. The checklist is a read and do, versus challenge and response.

He did not know if there was a procedure to pull the CVR circuit breaker after an accident or incident to preserve the data.

He was so proud of how well they worked together.

When asked if he would have done anything different, he said that the low margin for error on the OPC for a POOR runway, perhaps his personal minimums could have been higher, and he would have considered the entire runway as POOR. He wishes that he had used the lowest braking action/worse report for the entire runway. He felt as if they had covered all of the bases.

In reference to identifying a potential touchdown point, he said that it would have been very difficult to discern taxiways versus crossways.

They found out afterwards that a company airplane in front of them had to divert to STL.

The HUD is used below CAT I minimum. Other times it is captain's option. Some use all the time and some do not.

When rolling down the runway, he considered a go around for a split second but realized that there would have been a worse outcome. They were too far down the runway by that point.

He did not recall turning the engine anti-ice switches off but is almost positive that he turned them on.

**Interview:** Timothy John Bidlack, SWA, Captain  
**Represented By:** Richard H. Donohue, Southwest Airlines Pilots' Association  
**Time/Date:** 0830 December 11, 2005  
**Location:** Marriott Chicago, IL  
**Present:** Kirchgessner, Lemos, Timms, Perkins, Laurenzano

During the interview, Captain Bidlack stated the following information:

His DOH with Southwest Airlines (SWA) was May 6, 1959. He lives in Albany, NY and is based at Baltimore airport. He said that he had about 10,000 total flight hours with 600 hours as pilot in command (PIC) of the 737. He did not have any previous experience as a check airman. He started as a first officer and upgraded to captain in April 2005.

His experience prior to Southwest was initially as a civilian flight instructor in college where he earned his PhD in Engineering. He entered Air Force Reserve pilot training in 1985 and had duties as an instructor/evaluator and chief of standardization/evaluation. He flew C-130's in combat four times in the Middle East and Bosnia.

He averages about 100 flight hours per month. He picks up extra hours, and typically flies a reserve schedule. He can pick up extra trips and hours and works about 50% over the normal amount to do this.

He was riding on a scheduled deadhead flight to Chicago to start a three-day trip, which is why he wasn't in the cockpit. He said that it was more comfortable when you're able to ride in the back. He had reserve schedule for Thursday, Friday, and Saturday. His schedule had changed three times that morning. He was deadheading to Chicago to start a 3-day trip.

He knew the captain of the accident flight and they commuted to Baltimore together several times. Both flew C-130's, although he had never flown with Captain Southerland. His only experience with Captain Southerland is when Captain Southerland was jump seating with him while he (captain) was a first officer.

He spoke with Captain Sutherland the day of the accident when he arrived in the crew lounge in Baltimore and they conversed about the trip that day and other small talk. The flight was delayed several hours that day, so he was on and off the airplane. He then went to check his email and get some food and there wasn't much interaction with the captain past that point. There was nothing out of the ordinary that struck him that day. He has the utmost respect for Captain Sutherland. He had no interaction with the first officer.

His understanding regarding when the company was going to use the autobrakes was that they could be used after "the read before fly" (RBF) memo was issued. He has not yet seen the RBF memo. He had planned on checking this in Chicago prior to flight, but had not checked it at Baltimore.

He received autobrake training material, including a training CD, but it didn't work properly. He read the training material on the accident flight.

He did not receive any autobrake demonstration during his six-month proficiency check in October.

He received CRM training in initial ground school and after upgrading he attended one day of CRM training. He thought that his CRM training at SWA was good training and that nothing stood out although his only comparison is to the Air Force.

He was initially concerned about upgrading because he didn't want to do a lot of babysitting. He feels that SWA is hiring good people and that has turned out not to be an issue. He has never had a problem because first officers are doing what they are supposed to be doing.

He said that the winter operations training was in the flight operations manual (FOM), although there is emphasis information that is provided separately by the company (e.g., de-icing.) His upgrade training was total and encompassing, and he distinctly remembered the topic of de-icing.

He is required to read the RBF book, but that he is not required to initial it.

His belief was that SWA is changing autobrake procedure to emphasize better braking, and there is no conflict between aircraft models now that the 737-200's are gone. He stated that it might say this in the pamphlet.

He felt that he had enough information to be comfortable to use the autobrake system as he used it in the 747 he flew previously for Atlas, and that there is not much difference between 747 and 737. He said that in the 747 you need to exceed brake pressure and with the 737 you need less brake pressure, which should help in taxiing, although he hadn't used it. He was aware of others who have used autobrakes when with a check airmen.

As a captain, he had personal limits as far as what things he would not do, even though legal. He couldn't say in this condition, but if he was not feeling comfortable, he probably wouldn't continue, but it is a continuum that is difficult to say and that this is where the team effort comes into play. It would be a red flag to him if the first officer said, "Is this smart?" He did not feel that SWA puts any pressure on people to land in various situations.

He recently diverted out of Phoenix because of weather when he went to minimums two times and couldn't see anything. He felt that SWA empowers you to make good decisions and stands behind you if you're making decisions with your best estimate.

He had never called dispatch within the six previous months to say that he wanted to add additional fuel, though he didn't think it would be a problem if he put on more fuel than the flight plan called for.

He experienced a situation where he was unable to deploy the reversers. He was not sure why, but stated that about one time every year he had to try several times for the reversers to kick in and though, as a first officer, he did not document these incidents in the logbook, the captain would.

He stated that he was trained in the simulator to immediately slide his hands forward and put in the reversers after the flare, after the throttles are back to idle. He stated that he doesn't look at  $N_1$ , but listens and feels, and only starts to look around if there's a problem. He remarked that it was a bit different in the C-130's, which makes him adamant about waiting until the nose gear is on the ground. There is a longer delay, but he's very cognizant about the timing of this. He said that below 10 ft. the thrust reversers would go into effect in the air and that it was possible, but not desirable.

He spoke to the flight attendants and noted nothing abnormal. They spoke about passengers, and he characterized their conversation as inconsequential. He sat immediately behind the exit row on the captain's side. The only abnormality he noted during takeoff and enroute was that the FO repeatedly switched on the leading edge light checking for icing on the wings at altitude.

He heard many announcements from the cockpit about delays and holding and characterized the announcements as routine. When delayed, the captain spoke to the passengers, and told the passengers a lot of detail regarding the weather.

He was surprised to find the ceilings higher than he expected, about 500 ft. Visibility was better than he had anticipated. He wasn't surprised by the weather as he flew out of Albany for 20 years and was used to weather. He was based in Chicago for 2 years.

He was typically on edge a bit in Chicago because of the airport and that you have to make sure not to be high on the glide slope, and that you learn how to make the approach, ducking under, etc. He is very familiar with this particular approach. He looks at where

he touches down relative to the airport, relative to the other runways and he looks for the blue lights.

It appeared to him that the accident aircraft landed where it was supposed to be, though he only has a feel based on the blue lights. He has no other reference but it didn't feel out of the ordinary.

Upon touchdown he noticed that the plane didn't land hard, but it landed more firmly than it would on a long runway, where you can afford to let it float a little more. He didn't notice the condition of the runway as he was looking at the lights. He immediately noticed that the anti-skid was working more than normal and that the feeling immediately got his attention. He was unable to notice if the spoilers deployed.

He noticed that there was no reverse and that the expected pattern was out of sequence. He waited to hear, see and feel it, but there was nothing. He thought "where is the reverse – you're forgetting the reverse" but there was nothing. The reversers deployed past the 1000 ft. marker. He thought that they should have used reverse thrust before that and should have been coming out of reverse by that time.

He felt like they were sailing down the runway, but he noticed the anti-skid, and after that his concentration was on the reverse so he wasn't paying attention to the brakes and anti-skid. What got his attention was that the anti-skid became so active right after touchdown.

He only saw the 1000 ft. marker and didn't see the crossing runways as he was focused only on the fact that they weren't reversing. As he started getting closer to the end he was concerned about where they were in relationship to the end of the runway.

He was glad that the plane was finally reversing though it didn't feel like full reverse at the end. He thought that he would be going to the overrun. It felt a little bumpy, then it became more significant, and then there was a very significant bang, and he held on. The ride was only severe at the end. He didn't know where they were and thought maybe they were still in the overrun. People were screaming, not excessively, but in response to the bumps. He knew what was going on, although the other passengers didn't.

He felt that the aircraft was tracking pretty well and was quiet (no reverse) and straight.

He was not sure when the emergency lights came on after stopping and was not sure when the engines stopped. Everyone in the back was anxious to find out what was going on. Fairly quickly after that he heard Captain Southerland make a PA to tell everyone to remain seated. He immediately heard the FAs repeat the message in the cabin and noted that the passengers seemed to relax at that point and quieted down. He stated that he had no concerns other than having the airstairs come.

He reported that the FAs stayed in their jumpseat, and repeated the commands.

He was wondering about fuel leaks. He noticed a long pole sticking over the nacelle, and thought about how to assist with the evacuation. He saw children and, at that point didn't know that we were anywhere other than the airport. He noticed the pitch attitude. He saw the horizon and it got his attention. He expected the airstairs, and that they would walk off the aircraft. He wondered why the fire trucks weren't there yet.

He saw the FA pull out the megaphone to talk to everyone though he couldn't hear it because people were talking and no one could hear her.

About 45 seconds to 2 minutes after coming to rest he saw Captain Sutherland came out of the cockpit and take the megaphone, though no one could hear him.

He saw passengers get up and start to get their bags, but the flight attendants shouted for people to leave them. There was no waiting and the line moved quickly. There were stairs up to the back up the aircraft very quickly. An announcement was made to the back half of the aircraft. He saw that passengers starting from 3-5 rows behind him forward all went out of the front, while others exited out of the back. He waited to assist the passengers, and the evacuation was orderly. He helped to direct people whether to go to the front or the back.

He then saw firemen enter the aircraft from the back. He was the last person out of the front exit. He saw a stack of suitcases piled up in the forward service area. He told Captain Sutherland that all the people were off. Captain Sutherland appeared rattled, and seemed to respond "What?" This is the first time that he noticed any emotion in Captain Sutherland. He stated that when Captain Sutherland made his initial PA he seemed to have his faculties and appeared calm, controlled and professional. Afterwards he appeared less so, as if he (captain) didn't hear him.

He reported that the slide was very short and it was only as high as jumping off the table. He realized that the nose was low. He was in full uniform and so some people thought that he was the captain and they kept on telling him, "Good Job".

He didn't notice when the fire trucks arrived.

He had limited contact with Captain Sutherland, but not with First Office Oliver after the accident. Captain Sutherland told him that he needed to make time to make the right decision and that made sense to him as he said that it sounded reasonable, that Captain Sutherland opened the window to determine where the people would go. He did not see an indication of fire that would call for doing something at that time. He felt comfortable in the back to wait, and did not feel a sense of urgency. He claimed that it was an expeditious exit from the aircraft and didn't realize how quickly this process could occur.

He was struck that, after getting out of the aircraft, there were 100 people in the snow, without coats, and he wondered, what to do with the passengers. Someone said, "Everyone go over there, there's a lot of fuel around here, move over there."

There was a bus in the parking lot, and he stopped the bus, and asked if they could put people on the bus. The driver responded that he was off duty. He said that there was an accident, and the driver responded that he understood that. He told the driver that there were people without coats, and the driver agreed to allow passengers on the bus.

The passengers were looking for direction. Since he was in uniform, they listened as he told them what to do; they did it immediately. Two other buses came immediately.

He spoke to the system chief pilot in Dallas; there were several phone calls. He called the Baltimore chief pilot while on the bus as it took three hours to get to the terminal. He then tried several other numbers after there was no response. He eventually reached someone from SWA, and they asked him a bunch of questions about the evacuation, number of slides, etc.

At the terminal SWA Chief Pilot Lou Freeman took him to the hotel and he told Chief Pilot Freeman about not hearing the reversers. He told SWA Vice President of Flight Operations Greg Crum the same information included in this report. He was asked by Captain Freeman to write up the situation, but never did.

He conversed with the pilots of a previous SWA aircraft that landed that night and they said that it was the most difficult landing they've ever made because of the short, slippery, tailwind, and low visibility conditions. The other crew told him that they put the reversers on immediately after landing and they were on it right away. He was never told why they actually went through with the landing. He stated that their opinion seemed more like a determination after the fact.

The following morning he spoke to a SWA crisis team and told the story again.

He did not see the inboard reverser. He saw the snow when it finally kicked in.

He was not sure if he saw the damage to the nacelle from inside or outside. He was too focused on the nose of the aircraft. The emphasis was on walking away from the aircraft.

He said that the wing was covered with a dusting of snow. No ice was on the wing, although he couldn't see the leading edge. He explained to passengers about the brakes, how the various systems work and it helped the passengers.

He sensed an odor in the aircraft and wondered if it was electrical or brakes. Someone yelled that it might be fuel.

They sat on the bus for a long time, and when he went out to ask what would happen with them, someone said that the Police were in charge and would handle it.

He stated that he would use the AIII mode on the OPC anytime it is an AIII approach, regardless of visual conditions, and that if you fly the flare cue, you're going to land long as it starts your flare higher.

He stated that he doesn't use the AIII mode on the ILS Z 31C because although the AIII is great in low visibility (which normally means calm winds), he doesn't want to get an approach warning go-around. He also doesn't use it with big gusts, etc.

He was not familiar enough with the ILS Z 31C approach to determine if it was a CAT I approach.

He stated that the OPC AIII setting adds 1,000 ft. on the landing.

**Interview:** Jeffrey George Kilponen, SWA, Captain  
**Represented By:** Richard H. Donahue  
**Time/Date:** 0800, December 13, 2005  
**Location:** Chicago, IL (Marriott Courtyard)  
**Present:** Kirchgessner, Lemos, Perkins, Timms, Laurenzano

During the interview, Captain Kilponen stated the following:

His date of hire was November 15, 1982. He upgraded to captain for SWA in May of 1987. He has never worked in management or in training; he was once asked by the company to do so, although it didn't work out for various reasons.

After the accident he was in the lounge with the other pilots and offered to help Tony Dorsh (Assistant Chief Pilot). He helped to secure rooms for the accident crew, and brought them to the hotel.

His understanding of when autobrakes are authorized to be used is that after reviewing and understanding the training materials, pilots were to await a further memo as to when the procedures were to be implemented. He hasn't flown since the day of the accident, and has not yet seen an RBF on this topic.

This method for institution of a new procedure is consistent with how he's seen things implemented previously at SWA.

He wasn't concerned about not having used the autobrakes before, nor has he heard any concern among other pilots, other than the fact that pilots, by and large, can never have enough training, but that is not true in this case. He doesn't have any reservations. In general, he feels impressed with the training, and that it meets the needs of the pilots.

Per his understanding, the autopilot is required to be used only in company procedures approaches. For ILS procedures, this is where the FO is the PF on autopilot, at DH the captain makes the decision for the FO to continue manually, do a GA, or to continue manually but for the captain to become the PF if the RVR is less than 4000. For non-precision company procedures approaches, the autopilot is not required, and the weather

minimums are 1000 and 3. He believes that these requirements are not discretionary, but are dictated by the conditions.

He reported that visibility determines when the HUD is required to be used. It is required below CAT I minimums. The ILS Z is unique, tailored to SWA, and it requires use of the HGS. The HUD provides additional guidance in less than CAT I minimums. This information is dictated directly only the approach plate. Specific CAT I minimums differ according to the airport and the runway, although it is typically 2400 RVR.

Pilots decide whether to use the ILS or the ILS Z approach at MDW. They are simply cleared for the ILS runway 31C approach. Sometimes approach control asks you what your RVR requirements are, to know what minimums you are capable of flying to, although you likely wouldn't tell them that you are flying the Z approach.

If conducting the ILS Z, with an RVR of 3500, the HGS is required, and it would be in IMC mode. You wouldn't use the AIII mode, but the IMC mode. It's not an AIII approach. There are three modes on the HUD: VMC, IMC and AIII. AIII puts you further down the runway about 1000 feet, and the ILS Z is not an AIII approach. AIII mode also has an approach-warning mode that helps in GA guidance. If an HGS is required you have to use the setting called for. If HGS is not required, you can choose whatever you want. There is a checklist in the cockpit to determine which one you would use, which is based on visibility. When you select AIII in the HUD you are also required to put AIII in the OPC.

You are required to use the HUD when minimums are below CAT I and when the approach calls for it. Even if breaking out at 600 feet, with 5000 RVR, you are committed to using the HGS all the way to touchdown. This is how we're trained. You can never disregard the cues from the HUD. Once executed, follow-through is required.

He cannot speculate as to why the accident crew may have selected the AIII mode given the conditions described to him. However, some pilots may prefer the AIII mode because it contains less information on the screen.

He's not sure how the AIII brings you 1000 feet further down the runway; he believes that this approach is designed to make it easier when you break out at 50 feet.

On the accident night, Captain Kilponen executed a CAT I "company procedures" approach to ILS 31C (not Z). There was the third aircraft to land after the runway was plowed. The visibility was more than 5000 RVR. He had briefed a "company procedures" approach, in which the FO was flying, and he monitored the approach through the IMC HUD mode. If below 4000 RVR, he would have been required to land the plane and take it from the FO. He wasn't required to use the HGS that night, but he did because of the additional aid. The autopilot was used until the landing transition.

When asked if there has been a change in company pressure over the years, he responded that no one has ever asked him to do anything unsafe. The first priority is safety, and the second is passenger comfort. He has never heard anyone say that they've been pressured.

After the Burbank accident, there was an extensive rewrite of the operations manual and many of the procedures changed. They also changed some of the training personnel. When asked what prompted these changes, he speculated that it might be related to the relationship between SWA and the FAA, but that he didn't really know.

The last time he diverted was within the previous 6 to 8 months. He was coming from Manchester, NH to Nashville, TN, and there was a fog bank, so they diverted to Louisville. This weather had not been forecast, so he had not previously chosen an alternate. He had never heard of anyone who has ever received a hard time from the company for diverting.

No FO has ever told him to GA. Only on one occasion, both he and the FO called it at the same time. He has, however, directed a GA. If an FO told him to GA on an approach, and he didn't know why, he would probably perform the GA. He would have to make a quick decision, and trust that the FO is saying this for a good reason. When asked about this again, Captain Kilponen stated that he must have misled us, that if you hear the GA command, you're supposed to go. You would want to understand the reasoning but wouldn't question it. You have to evaluate everything you're given to deal with.

On the accident night, he was coming in from Albany. It was the last leg of a three-day trip. He was originally scheduled to land at 1655, but landed after 1900, as he'd been ground-stopped at Albany, just before pushback. He was originally given an update time of 45 minutes. He started the day in Tucson, and his start time was approximately 0730 central time. It was kind of a long day.

When he first picked up the ATIS, it called for ¼ mile, snow, below minimums. They were out a ways still. His landing weight was 106,000, although he didn't recall the landing fuel. He was getting concerned about the Kansas City alternate, as he wanted to stay in the fight a little bit longer, and so he sent a message to dispatch via ACARS to obtain a closer alternate. He received St Louis. He indicated to dispatch what the minimum divert fuel would be (10k?). He likes to be fairly conservative on the amount of divert fuel.

They were in the clouds during the hold, and had picked up some ice at higher altitudes during the descent. They had moderate icing at 18k. Their first hold altitude was 15k, and they stopped accumulating ice at that point. They had a longer hold at 7k, and they were still in the clouds. It was solid down to the approach. They came out at 1200.

The first hold was for sequencing traffic. The second hold was because the airport was below minimums. The weather then went up and they had to plow the runway. He heard

other aircraft asking the same types of questions of approach and dispatch as they were about the weather.

After the airport was plowed, they were the third aircraft to land. Two other SWA aircraft were in front of him. He was monitoring the company frequency, and the company dispatcher sent him a report of the runway conditions. He didn't know if all aircraft received this level of attention, but he happens to know the dispatcher personally.

Before the aircraft was plowed, the braking condition was reported as FAIR, although he was mainly concerned at that point about visibility, not the runway condition.

They had information Tango. Based on the OPC output, he wasn't legal to land, and the visibility was the primary thing that wasn't supporting a landing.

When on approach control, he listened to the two company aircraft in front of him. They didn't report anything directly. The information was relayed by approach control as FAIR to POOR. Then they gave him the RVR.

He didn't recall if the tower had given him another report when he was cleared for the approach. He wasn't sure, although he knew that he did have one prior to that.

He entered FAIR for runway condition into the OPC. When queried, he reported that he entered FAIR because he has a lot of experience flying at MDW; he knows what FAIR to POOR means to him. He elected to utilize FAIR because he decided he and the FO would take advantage of their experience.

The weather reports were consistent with what he found.

When asked if he had diverted to another airport, would his thinking have changed on the braking condition, he reported that this wouldn't necessarily have changed his opinion. He had considered that there is a reason for why it could be FAIR to POOR, that there's likely less wear and tear on the runway, and that the FAIR portion is cleaner because of the departing aircraft. In the reports, they don't tell you what portions are FAIR and which ones are POOR. It also depends on who gives the report.

When asked what the company procedures is regarding how to handle mixed reports, he responded that he believes that you are to revert to the worst condition. However, he wasn't sure, and also wasn't sure if it is in the written guidance. He thought that it may be in there. He said, however, that if the statement were to be in there, that he would support it.

That said, he also said that, many times, other airlines launch when flight operations are prohibited (e.g., reports of severe turbulence forecast). He, as a captain, is not prohibited from flying, as he's paid for his judgment.

When he plugged in POOR to the OPC, it wouldn't support a landing. He wasn't sure what the limiting factor was. However, the OPC would support FAIR. He didn't recall the specific numbers.

For the OPC calculations, he used the ATIS winds, which, at that time were 110/9 or 110/6, he didn't recall. However, the check from the tower was fairly consistent with these numbers.

He reported that they are in the business of flying airplanes, that they don't knowingly break the FARs, but that they are paid for their judgment.

On final the tailwind was stronger than reported. Between 1500 to 1800 feet it went down to 21kts. He was concerned about the strong tailwind component, so he was continually verifying this.

Someone else did ask for 13C, and the controller responded "unable" due to the approaches at O'Hare.

He instructed the FO to execute the approach, and that at the minimums call, he was to transition from autopilot to manual control. He instructed the FO to make sure that he didn't go high on the GS, that he wanted him to err on the low side, to use the maximum runway possible. When they touched down the runway markings were not visible, consistent with the weather reports.

As soon as they touched down, the captain deployed the speedbrakes manually and immediately. The FO got into max reverse and braking, and the deceleration rate seemed to decrease markedly about at the halfway mark. When they were well into the reverse and stopping phase, the anti-skid started to cycle. He told the FO to stay with it, to stay on the brakes in max, which he did. He felt as if they were ahead of the game, but when he made the 80kt call, he told him to get back into reverse. The FO didn't do it fast enough, so he took control of the aircraft and put it in max reverse.

He turned off at the end of the runway and was stopped by that time. They stopped by about 700-800 feet prior to end. There was about 1-2 inches snow, and the two aircraft that had landed in front of him were holding short of 13L.

The FO called ground control, and they were cleared to gate B19. It appeared that the tower wasn't aware of the two aircraft holding in front, because of the fact that he was cleared to the gate. One of the captains from the other holding aircraft said that the tower was too busy to give them taxi clearance. We all then started back taxiing on 13L. We held short of 4R.

The ground didn't ask for a braking report, and he didn't give one because there were no changes. Had he given one, he would have said FAIR to POOR. The fact that the anti-skid was working meant to him that there was at least some braking. If there had been no

anti-skid, he would have thought the conditions were NIL. He felt that they had matters in hand prior to hitting the POOR section of the runway.

When asked if he had ever had an occasion in which the reversers didn't come up, he said that a time or two they didn't work as quickly as he would have liked them to, but he didn't recall ever not being able to get into reverse. The times he's referring to are random, and didn't seem to be associated with any sort of pattern, nor did it seem like a mechanical flaw.

He reported that this was a night that required everything to be done right. He's seen these conditions before at MDW, so it wasn't more difficult than many other nights he's seen. In fact, the Detroit City airport is more difficult, that compared to Detroit City, MDW is a walk in the park.

He didn't make any aileron input on landing. The snowfall was consistent with HEAVY.

Regarding evacuations, he was trained that the captain calls for the emergency checklist, but that anyone can order an evacuation, even the FAs. The checklist is a "do and then follow up." Once completed, the FO is expected to go out and assist, and the captain is the last one out. He had not completed an evacuation in his last PC, but did so on his last PT. Whatever is needed to fulfill the requirements is what determines when they practice them.

The engine anti-ice was on from altitude all the way down.

They log HUD AIII approaches periodically for currency issues, and for maintenance records.

When holding at 15k feet, he was holding near the GOSHAN VOR. They hadn't even made a full turn when they went to HALEY at 7k feet.

When asked if on the OPC the reverse thrust is taken into consideration, he reported that the aircraft is certified without reverse thrust, and that the landing data in the aircraft certification process is done without reverse thrust in the equation.

The thrust reverse is manually selected, not automatically deployed.

When asked if he ever felt saturated that night, being so busy, he reported that he did not, that it was just a busy night. They were in at about 1900.

When conducting an approach to maintain currency, he is usually in the AIII HUD mode. When asked if he also inputs the AIII in the OPC when he does that, he responded that he couldn't say that he does it all the time. Typically he's only doing it for currency purposes on a runway that supports that. If he were to break out in VMC, he still would follow through with the approach that he had briefed.

When asked if he generally uses the HUD, or if he uses it more often than not, he responded that he does not.

He understands the target point when using the AIII mode puts you further down the runway, but he's not sure what accounts for this, just that the OPC lands you further down the runway than if you were using the raw data.

When asked to further clarify if the OPC takes into consideration use of reverse thrust in the performance calculations, he said that he assumes it doesn't.

When asked how he thinks it would have changed the performance of his landing that night if he had used autobrakes, he said that he didn't know, but that perhaps the autobrakes would probably have operated better.

When asked what minimum remaining runway distance would have been his personal limit, based on his experience with MDW, he responded that between medium and maximum, he would have not made the landing. He doesn't base the decision on the runway remaining length. That night he had no red boxes.

He believes the maximum tailwind component limitations are for 5kts maximum with RVR less than 4000. It's not based on runway length.

In hindsight, he would have done this landing again. However, he would not have allowed an FO to do this. (The FO that night was captain qualified.)

He saw the accident aircraft land. He was on 4R, holding in front of 13L when he saw him touch down. It appeared to him that the accident aircraft landed longer than he should have. He noticed that there was no reverse thrust, and he was very worried.

(During the interview, Captain Kilponen was shown an airport diagram, and estimated that the aircraft landed just prior to the halfway mark.)

Per his understanding the use of autobrakes will be mandatory based on information presented on the OPC, that it will not be discretionary.

**Interview:** James Donald Vandertoll, SWA, Captain  
**Represented By:** Dave McCracken  
**Time/Date:** 1400, December 14, 2005  
**Location:** Chicago, IL (Marriott Courtyard); Teleconference  
**Present:** Kirchgessner, Lemos, Perkins, Timms, Laurenzano

During the interview, Captain Vandertoll stated the following:

His date of hire with SWA was 12-1-1994. He upgraded in June 2000.

We started planning for the approach at GOSHAN, weather was fluctuating between 3 and 4000 RVR and the tailwind was right at the max. OPC was telling us between 9 and 11 tailwind.

There were 2 holds. He's not sure how long we held at HALEY (second hold), perhaps 15-20 minutes. They had a Captain in the jumpseat, Jim Mondik, monitoring the ATIS and helping with the OPC.

They briefed the approach prior to the first hold. They had to hold out there for at least 50 minutes to an hour to legally make the approach because they had to burn off some gas. After they were holding for about an hour, they got to a weight where they were legal to land, but according to the OPC, they had only 400-500 remaining runway distance based on Max braking.

They then started to get low on fuel. They had about 9000 lbs.

When they checked in with the approach controller, he immediately told them that braking was POOR. The controller went off frequency to check with the tower and came back on and said it was FAIR, FAIR, and POOR. That's when they decided it was time to go to St Louis.

With FAIR in the OPC, they only had 500 feet runway remaining distance after stopping. The braking reports are subjective anyway, and he didn't want to take the chance.

Everything he's been told in training is to enter the worst-case scenario into the OPC. He could not recall if that was written anywhere but that is what he has always done at SWA.

The landing weight was between 124,000 and 125,000.

When he switched to approach control, the controller told him the braking action was poor. That was the entire runway, there was no mixed report given.

They ran the numbers for POOR, and it wouldn't allow a landing.

He did not brief any specifics regarding the braking or spoiler deployment during his approach briefing to the FO.

He (captain) was spring-loaded to go to St Louis. But had he landed, he would have gotten it on the runway as soon as he could, but he didn't say anything to the FO about that because he (captain) was doing the landing.

If it had been the FO's leg he would not have let him land because the RVR was below 4000. The RVR was 3000.

They briefed for the HGS ILS 31Z approach. He planned to fly the HGS approach in IMC mode. He wouldn't use AIII, as he didn't want to get an approach warning, its not

required, and with the flare command it adds about 1000 feet to your stopping distance. He would have hand-flown it from the GS intercept, with 40-degree flaps. His intention was to fly the HUD commands all the way to touchdown. In IMC, there is no flare command. With the AIII, you start getting a flare cue at 50 feet.

As soon as he saw the runway he would come off the HUD, and try to plant the aircraft on the ground as soon as possible. He would leave the HUD down – it's pretty easy to see through it.

He normally has to adjust his seat when using the HUD. He doesn't find that it hinders his view of anything on the instrument panel, except the instrument comparator light. He likes to move the seat up because its easier to see down the runway.

He would not have allowed the FO to land that night, even if the RVR would have been above 4000 RVR because of the braking action, tailwind, and the FOs experience level.

The procedure on how to how to classify mixed braking condition reports is to defer to the worst.

He didn't recall the winds aloft.

When asked if the controller tells you the braking action report is based on a GA citation, if this would influence his actions, he reported that it would. If the Citation reports FAIR to POOR, he would consider this to be NIL for his aircraft (737).

He diverted several times (4-5) as a captain for SWA, and has never gotten any grief from SWA.

If autobrakes had been authorized for use that night, he would have used them. He would have no problem using them for the first time, even in adverse conditions.

During his recent training, he was allowed to try the autobrakes in all modes.

Every once in a while he would have trouble deploying the reversers, and would have to yank on them. He didn't know why, possibly they were out of rig. He never entered that in the maintenance log before, because it was only for a few seconds. But, he will from now on.

The OPC for the -700 takes into account thrust reverser in the formula for landing distance, but doesn't for the -300 and -500.

He would select the AIII mode in the OPC when shooting and AIII approach. He would do this even if it were to be a practice approach for currency. AIII adds 1000 feet to your landing distance.

He confirmed that he was taught in training to use the worse condition in mixed braking report conditions, not just that it was the general practice of pilots to do so.

**Interview:** Carl Anthony Youngblom, SWA, First Officer  
**Represented By:** Dave McCracken  
**Time/Date:** 0900, December 14, 2005  
**Location:** Chicago, IL (Marriott Courtyard); Teleconference  
**Present:** Kirchgessner, Lemos, Perkins, Timms, Laurenzano

During the interview, First Officer Youngblom stated the following:

His date of hire with SWA was February 14, 2002.

He flew at Mesaba Airlines for 6 years, a Saab 340, BAE146 and 4 years were as PIC. His approximate total time is 10000 hours, with 3000 hours as PIC at Mesaba.

Last Thursday, he was on the last day of a three-day pairing. The duty day started around 9am and they flew 4 legs that day. The trip was PIT-MDW.

The captain's name was Vandertoll. He had never before flown with him, although he had no problems in flying with him. The approximate time of diversion to STL was 1430.

They had to hold coming into MDW. They held twice on the published arrival, the GOSHAN 2. No reason for hold provided by ATC. They knew the weather was bad, so they figured it was either for spacing or cleaning the runway. They didn't ask.

While in the hold, weather reports were sometimes above landing minimums and sometimes not. When leaving the hold for the approach, the RVR was 5000, which was above landing minimums. They received vectors to the approach ILS 31C, and their intention was to use the 31Z minimums. This was the only approach that they could do based on visibility.

The captain was the PF. The approach was fully briefed by the captain and he would be using the HUD. They expected the runway to have compact snow and to be a little slick. He told the FO to make sure he made the normal stabilized approach deviation callouts. The captain did not give any other special instructions. The captain did not brief that he would manually deploy the spoilers.

During vectors to the approach, the weather was IMC.

Braking action was reported as FAIR to POOR. While in the hold, he programmed the OPC for WET/FAIR and WET/POOR. FAIR in OPC gave them limited stopping distance, and POOR prohibited them from making the approach.

The approach controller gave them braking action as FAIR /Rollout POOR. They took this to mean the first half was FAIR and the second half was POOR. Their weight was 128,000 and the OPC indicated they could not land with POOR braking.

He said the procedure is to take the worst case and put it in the box. To his knowledge, that is not written anywhere.

Taking all of the information they had, even with the FAIR condition entered, they had a small number for distance remaining after stopping. Then when they heard POOR, it didn't make sense to them to even attempt a landing. All values with POOR were bracketed in the OPC except for max braking. The distance remaining would have been 150 feet.

With POOR entered, the 10-knot maximum tail wind was still within their limits.

When they made the decision to divert, they had intercepted the localizer, but were about 15 miles out at about an altitude of 4000 feet. He told the controller that if it were POOR, they would have to go to St Louis. They had to make a decision because they were at their Bingo fuel. Their other alternate was Kansas City.

It was going to be a coupled approach. The captain said he would stay coupled until minimums and then fly manually after that. AIII was selected on the HUD. AIII was also entered in the OPC. He believed the captain's intention was to fly the HUD commands all the way to touchdown.

They had 9500-9800 pounds of fuel when they made the decision to divert.

There were SWA planes in front of them that were already on the tower frequency so he's not sure what braking action reports they received. There were 2 flights ahead of them and not sure how many flights behind them.

When asked if the captain and he discussed how some of the other SWA flights were getting in, other than the fact that they were a little lighter, they thought maybe they were a -300 or -500, and they were not as heavy. He said they were at their maximum weight. They didn't think that any of the landing airplanes would have been close to their max landing weight. Other than weight, the tailwind was an issue because sometimes it exceeded their limit.

At 4000 feet, he could not recall the winds, however, they did have that page pulled up on the CDU.

It was normal to see captains adjust their seat when they wanted to use the HUD. He was not sure whether it was up or down.

He diverted one other time while at SWA because of fog in CA but he did not remember specifics.

This leg was the captain's normal leg to be the pilot flying. The captain did not make any comments regarding whether or not he would be more comfortable making the landing if it was the first officer's leg. He had never had a captain want to land when it was actually his turn to be the pilot flying.

There were no negative comments from the company regarding their decision to divert. He had never felt any pressure here at SWA to complete a flight.

It was smooth with no turbulence that night. He could not remember the letter designator for the last ATIS they received.

The last time he flew on the line was the day after the accident and autobrakes were still not authorized for use. His understanding was there would be an RBF letter issued implementing the policy. To his knowledge, that letter had still not been issued. The auto brake study package was good.

The captain and him discussed the new auto brake and anti-ice procedures during the enroute portions of some of their flights. They talked about when they would be implemented and the differences between the new procedures versus previous procedures.

The captain did not make any comments that he wished they were authorized to use them for this landing. He had never used auto brakes before coming here and there had been no demonstration of that system during any of his SWA training. He said he would not be apprehensive if he had to use them for first time in adverse conditions.

He did not hear anyone else divert that night.

He said he puts more credence in braking reports depending on who gives them. When asked if the same braking report had of been given by a Citation would have influenced their decision to execute the approach, he said no.

He had no problems getting up to speed on the OPC during training. Training took a ½ day. He did not recall any training regarding a mixed braking report.

He had never heard a mixed braking report since he had been here. Both he and the captain mutually agreed that the worst braking report received should be entered in the OPC.

They used the card to brief the ILS Z approach. RVR was 5000 that night.

The OPC calculations were based with/without thrust reversers. It was not included in their equation.

They knew it wouldn't be GOOD, so he entered FAIR and then POOR in the OPC for comparison. They knew that if they received a POOR braking action report from the tower, they would have to divert. Therefore, when approach control gave them the braking action, they knew they could not land and would have to divert.

He never had a problem getting thrust reverser levers up. There is only a delay for wheel spin-up.

He said the AIII mode was always for an HGS required approach.

During our approach briefing, the captain said he would use maximum braking and full reverse. He did not brief any other specifics outside of the norm.

With POOR in the OPC, it didn't allow landing because the max braking setting was bracketed and red. He was not sure what the distance remaining was.

**Interview:** Michael Roderick Cook, Jr., SWA, First Officer  
**Represented By:** Richard Donohue  
**Time/Date:** 1530, December 13, 2005  
**Location:** Chicago, IL (Marriott Courtyard); Teleconference  
**Present:** Kirchgessner, Lemos, Perkins, Timms, Laurenzano

During the interview, FO Cook stated the following:

His date of hire was May 5, 2005. Previous to working for SWA, he was in the Air Force, flying both the C-17 transport and the Lear 35. He had no previous commercial time.

He met the accident captain approximately one week prior to Thanksgiving. It was a 3-day trip, 8-9 legs. It was the first time he had flown with Bruce.

They met in the crew lounge; he (FO) was on reserve, prior to flying the first day of the trip. It was just a standard meeting and introductions. He was a warm, friendly guy, a previous AF guy as well. Bruce asked where he (FO) was from, etc., to get to know him personally.

He was more approachable than most, open, not awkward.

He said Bruce was an excellent pilot and he didn't notice anything abnormal.

They flew to the west coast, and other than overcast, they didn't have any instrument approaches.

He would definitely fly with him again.

They played 14-15 holes of golf and had dinner both nights. They had 1 beer prior to golfing, and a glass of wine with dinner both nights.

Bruce made proper responses to the checklist and also read the challenges on all the checklists when he (Bruce) was not flying.

Nothing stuck out in his mind other than they discussed not mistaking Biggs Airfield for El Paso. It was his (FO) first time into El Paso.

Each of them flew every other trip.

He did not recall completing a cold weather test this year. He couldn't recall if it was done in initial but he was sure it was covered. In the pilot lounge he saw a test floating around, and he asked about it, and some employee numbers were exempt because of recency of training.

He last flew on the line Sunday and landed at BWI Monday morning. Auto brakes were not yet authorized. First day was to be Monday 12<sup>th</sup>, but a new notice had delayed it.

He said the training for auto brakes was sufficient. He would not be apprehensive if he had to use them for the first time under adverse (snow/ice) conditions. He's comfortable with the aircraft and its parameters.

Use of auto brakes would be mandatory under certain conditions, depending on stopping margin. At other times it is at captain's discretion.

He made a GA once during his IOE with a check airman. Going into PHX, he was high on the approach and the check airman told him to go around. He had never told a captain to initiate a go around.

He diverted once for fumes in the cockpit. A diode in the door locking mechanism caused the smell. They did not make an emergency descent. They analyzed the situation and conferenced in with maintenance. They diverted about 10 minutes after the onset of the fumes. A circuit breaker was popped but maintenance did not have them reset it.

There was no pressure at SWA to take a flight or stay on schedule.

Training he received on the OPC was outstanding. He is still learning new things every day.

If he received a mixed braking report (FAIR/POOR) he would enter POOR in the OPC because it's more conservative. It's the worst part of it. He thought the FOM addressed that but he could not recall.

He had never been with a captain who made a landing that didn't use reverse. That also was never practiced in the simulator.

He could not recall if there had been an auto brake demonstration in the simulator.

He had never had any trouble deploying the reversers and had never seen anyone who had.

He had not made any CAT III landings since he had been at SWA.

The classic airplanes do not use reverse in the OPC computations but the -700 does. He had just discussed this topic with a captain this past weekend.

**Interview:** Robert Jackson Zyriek II, SWA, First Officer  
**Represented by:** Richard H. Donahue  
**Time/Date:** 1030 December 11, 2005  
**Location:** Marriott, Chicago, Ill.  
**Present:** Kirchgessner, Lemos, Timms, Perkins, Laurenzano.

During the interview, FO Zyriek stated the following:

DOH at SWA: Oct 17, 2001  
Position: FO

Aviation Background: Was in Air Force (AF) for 20+ years, flew primarily F-4, F-16, A-10. He was hired immediately afterward by SWA.

Higher Power in Dallas is where he got his 737-type rating.

Initial training at SWA was different from the AF, in that the military is anal. SWA is a different culture, more relaxed. At SWA, everyone wants to be there. In the military it was less structured in terms of the administration, uniforms, etc.

He did not experience trouble adapting to the CRM practices. He had flown 2-man jets in the AF. CRM training was at least as good, if not better than in the AF. He's not sure if he learned anything new, but it re-emphasized common CRM issues. Couldn't remember if decision-making was specifically covered in CRM. There is not a full-blown 2-day CRM class in recurrent, as in new-hire, but you do get a short hour or so block that reviews CRM issues.

He never met up with anyone here who didn't practice CRM at SWA. There are different personalities, some people are more straightforward, and some are more willing to take ideas, but he's never met anyone that he wouldn't fly with.

When asked if he ever had a trip where a captain took him into a situation that he wasn't comfortable with, he said he had never flown a low weather approach. Air Force

minimums are higher. He was apprehensive because in the AF they don't fly when the weather is poor.

When asked what was his perception regarding when autobrakes are going to be authorized for use, if not already, he said, based on his last trip (4 days ago), although they'd been giving the training materials, they're waiting for the RBF to come out to do it. He had not seen the RBF yet. Therefore, he wouldn't use it today if he flew. The auto brake training package was adequate.

All his diversions at SWA were weather related. OKC and ORD come to mind, but he didn't recall specifics. The weather was below minimums, and they held for a while and then diverted. The weather was below minimums for approaches, they couldn't even start the approach.

When asked if captains were pressured to make approaches and stay on time, he said that he had never had an instance where a captain was telling him to do something that wasn't right. He have never felt like someone was looking over my shoulder. However, this is a business, and we do our best to get customers to where they want to go.

He never had an occasion that when trying to deploy reversers they wouldn't come up.

He thinks the OPC is easy, magical, and accurate.

In initial and recurrent he could not remember what type of cold weather training was given. His impression was that they cover certain aspects of it. 2 years ago was de-icing. In PT they covered cold weather ops. They have a ready-access card in terms of visibility, icing, etc. This is relatively new.

The worst runway contamination he had ever seen at SWA was December 2002. There was a big snowstorm in BWI. It shut down operations for the morning but he could not remember specifics or what they entered in the OPC.

The last time he flew with the accident pilot was Thanksgiving of this year for 1 day and 3 legs. The captain flew twice and he flew once.

He did not have occasion to socialize with Bruce.

He met him that day in the morning in the hotel lobby. Bruce introduced himself, was very nice, bought him a cup of coffee, and spoke about how he got this trip. He was a nice guy. The FAs were there, but perhaps not in the conversation.

Bruce interacted with the FAs on the long drive from Nashville, and they were speaking about a recent trip Bruce had to Scotland. He briefed the FAs in the van on the way to the airport. All seemed well.

He (FO) did the walk-around that day.

When asked to describe him as a pilot, he said nothing stands out. He did not remember anything that happened out of the ordinary, which means to him that Bruce was a good pilot; he must have met his expectations. He couldn't honestly say anything unusual about the flights themselves. Bruce was easy to fly with, a nice guy, and he bought me lunch. The weather was nice, so there were no weather issues. Just nothing stood out. Checklist challenge/response was done well.

Bruce supported him during a gusty landing in Providence. He was fine; nothing out of the ordinary.

Every approach was visual, so they didn't review the entire approach procedure. It was not as in-depth.

Enroute, Bruce spoke about Scotland. No other specifics stood out.

Bruce would not fit in the category of those pilots that he would rather not fly with.

The new performance cards could not be used until a RBF letter was issued.

The AIII mode on the HUD is based solely on weather minimums.

CAT II/III approaches require the use of AIII. He knew of no instances when the AIII mode could not be used. The OPC factors in the runway length.

There was nothing with regards to taking over the controls taught in CRM. His approach would be to try to talk and suggest first. It's just a natural thing to take over if safety is an immediate issue.

**Interview:** Thomas Randolph Darkis, SWA, First Officer  
**Represented By:** Richard Donohue  
**Time/Date:** 1345, December 11, 2005  
**Location:** Chicago, IL (Marriott Courtyard)  
**Present:** Kirchgessner, Lemos, Perkins, Timms, Laurenzano

During the interview, First Officer Darkis stated the following:

His date of hire is March 14, 2002. He previously flew for Midway Airlines from 1999 to 2001. His total flight time is about 10,000 hours. He was a captain on the Canadair Regional Jet and flew King Airs and Citations for many years.

His last flight was last week. He read that the autobrake usage would start on December 12<sup>th</sup>, but not until another read before fly (RBF) memo was issued, and that it may have been issued since his last flight. He has not seen an RBF that said autobrake usage would begin on December 12<sup>th</sup>, and would use the old procedures until he saw the memo.

He was the flying pilot (PF) where both pilots decided to go around at the same time. They had to go-around due to an aircraft cleared for a crossing runway, so he didn't have to tell the captain to GA.

He went around once on OAK where the controllers keep you up high. If it's not right, you go around. This occurred three years ago.

He had a diversion last spring but it wasn't directly related to weather

He finds crew resource management (CRM) on the line fantastic compared with his previous FAR 121 experience and characterized the training as more standardized. He finds that everyone does the same thing in the cockpit and you do not have to always question what the pilot is doing.

He hadn't ever flown with anyone at SWA who doesn't care for the checklists itself, just the way it is administered after a procedural change. In this example, he was a new-hire probationary pilot on line about six months, and SWA had just transitioned from reading the checklist on the taxi. The captain wanted to do some variant of the old procedures. He told the captain that he wanted to do the procedure the correct way and that he didn't want to be confused. The captain complied, but laughed at him.

He has occasionally been uncomfortable with where a captain has taken him, but he usually lets them know that he is uncomfortable, and that generally resolves it. He gave an example of a situation in a heavy weight aircraft in high altitude turbulence. He has less of a threshold than others might. He was uncomfortable with the margin that was determined by the FMS, charts or the on-board performance computer (OPC), and he used all three. The requirement is for checking any of them, depending on the conditions (e.g., if its above the optimum altitude for the trip.)

He flew with Bruce right after Thanksgiving Day. It was the first time he had met Bruce. They flew a three-day trip of four legs, three legs, and three legs. The initial meeting was characterized as excellent and great. Bruce puts you at ease, is good with people, good with the flight attendants and gave good briefings. He finds Bruce's management style compatible and said, "If you keep it simple and straightforward, we'll get the job done." Because he's (FO) conservative, he told Bruce that he'd be scared long before he (captain) would. He remarked that Bruce was great with the flight attendants and makes communication an open option. Bruce tells them about the weather and welcomes them to the cockpit.

He had no concerns about Bruce's airplane handling skills. They flew into MDW, and in ALB they encountered light snow in overcast conditions, groomed runways with good braking action. They also had a pressurization problem in Florida at 41,000 ft., when the pack tripped went off. Bruce handled it like he's supposed to by descending and wrote the airplane up on ground.

He has not had any trouble deploying the thrust reversers.

He and Bruce went out to eat. Bruce had one beer.

He flew one-day trips with Bruce and noted that Bruce likes to fly PM trips generally, but was stuck on an AM reserve schedule all month, but that it didn't seem to bother him.

He considered Bruce detail-oriented, based on the way he handled and responded to the pressurization issue.

Bruce had not make any comments regarding his flying, because there was no need to.

No other instrument approaches aside from Albany were made.

He had not had an FAA observation while he flew with Bruce, and has not had an FAA observer on one of his trips in the last six months. There was an FAA observer on his jumpseat at one time who was going to give another captain a checkride, but they did not comment on his performance.

He indicated that SWA company policy on alcohol between trips is the same as the FAA rule.

He asks captains if they want him to select HUD/AIII on the OPC, and their answers vary depending on whether it's visual and if they're just practicing. He would not use the AIII guidance mode unless it was an actual CAT III approach or if they're practicing the approach.

He considers the MDW ILS Z 31C a special CAT I approach because it says HGS only on the chart.

He stated that the OPC HUD/AIII selection changes the landing distance by making it shorter if you press it.

If given the choice, he would you rather have worse braking action in the first half rather than last half of a runway.

He had not received any training in jet fuel volatility. He has no idea what temperature jet fuel ignites.

He stated that most captains learning the HUD love it, and that he hasn't discussed why some don't. Most guys love it.

**Interview:** Rory Brett Russell, SWA, Captain  
**Represented By:** Dave McCracken  
**Time/Date:** 1300 December 11, 2005

**Location:** Chicago, IL (Marriott Courtyard)  
**Present:** Kirchgessner, Lemos, Perkins, Timms, Laurenzano

During the interview, Captain Russell stated the following:

He was hired by Southwest Airlines (SWA) on in 5-8-1997. He upgraded 3 years ago from first officer (FO) to captain.

There was nothing covered regarding cold weather operations during his last proficiency training in November 2005 or in his most recent proficiency check in May 2005.

He did not remember getting a cold weather operations package regarding deicing this year though he has gotten them in the past but doesn't recall when they came out.

Per his understanding, autobrakes usage will be allowed December 12, 2005 and that there was a RBF memo that mentioned the specific date.

He doesn't have any sense why SWA will start using the autobrakes when they haven't in the past and he hasn't flown planes with them before.

As a captain he uses the autopilot in a normal flight as soon as possible after the aircraft is cleaned up and at 1,000 ft. He uses it as much as possible until the approach phase depending on the particular approach. He flies with it as much as he can.

One of his personal limits is fuel. Even though legal to land at 5,000 lbs fuel remaining, he doesn't like to be at the minimum. He doesn't think that this gives you enough cushion in certain circumstances and usually bumps it up 1,000 lbs. The company has never said anything to him about it.

He has never diverted to his recollection. He thought that one potential divert situation was because of weather in Baltimore.

His personal weather limits are nothing more than what the legal limits are. He feels as if he has the fuel and is legal to shoot the approach that he will try and do the missed approach. He won't fly in thunderstorms or something stupid, but he doesn't go out of his way to avoid weather.

There were no occasions in his past where he felt that Southwest Airlines (SWA) was putting pressure on him to make a flight.

He could not recall any occasion where either he or the FO had trouble deploying the reversers.

He had an occasion to go-around when the FO was outside of parameters. He's done that himself when he was out of parameters but never because of weather minimums. He has

never had an occasion as FO to tell the captain to go around and has never been told to GA by an FO. If a FO told him to go around he would without explanation.

He has never had the FAA ride with him.

Once during a ride with a line check airman, the check airman commented that he should have paid more attention to the maximum landing weight, that it was close to the maximum. He had relied on the FO's review of the numbers, and the FO kept it too close. He has monitored this since that time.

His proficiency checks have all gone well since he's been a captain.

He feels that the CRM works well out on the line and is adequate at SWA. He doesn't believe that FO's are intimidated out on the line. He receives good input from the FOs all the time.

He last flew with FO Oliver three-day trip on November 16, perhaps 3-4 legs per day, and approximately 12-15 legs total. They alternated flights. This was the first time he had met him. Upon meeting FO Oliver, he introduced himself; they spoke about where they lived, and the specifics of the flight. It went fine – no different than with anyone else. He described FO Oliver as professional, conscientious and confident with great skills.

He characterized FO Oliver as an above average FO for his experience level and had no reservations in flying with him again. He described FO Oliver's checklist usage as disciplined and remarked that FO Oliver was very helpful in staying ahead of what they needed as a team. He would remember if anything was amiss.

They had weather on the first leg out of BWI to ISP: low ceilings, wind, and rain. It was a nasty, gusty day. It was his flight and FO Oliver did a great job helping him keep up with the weather. It was a bad ride but it was still visual. The next leg was to MDW, and they expected it to be a bit better, and it was still windy, gusty, and with flurries. FO Oliver did a great job again, and was in the slot and on speed. Another flight that sticks out in his mind is going into RNO, a tough approach. FO Oliver was flying that leg. It was very windy and he did a great job.

He did not have occasion on the layovers to socialize with him, as they didn't have much time. FO Oliver told him that he worked out a little bit.

He believes that the HGS is required for an approach when it says so on the approach plate, is a CAT II/III, or a special CAT I approach.

He believes that the HUD/AIII setting in the OPC gives you an extra landing margin and should be used when shooting an AIII approach, but at no other time.

Aside from fire, he considers an immediate evacuation as a judgment call. An immediate evacuation for structural damage depends on whether there is a fire.

He was taught to initiate reverse thrust after the nose wheel touches the ground.

**Interview:** Larry James Smith (“L.J.”), SWA, Captain  
**Represented By:** Dave McCracken  
**Time/Date:** 1345, December 11, 2005  
**Location:** Chicago, IL (Marriott Courtyard)  
**Present:** Kirchgessner, Lemos, Perkins, Timms, Laurenzano

During the interview, Captain Smith stated the following:

His date of hire was June 17, 1999. He has been a captain for about 6 months. His total flight time is between 6,000 and 7,000 hours. His previous experience is military (Harrier). Southwest Airlines (SWA) is his first commercial job.

According to his knowledge, the autobrakes were allowed to be used in a few weeks. He hasn't seen paperwork that says when this will actually occur.

He flew last week and read the read before fly (RBF) files. He recalls being told not to use them yet, and to wait for the RBF. He has not flown an aircraft with them before. He is not sure if he feels that the training package was adequate enough as he hasn't looked at it very closely.

As a captain, he uses the autopilot at 1,000' on departure, on approach, whenever he wants, otherwise no lower than 50 feet lower than the decision height. He likes to use the autopilot right away but another FO might prefer to hand-fly to altitude.

As a captain he has personal limits, and if something doesn't feel right, he won't do it though he couldn't think of anything specific. In hindsight, there were a couple of occasions as an FO where he thought he should have done something different. He could have talked to the captain and the incidences were mainly turbulence and thunderstorm related.

He has never diverted as a captain, but had as a FO he diverted from ISP to BWI for low visibility.

As a captain he has not had an occasion to tell a FO to go-around. If a FO told him to go around he would without explanation.

He has not felt any pressure to carry out a flight and does not know anyone who has.

He wasn't looking forward to captain training but ended up getting a lot out of it. His last proficiency check went well. The FAA observed during his captain checkride and the comments were all positive.

When he was an FO there were occasions where the FAA was on board, but he didn't remember any comments.

There were no occasions where he was unable to deploy the thrust reversers.

His did not expect many deferred maintenance items on airplanes he flew, even on the 737-300s.

He last flew with FO Steve Oliver about three weeks ago, and five to six months previous to that. They averaged three to four flights a day for a total of about 20 flights. He liked Oliver on their first contact and Oliver made him feel as if SWA has good guys out there in the right seat. He enjoyed flying with Oliver and would look for his name on the trip. He described Oliver as a good guy with a good personality and as a good, dedicated pilot. He could not recall anything unusual during his experience with Oliver and could not remember where they went.

He noted no problems with Oliver's checklist protocol.

He (captain) is not CAT III qualified yet, but practices them all the time. He would not use the AIII mode below 4,000 RVR.

He would use the AIII selection in the OPC on an AIII approach because it gives added margin for the flare cue.

He would use the OPC HUD/AIII mode selection for a special CAT I approach.

During AIII mode approaches, he would not deselect AIII mode just because he didn't like what he saw. If you need it, you use it.

**Interview:** Charles Preston Nicholson III, SWA, Captain  
**Represented By:** Richard Donohue  
**Time/Date:** 1335, December 13, 2005  
**Location:** Chicago, IL (Marriott Courtyard); Teleconference  
**Present:** Kirchgessner, Lemos, Perkins, Timms, Laurenzano

During the Interview, Captain Nicholson stated the following:

His date of hire at SWA was June 8, 1995. He upgraded in 2000, and has never held any roles in management or training. He has about 3500 hours as a PIC, and his flying experience is civilian (Piedmont/US Airways, Metro Airlines).

The last time that he flew with the FO was Thanksgiving of this year, just a few weeks ago. It was a 4-day trip, with a total of 13 or 14 legs. They swapped PF duties for each leg.

When asked if anything sticks out about the FO, he reported that he is one of the good ones: friendly, pleasant, no stress, makes for a fun cockpit, and is a very good pilot. They both had flown Saab 340's in the past so they had that in common. He is good with SWA procedures.

This was the first time that he had both met and flown with the FO. They met at BWI at the gate, and engaged in the usual small talk.

When asked to characterize the FO's personality, Captain Nicholson reported that he (FO) was friendly, outgoing, polite, and professional all the way around.

When asked to characterize the FO's skills as a pilot, Captain Nicholson reported that he (FO) was precise, smooth with the airplane, and AS was smooth and on target.

When asked if, as a captain, he does anything different with an FO that he's never flown with, he reported that he does not.

His checklist procedures were very good; he had it out and verified when items were completed, and had a good checklist discipline overall. His approach briefings were by the book. During their trip the FO had to shoot several IMC approaches, and did so as required by the FOM. They didn't do any company procedures approaches, and they didn't run into any winter weather.

They did have the occasion to socialize on one of the evenings, when several crewmembers went out for dinner. They all consumed 1 alcoholic beverage and several glasses of water each.

Captain Nicholson last flew on Sunday, November 11<sup>th</sup>. His understanding of when to use autobrakes is that it was not authorized until he received an RBF letter. He did find an RBF in his box that stated use of the procedure would begin Monday the 12<sup>th</sup>. He feels as if the training package was adequate, and although he has never used autobrakes before, would have no reservations in using them.

He has diverted on several occasions. Once in the Fall of 2002, when trying to get into San Diego, and once in the Summer of 2004 when going to Omaha. There was a severe thunderstorm, and he diverted to Kansas City.

His understanding is that the PF or the PNF can call for a GA if the flight is not within the limits. If on a flight that he was the PF, and the FO called for a GA, he would execute it without an explanation, as he trusts the FO's at SWA. An FO has never told him to do a GA, nor has he ever had to tell a captain to do so.

He feels as if there is no company pressure to get the flights completed and to fly on time.

On one occasion he has had to take the aircraft from an FO, where the FO bounced pretty hard on the landing. He took over and recovered from the bounce. He has never been out with a new FO that's just been out of training. He reported that he finds the FO's very good, competent and well trained.

He recently had an FAA representative on his flight, and the only comments that he made afterwards were positive, and were in reference to the good CRM evidenced on the flight. His last PC went well, and he has never required any additional training in his PC's.

If weather at the destination airport were to be reported as the combination FAIR/POOR, he would enter the more conservative of the two classifications into the OPC to determine landing performance. He didn't believe that this was written in the guidance anywhere, but was just his personal guideline.

When asked about whether or not the OPC takes into consideration use of the reversers, he reported the differences between the -700 (yes) and the -300/-500 (no), having recently read this information in the FOM.

If he were to feel uncomfortable about a particular approach, he would not make it even if it were within legal limits, although most of the time he trusts the legal limitations provided by the OPC and the FOM. When asked if in the OPC the first two values were to be bracketed, would that change his thinking at all, he responded that it might.

He has never had any trouble pulling reverse handles up, and has never noticed anyone else having difficulty in doing so. He has never landed without reversers, would not contemplate it, nor has he ever seen anyone else land without using them.

**Interview:** John H. Croy, SWA, Simulator and Ground Instructor  
**Represented By:** Richard Donahue  
**Time/Date:** 1530, December 11, 2005  
**Location:** Chicago, IL (Marriott Courtyard)  
**Present:** Kirchgessner, Lemos, Perkins, Timms, Laurenzano

During the interview, Captain Croy stated the following:

His employment with Southwest Airlines (SWA) began March 25, 1999, as a simulator and ground training instructor. Prior to SWA he spent almost nine years in the Air Force and 31 years in the airline industry, with 20 years at Western Airlines and 11 years at Delta Air Lines. He held an instructor role for flight engineers at Western and was a 737 checkairman at both Western and Delta, where he retired at the mandatory retirement age. His flight experience was close to 30,000 hours total time and about 3,000 hours in the 737.

He is authorized to instruct in SWA flight simulators, and at the moment holds the position of Supervisor of Instructor Standards. He is still qualified to teach recurrent training, initial new hire training, and initial captain upgrade, and recurrent training for pilots in the simulator. He supervises 57 instructors.

He doesn't keep track of pilot training records as it's all computerized. In terms of new-hire or captain upgrade training, there is a detailed list of tasks and instructor comments in a training folder that is turned in to the SWA training scheduling department.

As far as he knows, it is not mandatory that instructors place comments in training records, but they are encouraged to do so. In the great majority of records there are comments and these stay in the files.

He is one of four instructor check airmen, and he gives instructor checkrides one-two per month on the average. He doesn't give checkrides to line pilots, and he doesn't hire new instructors. He is not currently involved in the training of new instructors and hasn't trained and instructor in a year.

Instructors are qualified as laid out in FARs. As a general rule, they're all pilot-qualified. They go through the entire new-hire training and complete a new-hire PC (PC). They go through the full captain upgrade training and take a PC. They then complete a relatively extensive simulator operation training program with multiple observations to be able to give training in them. They observe in various simulators, and are observed teaching by another instructor. They are then qualified to give a PC.

An instructor's first year is spent doing mostly simulator training. The FAA is involved only if the instructor is going to be a sim check airman, or needs a letter of authorization. The FAA sits in on some of the classes. Every 2 years they do checks. The FAA comes by to look at the training on a weekly basis, and is usually there for the day.

The last time he was observed by the FAA (four months ago), the inspector gave him a re-qualification check ride. The FAA watched him give a checkride to two other instructors. The inspector was pleased in general, but he was firm on the fact that training not be done during a PC, that it is simply a check. It was a fair comment.

SWA instructors do not do line checks for the pilots, they do PCs.

To the best of his knowledge, the FAA has not required or suggested that they make any changes to the SWA simulator program recently. The manager of the instructors training program may know this answer.

The FAA is quite aware of what SWA is doing and is involved in our changes.

Simulator checkairman are allowed to stop a checkride and do some training and restart the checkride, but we are not allowed to train during the check.

Occasionally training issues come up with new SWA instructors. SWA has never had an instructor not pass his PC.

High altitude stall training will be initiated in January. The new training profile begins next year and will start first week in January. Proficiency simulator training is about four hours. SWA has redone the profile, which incorporates high-altitude stall training for next year, and instructors have already been trained on it in the simulator. Several people felt it was important to emphasize that a high-altitude stall recovery is not the same as a low-altitude stall recovery. SWA wanted to demonstrate that and felt it needed to be covered. He is not aware of any specific incidents that precipitated the change, but had heard some rumor out of the safety record department of this occurring. The SWA aviation safety awareness program (ASAP) allows them to help determine what events should be covered or reemphasized in training, however, they're careful not to mention any details.

He used to teach recurrent ground training. The eight-hour program includes a systems review (differs based on the year, 1/3 for each year) and operational procedures from the flight operations manual (FOM). The flight operation training manual (FOTM) details specific topics such as de-icing, anything new procedurally, actual training and checkride maneuvers in general. This is scenario-based, where the situations come up. There is no other weather training outside of de-icing and performance.

There is not a specific crew resource management (CRM) training segment, although they try to incorporate it into several segments in recurrent training. CRM training is a full day in initial training.

SWA ensures the standards between the instructors and the check airman that are working with the pilots, because the managers are all in the same building and they talk to one another all the time. They communicate if issues arise with training topics though they don't get involved in the checking department.

He feels that the benefit of having separate instructors from the check airman is that the instructors bring a lot of background information from other airlines, and that they can contribute from an objective, greater perspective.

The check airman group is separate from the training group. They don't intermix at all unless a check airman gives a check and a particular problem arises with a pilot. The reason for the division is that it is a union contractual agreement.

If a check airman fails a pilot on a PC, the pilot would be sent back to the training department. Specific information would be passed on to the instructor to do the retraining. He guesses that the same check airman would not give the recheck. He is not sure what occurs if a pilot fails subsequent to that. He is not aware of the SWA failure rate for PCs. The last PC retraining that he performed was about a year ago, because he doesn't do much training. His job is to standardize the training for the instructors.

There were no common threads when he was getting pilots for retraining. Topics were occasionally general procedural knowledge and sometimes system knowledge. The most difficult maneuvers are normal missed approaches and the visual portion of non-precision approaches. SWA has worked on it and they don't seem to be as much of a problem anymore.

SWA is not authorized for circle-to-land.

Standardizing the instructor training is a full-time job.

The last change that he was personally involved in was manual changes. He doesn't recall the last procedural change he effected.

He was not involved in the reinstatement of the autobrakes. He knew it was being considered but doesn't know why. He has previously given demonstrations in the simulator but only with the RTO function and not during landing. This is standard among the instructor ranks. Though different airlines have different procedures, he has used autobrakes before at other airlines but didn't use them all the time.

When the main wheels touch down during the landing, the captain is taught to lower the nose, begin manual braking, if necessary, bring the thrust levers to idle, and initiate reverse thrust to a minimum of 65%. There are more caveats regarding when it is necessary to get on the braking. The pilot not flying (PNF) will note and announce if the spoilers are not deployed. The captain always deploys the spoilers whether he is the pilot flying (PF) or PNF.

Though not currently integrated, doing an autobrake demonstration may be done in the simulator in the future. He doesn't know if the simulator is capable of recreating anti-skid activation. He can program different runway surface conditions, but doesn't know whether the feeling of the release is the same.

He has only used the HUD in the simulator. The specific HUD modes are dependant on the weather, although you can use it for any approach if you want, including VFR. You can use the HUD all the time. He identified the primary mode, and that IMC mode and AIII mode are both de-clutter modes. There are parameters that you put in: runway length, field elevation, etc., which are based on entries with a quick-reference card.

OPC is a big portion of training, and is used all the time. There is a full day course for new hires, and only a review for captain upgrades.

At this point Captain Cory was apprised of the particulars of the accident approach and weather.

He reported that SWA recommends that anytime you're doing an AIII approach, you also select AIII on the OPC because it adds 1000 extra feet. Even if you're practicing, the OPC will tell you that you don't have enough runway, assuming you use the AIII all the

way down to the flare. The specifics are in the FOM. He feels that they cover it pretty well, and that pilots know that it reduces the stopping margin.

He doesn't recall specifically what SWA policy is regarding mixed braking action reports, but believes that you stay on the conservative side and use the lower condition. He is not sure if there is any written guidance.

He has not seen anyone having difficulty deploying the thrust reverses in the simulator. He has not heard of it happening on the line.

SWA does an incapacitation scenario on a CAT III right at the minimums where the captain stops responding or taking any action and the FO must take over.

There is written guidance regarding go-around, in that regardless of who calls this, the PF must respond without explanation

There are varied evacuation scenarios, which include landing gear-collapse, an engine fire that cannot be extinguished, and a cargo fire. Pilots consider what exit they will use. Pilots are keyed into evaluating the situation prior to determining what to do; this is the main procedure for any of their abnormal procedures: 1) maintain control, and 2) analyze the situation. On the ground you can start with the second step.

Pilots are taught to try using the slides and pilots realize that using the slides is a major decision.

He wasn't briefed on the accident, but was here prior to accident, and saw it on television. From this he was able to assess that it was major damage.

He's not sure if the aircraft should have been immediately evacuated, without knowing what the pilots could see from their perspective. He said that he would evacuate the aircraft, based on a nose-low attitude and going through a fence, and not knowing what had been ripped up on the engine. He admitted that it was easy for him to say that in hindsight.

There is very little interaction between the pilots and the flight attendants (FAs) in the simulator that he is able to simulate, as there is no one there. SWA does emphasize pilots talking to the FAs and passengers.

When simulating a fire in a simulator scenario, he expects crews to run the passenger evacuation checklist, talk to the rescue trucks, see what air traffic control (ATC) knows, decide to evacuate or not, give the evacuation command, and state which exit(s).

The evacuation checklist is called for, not just started by someone. It's on the yolk, and we also have a quick-reference guide in the abnormal section. It is not necessary to run it in sequence or to complete all items. Pilots should use their own judgment. It's not made to be a challenge-response, only a read and do.

The basic premise for checklist usage at SWA is that if it is not a memory item, pilots can elect to do it from memory, so long as the pilot does it in the correct order. There are very few memory items at SWA.

He described a SWA stabilized approach as configured, on glide path with sink rate and airspeed within limits by 1,000 ft. The normal flap setting for landing is 30 and SWA recommends 40 for other conditions. Gear and flaps must be down by the marker.

All instructors except two are pilot instructors that can teach both ground and the simulator, and two teach only ground. He takes a PC twice a year. He is a simulator checkairman for instructors only. There are normal check airmen for pilot check rides.

They don't teach preservation of the CVR in the FOM; he didn't recall seeing it anywhere.

Icing training is done every year. Cold weather training consists of forms, procedures, contamination checks, holdover time, fluids, checklists, corrections for takeoff and approach. It is a block of scenarios surrounding these issues that he described as a PowerPoint LOFT.

First officers are not required to verify that the thrust reversers have actuated.

He was not sure which specific approaches are an example of a special CAT I approach. The ILS Z is not a special CAT I. ILS 31C is in the simulators and is used in LOFT.

When asked what the common errors are during OPC training, he responded that there is one primary OPC instructor, and the topic is also covered in the simulator. There is a lot of training on it, and it's a pretty straightforward device.

To his knowledge, there have never been any simulator scenarios with a mixed condition braking report.

There is not any training on the volatility of jet fuel.

CRM training is not a separate block in recurrent, it is integrated in the scenarios. The training department is a big believer in working it in when you can.

To his knowledge, there is no specific CRM-related infraction (not performance related) that would lead to a checkride failure.

In the scenario described above where the PF is incapacitated and the PNF must take over, it is a medical incapacitation.

When asked what type of deviations or errors would call for a PT failure, he responded that the pilot would fail if it looks like they are making it up as they goes along. Most of

the instructors have been around for a long time and they know what they're doing. There is no hard criterion.

**Interview:** Walter Harold Timms, SWA, Checkairman  
**Represented by:** Declined  
**Time/Date:** Saturday, December 10, 2005  
**Location:** Marriott, Chicago, Ill.  
**Present:** Kirchgessner, Lemos, Timms, Perkins, Laurenzano.

During the interview, Captain Timms stated the following:

His date of hire at SWA was May 9, 1983. He was hired as an FO and became a captain after being with the company for about 5 years. He has been a PC/line check airman for the last 2 months.

He previously worked for a charter company in DFW flying Lear 25, 35, King Air, and G1. His total time was about 23000 hours and 18000 as PIC. He had also previously been a flight instructor but had no instruction duties at SWA until he became a check airman. He had no incidents/accidents/FAA action.

SWA asked him to be a LCA. His training consisted of 4 days ground school and a little simulator and 2 days of dedicated simulator time. He said he received a total of 10 hours in the simulator. During training they were asked to develop profiles and then would teach the profiles to other pilots.

All PCs that he has given so far have been satisfactory. There is no probation period for a check airman. He did receive an FAA observation while he was giving his first line check.

When giving a PC, he is not given the pilot's training records and he has no prior knowledge of the pilot's ability. If it were a recheck, he would be given the training record where the deficiencies are documented.

He said he had given additional training during a PC because of an unsatisfactory go around.

He expected to be used a lot in the future because he is based in DFW and that is where the simulators were housed. They have 7-8 simulators of the -300 and -700 models.

When asked about the company philosophy on manual versus automation flying, he said they don't use automation to the extent that your manual skills are lost. Use the automation to assist you; just don't give the airplane over to the automation. Autopilot generally remains engaged from 2000 feet after takeoff until 2000 feet MSL on the descent.

Pilots are taught to recover at the first sign of a stall. They just started doing stalls at high altitude also. The technique is different. At lower altitudes you try to minimize your altitude loss, at higher altitudes you are going to lose altitude and ATC must be notified. High altitude stalls were introduced because the analysis of FDAP data indicated prior incidents. They also train upset recoveries.

He described the level of standardization at SWA as very high.

He said he had flown occasionally with a pilot who missed something, but that was not unusual. The bar is set high and you strive to raise it higher.

When asked if he was giving a line check, what some of the things would be that would call for him to down the pilot, and of those, which things does he think he'd see most often, he said continuing an unstabilized approach or unsatisfactory go around.

There are no written requirements when you have to down someone. It is a judgment call. He could not give specifics on simulator failure rates but said pilots failed less than 5% of the time in the simulator.

When a pilot fails a checkride, the crew is debriefed together, the training department is notified and the pilot is removed from flying status. You then finalize your notes and send them to the training department. A decision is then made regarding what sort of training schedule would be best for the pilot. The head of training and union are both notified. There is a discussion with sim instructor regarding best course of action for the pilot. Someone else would give the re-check. After a second failure the FAA would get involved and there might be certificate action.

He characterized training at SWA as very good.

Cold wx ops are covered in the FOM. Training involves visibility and temperature limitations.

The ATIS is picked up prior to initial descent.

The crews have adapted very well to the on board performance computer (OPC); it has been very beneficial. It works as advertised. When they input the numbers, there is no requirement or guidance to check the numbers, that is, they accept the numbers that are calculated by the OPC.

When asked if he had any personal guidelines regarding legal versus safe, he said yes but they're specific to the situation. He had refused to land once when he was legal to do so because there were too many limits that were at their maximum allowable. The visibility, cross wind and braking action, on a short and narrow runway at Detroit City Airport caused him to divert when he could have legally landed.

Based on personal experience, the company did not pressure pilots to complete trips. When asked if he had heard stories where pilots look back and report that they would have not completed the trip in hindsight, he said yes.

He said the company was going to start using auto brakes because of FAA pressure. He did not think it was incident driven or demanded by the union. The FAA said that with wet runways, low visibility with crosswind, use of auto brakes was justified. The training program for use of auto-brakes was a home study only. They sent everyone the package, and then the company would issue a read before fly (RBF) letter as to when pilots could start using them. To his knowledge, this hasn't come out yet. Monday, December 12<sup>th</sup> was the start date.

Based on his knowledge of the program, the accident pilots should not have been using the autobrakes.

If runway is not dry and the runway remaining distance is less than 500 feet, they are to use the autobrake. Wet and less than 500 feet stopping margin requires the use of autobrakes. OPC won't tell you what to use (that you have to), it will just advise you of the setting to use, if you use the auto brakes. Settings are 2, 3 and max.

Based on your knowledge of the airplane and what you heard in the interviews, do you think the accident might have been prevented if the auto brakes were not used? He said he had no way of knowing that.

He said that based on what he had heard; he felt the auto brakes were functioning properly.

When asked if there was any guidance regarding when to override the autobrakes and apply brakes manually, he said that he would like to check the FOM because it is a new procedure and he is not totally familiar with it as yet.

Pilots are taught to use the autopilot on an ILS to minimums. If weather is not at minimums, autopilot use is at pilot's discretion.

He said they do not use auto-throttles because the company feared that too much automation might have the result of taking the pilot out of the loop on the airplane.

He did not know if the ILS 31Z approach at MDW was practiced in the simulator.

The captain is responsible for making sure the speed brakes deploy after touchdown. He said most are looking for the handle to move aft. There is no requirement to putting your hand on it to make sure that they deploy. Pilots are taught to arm it, ensure they deploy, and if not, to manually deploy them.

He never had any problems getting the reverser handles to move after touchdown. If he could not raise the reverse levers, he would stand on the brakes hard, and would continue to try to deploy the reversers.

Minimum reverse on a dry runway is 65% for a dry runway, and if you need them, max.

Pilots are taught to initiate reverse as soon as the nose wheel comes down. He was not aware of anything that would preclude initially deploying them.

When the reversers do come up and back to the interlock, pilots are taught to maintain and hold continual pressure until they deploy.

Pilots are taught to come out of reverse as you approach 80 , then you would apply brakes.

Regarding evacuation procedures, pilots were taught to:

1. Call for the checklist. It's on the yolk. Under most circumstances, the captain would do this. It is challenge and response. The reader does not do the steps. One reads and one does.
2. When you get to the step to initiate the evacuation (call to the back), he said it would depend on the particular situation. He was not sure if choosing which doors to egress was addressed in the simulator. In his last simulator training, it was obvious because of a gear collapse.
3. After completing the checklist, the FO would exit the aircraft to assist with evacuation, and the captain goes back to assist with passenger evacuations. The captain would make sure that all are off the aircraft.

There is no written guidance that he knows of that sets a time frame for how quickly the evacuation process must be started.

When asked knowing what you do now about the accident flight, and listening to the interviews, as a captain, would you have done anything different in that situation (assuming you are not stressed out and have all faculties), he said he would keep passengers seated until the checklist was complete and reevaluate what is taking place. The accident flight had the benefit of having rescue there pretty quick to handle any potential fire. He believes that a more rapid evacuation would have been associated with more injuries. He said he thought it went as good as it could possibly go after the airplane came to a stop.

He said he did not think he would have made the landing based on the information he had heard regarding the accident flight. He said he would have been up against too many limits, the main one being a tailwind.

He said, for example, at Detroit, there were consequences in not landing, people had to be bussed, etc. He discussed it with other pilots that night and explained to them why he

made that decision. He was reflecting and wondering if he made an error. He also thought that there might have been some issues with the parameters for landing at Detroit. He spoke to the chief pilot (CP) the following day, and the CP responded: "Did you bend any metal? Did you go off the runway? Then what's the problem? That is why you get paid the big bucks. It is your discretion as captain."

There was no implied company pressure to get passengers from here to there. Both pilots need to be in agreement. He did not agree with the accident's captain's statement that 5 years ago, things were different.

He said that the Burbank overrun might have precipitated an extra effort in communicating to the pilots that safety is above passenger convenience and money.

The OPC had been around for about 10 years and pilot acceptance was high.

The training program for auto brakes was a home study package. There was currently no simulator training on the auto brakes except they were used in the rejected takeoff (RTO).

There were other items on the home study CD besides auto brakes. Deice procedures were also changing and were included. A RBF letter would be issued by SWA when it was okay to use auto brakes and new de-ice procedures. That RBF had not been issued yet.

When asked what they would have used for guidance prior to the use of autobrakes, he responded that the OPC would have told them when to initiate application of the autobrakes, according to the MIN, MED and MAX settings.

The glide path for the HUD is the same as for the ILS GS.

The reversers do not deploy automatically.

10 is the max limit for the use of the HGS system.

He did not think that a diversion required an irregularity report.

**Interview:** Frank Burnett Wright, SWA, Checkairman all checks  
**Represented by:** Declined  
**Time/Date:** 1125, January 23, 2006  
**Location:** Dallas, TX (SWA Training Center)  
**Present:** Kirchgessner, Lemos, Perkins, Timms, James, Ratley

During the interview, Captain Wright stated the following:

His date of hire with Southwest Airlines (SWA) was January 4, 1979. Prior to working for SWA he piloted T-33 and F-106 aircraft in the Air Force. He was hired as a first

officer and upgraded to captain in 2.5 years. He has always been domiciled in Dallas and participated often as a representative for the SWA pilot's union on several committees and as a first officer representative. He has run the CRM department for SWA and has also acted as a CRM facilitator and pilot interviewer. He has held the position of checkairman for five years and was always qualified as an all checks checkairman. He ran and made changes to the CRM program from 1989 until shortly after SWA had an incident in Burbank, CA. He resigned because a new training administration was taking over and he would not be able to keep control over the CRM program. He was not asked to resign by SWA and had been asked to remain in his position.

He witnessed personnel changes at the training center after the SWA Burbank incident. A number of procedural changes followed. The SWA Normal Operations Review Team (SNORT) was formed April 2004 to examine SWA procedures. The procedures developed by the SNORT team, referred to as the April 20 change, quantified a number of things. They helped avoid no-flap takeoffs, which were a problem according to FDAP data, by revising the after start flows and checklist. They also revised the stabilized approach criteria. At 1000' there are three criteria that must be met, on speed (-5/+10), on glide slope with 1000 fpm max rate and configured. Prior to that time, the criterion was not that black and white.

He flies the line full time and is occasionally pulled from a trip to run the simulator. He does approximately 30-40 checks per year, usually three per month. He also does a fair number of line checks but probably only one every other month because SWA has dedicated line checkairmen.

The last time he downed someone was on a line check. The captain was 25kts fast and 1.5 dots high on glide slope at 1000'. The probationary first officer (FO) was not very assertive, and said to the captain "I think that at this point I should be telling you to go around." The captain patted the FO on the shoulder and said that he thought that they would be okay. The crew made the landing successfully. Captain Wright said that he would have commanded a go-around if they were not stabilized by 500'. Captain Wright called the chief pilot on call and scheduled another captain to take the trip. The FO was not downed because he tried to do the right thing. The captain got four days of training, EPT, one day of recurrent ground school similar to recurrent ground school, possibly proficiency training (PT) and then a proficiency check (PC). He then flew with John Miller (Flight Standards).

The last time that he downed someone in the simulator was a PC. It was to be the captain's last PC. He couldn't fly a missed approach, was over-controlling and the FO took the airplane at one point. They performed four of them and Captain Wright was not comfortable. He said that he wouldn't want his family on the aircraft, the captain agreed and was given more training.

Missed approaches are common problems on PCs. He briefs that it's not much different than a normal takeoff and noted that people tend to get wrapped around the axel about the maneuver.

He characterized SWA training as excellent but stated that he was a part of it. If he were the Director of Training he would beta test SWA publications (prior to dissemination) because of the complexity of maintaining consistency when making changes. There is a specific department for publications. He has not seen any improvement since he has been at SWA.

He believes that instructors understand the reverse credit on the onboard performance computer (OPC). He thinks that it is described in the FOM section 'landing with braking conditions less than good.' They didn't make a big deal of it when they got the 737-700. It was not emphasized, but he believes that most people caught it in differences training.

SWA 737-700 differences training consisted of training materials, a paid study guide sent home with the pilots and a -700 differences card. There was no differences class although there was training in EPT and recurrent training. He didn't remember when SWA received the first -700. He didn't think that the -700 OPC reverse thrust credit was mentioned in the home study materials. It is now taught in new hire ground school. A new FO does one full day of OPC and performance training in ground school. He spends three days with them. He also believes that it's mentioned in the flight operations manual (FOM).

Crews are taught to achieve a minimum of 65% reverse on a dry runway and 85% when the braking action is less than good. He asks that question on oral exams. Crews are also taught to use reverse thrust as soon as the nose wheel is on the runway. Some people will crack the thrust reversers before the nose wheel is fully down. Crew is not taught not to use reverse thrust.

He has witnessed a landing where reverse thrust was not used once when he was a passenger. He spoke with the captain in the jet way and told him that that he may want to write up the thrust reversers since he knew the captain must have tried them but he didn't hear them operate.

If the OPC bracketed min-2, a wet runway classified as 'wet good' would not require 85%, but he would look at that before he said it in class. Runway conditions less than 'wet good' require 85% as a minimum. Reverse thrust is not normally used below 80 .

There is not any training for when thrust reversers fail. It could be a good idea, but since there is only one avenue at that point, he can't imagine anyone not getting on the brakes immediately.

The non-flying pilot (PNF) is not required to monitor thrust reverser deployment.

There is no crew training on braking action reports; it comes through experience. To the best of his knowledge, there is nothing in the airman's information manual (AIM) that quantified good, fair, poor or nil values. It is about learning the experience of antiskid cycling and the braking feel on the runway. There are some qualifiers under the

performance section in the takeoff section where the manual refers to wet, fair and poor braking action. He doesn't believe that SWA teaches that specifically but the performance instructor may teach it

There is a Mu measuring device in Amarillo, TX, but he rarely sees Mu values. He gets braking action reports from the tower but it is not often that he gets the Mu value reports.

If a general aviation (GA) aircraft reports nil braking action, he won't disregard it but won't shut down the operation because of it. If American airlines reported a nil value he would go around. It's like a Cessna reporting severe turbulence. If a GA aircraft reports nil braking action and it is the closest report, but SWA previously reported fair-poor he would not land because of the tailwind limitation in conditions similar to those encountered by the accident aircraft.

If given a mixed braking action report of fair-poor, he would use poor in the OPC. It is not written in the FOM. Most pilots would understand how to apply mixed braking action reports. He wouldn't normally give a mixed report in a checkride though he thinks that he will now. He can't imagine that people wouldn't understand that they should assume the worst possible as it is like in GA training.

He has not seen any specific problems with people using the OPC on line and considers people adequately trained. SWA didn't use it for every landing until about five years ago.

He wasn't involved in the decision to use a 1500' touchdown point in the OPC rather than the 1000' point used by Boeing.

He doesn't recall a reference to GA aircraft braking action reports in the FOM but he thinks that braking action and turbulence reports apply to the same category of aircraft as stated in the FARs. Pilots are not trained to disregard GA reports.

He found the take home study course for autobrakes adequate. He had not heard of any line pilot complaints about the training though autobrake usage has not yet begun. A read before fly (RBF) memo was recently issued because SWA put out new checklists prematurely and the RBF described how to respond to an autobrake checklist item.

He has allowed crews to try the autobrakes in the simulator but instructed them not to use them on line. Autobrake training may become part of recurrent ground school but he is not sure. Autobrakes are a no-brainer, a nice accessory. They will be required to be used when minimum braking is bracketed in the OPC and braking action is less than good, though you can use them anytime you want to. They must be used at the lowest level with 500' stopping margin.

Autobrake usage gives you a little bit of braking on touchdown that you wouldn't get normally, though the pilot can effect more stopping energy than the autobrakes can.

Pilots are taught in the training packet that when overriding the autobrakes, pilots are locked out for three seconds after touchdown. At 80kts you blend in, it takes more pressure on a 700, and the PNF makes a callout when the autobrakes are disarmed. Pilots normally use the brakes to disarm, but they can use the autobrake switch.

SWA had not previously activated the autobrakes because the 737-200 never had them installed. They would turn them on when all airplanes could use them in the interest of standardization. There was the SNORT change in 2004, and SWA can only accommodate so much change so they probably decided to bring them out at a later time.

He has occasionally seen people have trouble using the thrust reversers in the simulator. People react more quickly and sometimes they wouldn't initially come up but then they do. He has not observed any problems on the line.

When a pilot diverts on line, there is not a whole lot to do; it's like a normal stop. If offline, pilots have to reinvent the wheel. Sometimes they must keep the people on the airplane in cases where there is no security. With the help of dispatch, pilots take care of the issues one by one, and after perhaps 1.5 hour on the ground you would be up and running.

Southwest has a record of diversions. If he diverted, he would file an irregularity report so SWA would maintain that data. It's not unusual to have an offline alternate.

SWA would not reprimand a pilot if it didn't agree with a captain's decision to divert. In the case of an offline diversion it would get the attention of management but he doesn't think that there would be any questioning. It's in line with SWA priorities. If the captain thinks it was the safest way to go there would be no question.

He speculated that SWA didn't use the OPC thrust reverse landing credit in the 737-300/500 because the 737-700 is an excellent long haul airplane and maybe they needed it for performance, or possibly to tanker fuel. He doesn't necessarily agree that you would get another 1000' of landing credit if you were to add the OPC reverse thrust credit. There are going to be certain risks involved in moving 140,000lbs of aircraft around at 150 MPH and you have to come up with the risks. It may not be applicable to the 737-100/300/500 because it may have been a reliability issue in the past. They always seem to work now (more reliable?).

The autobrakes were being implemented now because the timing was good. There was one other item grouped in the training packet. It is common for SWA to implement multiple items at one time so that you don't get a procedure du jour. There were so many items in the 4/20 (SNORT) changes that it was too much to include the autobrakes.

He has not heard any complaints about the autobrake training but they are not turned on yet. SWA gave checkairman a packet of information and a letter and said go try this.

He tried the autobrakes in the simulator but he didn't try them at MAX.

He was asked what the significance of the 500' stopping margin guidance was and thought that 500' was acceptable considering variance in pilots, though he didn't know if there was some scientific basis for it.

The FOM reads that pilots should land if they have a positive stopping margin. He personally thinks that each pilot will have a different answer. He looks at a 500' margin as a variance for pilot technique and one of many factors to think about. He would be inclined to divert with conditions similar to those present at the time of the accident.

If pilots are not comfortable in a situation for a valid reason, they are taught about assertion and the safety criteria for speaking up in CRM training. There was a short runway scenario taught in CRM training, but it was with other factors. Pilots are taught that there is an intervention procedure if they are not comfortable with a situation, to say something then take action.

There is no reason why pilots would be apprehensive about autobrakes, though his conversations have been with checkairman. SWA did let FOs (flying with check airmen) land with autobrakes and it was looked on favorably, very smooth. He thought that they exited the runway sooner.

When considering the differences in -300 and -700 landing data assumptions, he would look at the OPC data, but wouldn't try to back it off because reverse thrust is considered in the -300. Pilots think that the data is conservative. He doesn't know why -700 data is different though he thought that it may be because it was a new generation airplane.

The tower is the disseminator of braking action reports. They would ask what the braking action was after landing. Dispatch will occasionally call you and ask what the braking action is like and what the ramps are like. The station puts out field reports, though he was not sure of the source of the information.

If he landed after several other SWA aircraft and the braking action was worse than anticipated, he would pass the report along to the company and to the tower. He could say nil and that would end it there. He could also go through dispatch and do the same thing. Any pilot can halt the operation by calling the chief pilot on call if you call with a valid reason. There was an event in Baltimore in 2003 where the operation was shut down. The first 1000' of the runway was swept but the rest was a snow bank. 8-9 engines were trashed. It takes a while for the information to track down. They talk about that event in upgrade training.

He considers Mu reports as less subjective than braking action reports, but would look at both of them. If Mu reads .10 he would not attempt to land. The FOM talks about Mu numbers, though he thinks that it states for guidance only.

His seat position when using the HUD is a little further up than normal. He discusses that with new captains during their upgrade operating experience (UOE). There are no

adverse effects from a higher seat position other than a lousy landing. He does not discuss other references for setting eye position.

He does not set a tailwind when operating the simulator. He does set a crosswind of 8-12kts. To fulfill the FAA requirements. He asks tailwind and crosswind limits during oral examinations.

He has never had a crew fail an evacuation maneuver during a checkride. There is considerable latitude in the maneuver and all items do not have to be completed. You will typically get them all completed in the simulator since you don't have smoke. Evacuation is not a normal part of the PC profile.

He is not involved in the development of the periodic take home tests. An instructor would be responsible for that.

If a line pilot has a problem with a policy or procedure, they have an on-line form that they can email. A more popular way is to talk with their chief pilot, or the director of standards. After April 20th, there was a hotline that was open for 4-6 months. There may be an answering machine now.

If the thrust reverser inoperative penalty were applied in the OPC, it would affect the landing data by about 10%.

When landing with the HUD, he doesn't come off of it any more than he would come off of instruments. It's a blend. When he begins to see the runway environment through the combiner, he is looking at the runway through the combiner. The tendency to land long is common for early users because they're focusing too much on the symbology. You look through it all the time.

When landing using the HUD cues, you will be really close to the 1500' touchdown point. If you are ½ dot above the glide slope you will land about 800' additionally down the runway.

When he approached a captain who landed without using reverse thrust, he did not approach the FO. He told the chief pilot and assumed that the chief pilot approached the FO.

The captain would normally issue evacuation orders through the PA. If the captain was incapacitated, the FO can issue the order. If both pilots are incapacitated, the flight attendants (FAs) can. If a nose gear collapsed, he would make the decision as a FA to evacuate very quickly. If there were a fire or smoke he would try to call the cockpit.

The SWA stabilized approach criterion does not change for circling approaches or IMC conditions. SWA does circle, though there are high minimums of 1000-3. The FOM says to be stabilized no later than 1000'; typically it occurs earlier in IMC conditions.

Every pilot received a training CD-ROM for autobrakes, single engine taxi and one other thing. There was a paragraph that spoke about the relationship between autobrakes and reverse thrust.

When flying a HUD approach and get an approach warning, you are not required to go around if you have visually sighted the runway.

People tend to fixate on a portion of the HUD; it's more of a thought process when learning to look past the HUD symbology.

**Interview:** Timothy James Broughton, SWA, Checkairman all checks  
**Represented by:** Declined  
**Time/Date:** 1322, January 23, 2006  
**Location:** Dallas, TX (SWA Training Center)  
**Present:** Kirchgessner, Lemos, Perkins, Timms, James, Ratley

During the interview, Captain Broughton stated the following:

His date of hire with SWA was May 9, 1991. He has no previous military or airline experience. His background before SWA was primarily general aviation. He was a certified flight instructor and flew as a charter pilot for various operators.

He completed a 737 type-rating course which was offered through a SWA type rating school. He paid for this himself.

After being hired by SWA in 1991, he spent nine months based in Houston. He bid back to Dallas, where he had been living. He was at SWA two years when they asked him if he wanted to help in the training department. SWA brought in FOs that they liked and qualified them to teach ground school. He helped teach recurrent ground school, which not everyone was allowed to do. SWA used captain qualified FOs in a 'captain midnight' program for type ratings applicants. FO's would sit in right seat, with applicants in the left seat. He continued that until captain upgrade in June-July 1995. He was a line-flying captain, when SWA asked him to come back and help teach, as they didn't have enough full time instructors. SWA asked him to be a check pilot. He was qualified for all checks. In late 1999 he helped teach check pilots.

He performs about 10 checks per month and guesses that about 1% are unsatisfactory. The last unsatisfactory PC, which he evaluated, was a recurrent FO who was not having a good day. He can't remember specifically what areas were bad. He debriefed the crew and took the FO downstairs to speak with the Director of Standards. Crew scheduling pulled the FO from line flying status. The FO received training and completed a requalification PC with no problems.

The last unsatisfactory line operation that he evaluated was a new hire IOE that he was not happy with at hour 24-25. They came up with a plan to get him up to speed in the next 3-4 legs and he came up to speed quickly.

He sees RTOs as a problem area in PCs. Pilots occasionally grab the thrust reversers before the speed brake. He thinks it's because of a lack of hangar flying because pilots don't practice them on the line.

PNFs do not monitor reverse thrust on landings because it is not SWA procedure. It may not be in the Boeing manual. SWA tries to stay in line with that.

He has not seen problems actuating thrust reversers on the line. He has seen problems in the simulator during engine failures when the failed engine is on the standby hydraulic system. Pilots catch that the handle is at the interlock and pull up on the good one. In his experience, people generally don't have a problem with them.

He believes that most instructors are up to speed on the OPC reverse thrust credit. He believes that line pilots are as well because it's talked about. SWA focuses more on how to apply landing data than what makes up the data. It's covered but not emphasized.

During line checks on a dry runway, he looks for the FOM requirements for the use of reverse thrust which are nose wheel down, minimum of 65%, brakes at the appropriate time and at 80 starts to reduce reverse thrust. There is no difference in when reverse thrust is applied if the runway is wet or dry. If the runway is wet with braking action less than good, he looks for 85%. Pilots can use reverse thrust past 80 knots using their emergency authority.

There is no reference in the book or training regarding what to do if thrust reversers do not deploy. Pilots should always consider a go-around. A pilot will know quickly if a thrust reverser doesn't deploy because they won't get past the interlock. The pilot's intuition is better than having the PNF monitoring for reverser deployment. Pilots are flying day in and day out and will know that a reverser doesn't deploy before a person monitoring because they will feel it in their hands. He doesn't fail thrust reversers on landing in the simulator, though he did in the 737-200 simulator to simulate a v1 cut.

He does not know why SWA takes the OPC reverse thrust credit in the -700 but not the -300/500.

Pilots should to use the worst case when issued a mixed braking action report. He doesn't specifically know if it is in the manual but it is talked about many places and is generally taught in new hire ground school. He did not know what specific scenarios are used to teach the application of braking action during new hire training. The information may be in the syllabus.

Every checkairman has a variance how they set up their PC scenarios and there is general guidance for subject matter. Captain upgrade is more standardized, FO training less so.

Standardization is something that they have worked very hard on the last year. It is already in the works to do the same thing with new hire training.

Pilots are taught to consider all the information at your disposal when considering general aviation (GA) braking action reports but it is up to the captain to make the final decision. If he was in a scenario similar to the accident aircraft, he would give more credence to a SWA aircraft. If a GA aircraft reported nil, he would look at the parameters. If it was a C421 it would not be as severe but he would consider it. If a NIL braking action report issued by the tower was received from a GA aircraft, he was not sure if he could use this information to land (he would have to look this up in the FOM). As a checkairman, he feels that SWA pays and trains pilots to make correct decisions in the name of safety. If a scenario was that close, maybe they should be looking to go somewhere else. He does not give poor braking action scenarios in the simulator.

Pilots have adequate knowledge of the OPC and he does not recall ever seeing a problem while out on the line in the jumpseat. He has not had to land on a slippery runway while on the jumpseat.

There were no problems in past with training or use of the OPC in the past that he was aware of. It's been an evolving process, so there were some problems with that end of the process.

If there was one foot of stopping margin remaining a pilot would be legal to land according to SWA procedures, but they would need to evaluate the situation. SWA is not looking for a 500' margin, but a positive stopping margin (the guidance doesn't suggest a 500' margin). There is some rationale around the 500' number. It is printed in an operational CD/handout. There would be oil, etc., on the last 500' of the runway and you would expect to find worse braking conditions (therefore, the aircraft should stop prior to the last 500').

There are differences in the pilot and checkairman autobrake training handouts. From what he has seen in the training handout as a checkairman, the handouts were not that different, basically the same. The pilot training is not yet completed.

The autobrake home study course was adequate. The FRM information has not been issued yet but the handout was a copy. He has not heard of any complaints regarding the adequacy of the training because they are not allowed to use the autobrakes yet.

He has not demonstrated the autobrakes during landing in the simulator but has demonstrated the RTO function.

Pilots are taught to use their experience to determine when to ask for a different runway. There is text in the book that the runway in use may not be the best runway to use. He has requested a different runway in LAX and other places. He has observed other pilots ask for other runways while in the jumpseat.

He thought that SWA had not previously implemented the autobrakes because the 737-200 didn't have them but has no first hand knowledge. SWA may be implementing them now because an advisory circular for low visibility approaches recommended their use and the FAA may have asked why they were not used. SWA will mandate their use when the runway is not dry, other times at pilot's discretion.

He thought that autobrakes may or may not be generally more efficient than manual braking. You get immediate braking but you can apply more braking force manually; it is apples and oranges. Pilots are taught to disarm the autobrakes by applying brakes while the PNF monitors the disarm light. He would not use the autobrake selector over the pedals.

He has diverted to IND from MDW. He has not been reprimanded for diverting and does not know of anyone that has.

He has seen lots of changes since the BUR overrun. SWA has redefined and clarified their stabilized approach criteria, the SNORT processes, redefined how pilots get from the gate to off the ground, made new and better performance cards to give crews better information, and the Mu readings have changed on the performance cards to get rid of overlapping values.

It is not common for him to get Mu readings at many airports. He hasn't flown in much bad stuff coming from Dallas, since most lines are Texas two-steps.

If he could run the training department tomorrow, he would like to see the nine month training program implemented. It is like AQP where you could do a LOFT instead of PC/PT. It would be an overhaul of the training program where you could do home training and spend more time in LOFT scenarios. There would be no captain on captain checkrides and you would train as a crew. SWA is waiting for a rule to be written by the FAA.

He does not discuss seat position when training captains in their upgrade operating experience.

His seat position when using the HUD is higher than his normal position.

He does not set tailwinds when operating the simulator during a PC. He does not give an evacuation scenario during a PC.

Both pilots monitor the amount of reverse thrust on landing. The manual guidance is written as a minimum. There is no call out. The FO makes a call out if the speed brake doesn't deploy. The FO does not pull the speed brake handle themselves.

An approach warning can be disregarded if the runway (not runway environment) is in sight.

It is not difficult to look past cues during a HUD approach. If someone lands long it's not because they follow the flare cue, it's because they didn't pull the power back soon enough.

A pilot should weigh other factors besides the -700 OPC reverse credit and it probably doesn't enter in their decision to land. "We do same thing day in and day out, we have the number."

In his experience OPC numbers are conservative. He cannot give a number for his personal guidelines for a stopping margin.

He would not interpret a braking action report from another airline differently than a SWA braking action report.

SWA guidance says that it is too late to go-around if the thrust reversers have deployed.

He was not aware of any apprehension with autobrake reliability.

The check airman group maintains standardization by have lead check airmen observe check airmen during checking events. SWA is trying to build a forum of things that the checkairmen see. There is a line check trend analysis on line as well as quarterly check pilot meetings.

He feels in sync with other checkairmen. There is always room for someone being creative while staying in lines with what's required.

Some pilot suggestions may be taken with a grain of salt by flight operations management, but anything with weight will be considered. Things have changed because of line pilot input. One captain couldn't get someone on the headset during pushback so they started the cutting edge team program where a pilot works the ramp and helps load bags. It builds better bonds and a more safe operation. We had a lot of turnover in the past in some places so the program went away. Senior stations already experienced it so it goes in cycles.

He could not remember why the 'autobrake 1' setting was not authorized.

**Interview:** John Eldon Cundiff  
**Represented by:** Declined  
**Time/Date:** 0800, January 24, 2006  
**Location:** Dallas, TX (SWA Training Center)  
**Present:** Kirchgessner, Lemos, Perkins, Timms, James, Ratley

During the interview, Mr. Cundiff stated the following:

His date of hire was December 10, 2002. Prior to working for Southwest Airlines (SWA) he worked in the banking industry and flew his personal private aircraft. He later flew

for Braniff on the A320 and was a FO and captain for Ansett Australia where he flew the A320 and 737-400 for eight years. He returned to the United States and flew for National Airlines in the 767 for two years. He then left National and joined SWA when someone in the training center convinced him to.

He was initially hired on as a flight instructor. He had interviewed for his current position, Manager of Flight Instruction, along with 5-6 other applicants. He has held his current position for five years. The person who previously held that position had previously lost his medical and is now working as a line pilot since regaining his medical certification. The person prior to that, Rich Willis, had died shortly after he left the position.

He reports to his immediate supervisor, Bob Torti, on a daily basis. He reports informally with an update on events of the day and any issues that need to be addressed. Meetings might become more formal with the change in new buildings, because the proximity and the need to schedule meetings.

Of his current direct reports, there was only one of the supervisors, Michael Sharpe, who was in the same position when he took this position. He has hired the rest of the supervisors to replace others, in an effort to get people into positions that are a better fit.

One individual previously in the standards position, a standards instructor, had to be replaced because he had a difficult time with the supervisory role of the position. He had to confront an instructor who turned out to have sleep apnea and was sleeping in the simulator. He is now a checkairman and participates on the SCRUB team, a group of subject matter experts who review revisions and bulletins to the FOM. Don Capriotti, Don Shull, and Don Dozier were all replaced. Mike Hutto's position as Supervisor Training Devices is the only newly created position.

There are six people on the SCRUB team. They review bulletins and investigate manuals and procedural items for accuracy. They can review items as a group or as individuals.

He would characterize the training at SWA as good. SWA has raised the bar with getting the right people into the right slots, to make the training right. The right people to ask about this, however, are those on the line. He gets feedback that is positive, such as excellent critiques.

He monitors bulletins and talks with Jim Ratcliff, who communicates with himself and with John Croy. He also looks at what he needs to do in terms of the SWA ASAP and FDAP programs.

He has compared SWA training to other major airlines by communicating with his counterparts at airlines such as American and Jet Blue. After talking with one counterpart at Jet Blue, who called him to get help with their training, he determined that SWA was ahead of the game with their product.

He believes that SWA plans to implement an AQP program but is not sure about the particulars. He is not familiar with the details of the AQP program.

He is not involved in the checkairman selection process. SWA has a running file and receives resumes from internal, external and retired applicants. The program has an interview process coordinated with the people department and many who interview do not get hired. The majority of people have prior FAR 121, corporate or military experience. He believes that it's healthy to have a mixture of backgrounds.

He instigated the instructors going to the checkairman meetings. He insists that his instructors are part of the process. He gets a lot of calls from people. He got a call from a checkairman who had some procedural questions after he did IOE on a new hire. He got the checkairman the answers to his questions. The instructors are also getting more IOE and UOE feedback from the checkairmen.

The checkairmen are not under his supervision; they report to SWA standards, John Miller. However, the checkairmen instructors report to him. He has formal meetings with his four checkairmen instructors usually once a week and at a minimum of once a month. Instructor checkairmen meet with the instructors once a week.

Informational data that is put into the boxes for pilots goes into his instructors' boxes. There is informational email every two weeks and hard copies for computer illiterate. It can be based on FDAP/ASAP or issues that his department received calls on such as non-precision approach step-down altitude procedures.

There are two take-home tests issued to the pilots every year – 1 every six months. The author of the test, Don Shull, has a bank of approximately 800 questions that are revolving. The test gets people “in” the FOM and is a good way to keep people in the books. They are graded on line. If a pilot doesn't pass it they do it again. If the test is not complete by a specified time the pilot lose line qualification. He is not aware of any problems with the tests in the last two years. Although the official pass rate is about 80%, the average grade is 98%.

If someone wants to add a procedure, the recommendation goes to the SCRUB team. The SCRUB team, which has been around for several weeks, was an effort to give SWA a method for improvement. The last big procedure changes were the SNORT team procedures, anti-icing and single engine taxiing. Instead of the procedure just being handed down, SWA has the SCRUB team review changes. There have been no procedures turned down by the SCRUB team.

The SNORT team is no longer in operation.

He was not involved in the autobrake study package that was put together by flight standards under Mike Clemovitz and John Miller. The SCRUB team would have been involved but hadn't yet been formed.

The autobrakes did not have anything to do with the MDW accident in his opinion. The timing on the autobrake and a Boeing revision caused SWA to think that they needed to take a look at them. This event caused him to put the SCRUB team together.

He doesn't receive very many calls from crewmembers complaining about the autobrake training package. There were many calls for the SNORT procedures. SWA has an 800 number that was on the last bulletin. There is verbal follow-up. There is an online method to ask a questions and provide critiques.

He was happy with his last performance rating from his supervisor. He is not required to maintain status quo and is encouraged to raise the bar. His boss has been pleased. Communications with the checkairmen are a priority and his critique was good because the communication is good between the checkairmen and the instructors.

SWA has very good OPC training and there are very good subject matter experts who are well versed. Not all instructors are qualified to teach the OPC. There are 4-5 OPC qualified instructors.

He gets out and rides the line and last rode two months ago. Nothing was out of the ordinary. There were no extraordinary pilot concerns or complaints, just questions about hot topics, and the training cycle. He has been getting good reports about training.

He was typed in the 737 when hired on and is not current. He has not piloted on the line at SWA.

Pilots are not required to monitor reverse thrust, though he had to when he flew the 767 and the A320 for other airlines. He was not sure why SWA doesn't require it and said that it would be a question to ask John Miller at flight standards. He would have to look at the data to see if it's an issue or problem. It hasn't stood out to be a data driven issue. The future may be different but for now it hasn't appeared to be a problem.

There are only occasional problems with pilots on the line getting the thrust reversers up, usually over-controlling and trying to get them up too quickly.

He has looked at the OPC reverse thrust credit, and the lack of standardization between the 300/500 and 700 is not an issue because the difference is only about 10'. It is trained and talked about. If the numbers gave another 1000' he would consider it.

He can't speak to how pilots are specifically trained to analyze braking action reports. Pilots should always be conservative and enter the most conservative setting. He thinks that most pilots have a good understanding of that. It is talked about in new hire training and recurrent.

He thinks that IOE on a clear, dry day or in a simulator is the best way to train the pilots on autobrakes. He has had to do it that way in the past. The best way to learn the autobrakes is in the airplane in a safe environment; the first time to see them is not in a

blizzard. Pilots are not allowed to use them on line yet, but his instructors can show them in the simulator. The accident will not change the implementation of autobrakes but the way pilots are trained on them might be. Nobody has told him about holding off on the autobrake implementation because of the accident.

There have not been any changes in his department since the accident. There are FYI and informational bulletins about emphasizing certain issues that they feel should be heightened, such as autobrakes.

The SCRUB team has not looked at the autobrake and other procedures. He is familiar with the procedures. He did not think that the training materials were lacking but he wished that his team could have reviewed them.

He didn't find the message in the SWA autobrake training material regarding the 500' stopping margin and a positive stopping margin requirements confusing, but he hadn't thought about it prior.

Autobrake usage is like an LNAV missed approach, not a no-brainer if you haven't done it. Training is the proper thing to do. It is proper to see it in training if you have never experienced it.

He has seen people try to initiate reverse thrust too quickly in initial training, but not usually in recurrent. It is ironed out before they leave.

He has not seen people adjust their seat position to use the HUD and doesn't move his seat himself. He has not heard of any seat position related problems.

The change to a nine-month training cycle would be a good thing for SWA. It may not improve the training product overall, as it is already a good product.

He has seen a pilot forget to use the thrust reversers when he was flying in Sydney, Australia. They were going to use a distant high-speed taxiway as instructed by ATC and the FO forgot to use them.

He has expressed his feelings about the autobrake implementation with Bob Torti and believes that he (Cundiff) will follow up with it. He believes that Captain Torti is on board with him but he hasn't received any feedback yet.

If he could change any training issue related to the accident tomorrow, he would emphasize legality versus prudence with regards to stopping margins and the reporting and interpreting of braking action. He feels that legality versus prudence is talked about in CRM training, but could be emphasized. Assertiveness is discussed in CRM training.

He would have a hard time interpreting a fair-poor report from a general aviation (GA) aircraft. He would not interpret a GA report as the same as an airliner. He would

consider weight and speed. The FOM says to consider that. He would consider a nil report from any aircraft to mean nil.

Pilots do not have a problem looking through the HUD symbology and he has not seen it as a problem as it is an easy transition.

He had 57 instructors under his authority until one recently resigned, so now it is 56. He set up the organizational chart to enhance instructor communication with their superior. Every six months to a year the instructors will switch groups to act as a check & balance and to separate problem children. This process was set up 6-8 months ago.

**Interview:** Timothy J. Logan, SWA, Director, Flight Ops Safety  
**Represented by:** Declined  
**Time/Date:** 0930, January 24, 2006  
**Location:** Dallas, TX (SWA Training Center)  
**Present:** Kirchgessner, Lemos, Perkins, Timms, James, Ratley

During the interview, Mr. Logan stated the following:

DOH at SWA: 2-26-01

He graduated from Ohio State University, Engineering/Aerospace. He was with Boeing until 1983 as a performance engineer. He was on the accident investigation team at ALPA for 9 years and worked on FDR readouts. In 1992, he went to NWA Safety Program and worked as a manager and director and left there for SWA.

His title is: Director Flight Operational Safety. He reports to Vice President of Flight Operations, and has a dashed organization line to also report to the Executive VP of Aircraft Operations. Barry Brown is the VP of Safety, and he reports directly to the EVP of Aircraft Operations and has a dashed organization line to also report to the CEO.

He formally meets with his boss at least every other week. There is an open door policy. There is a formal monthly safety incident review, conducted with primarily flight operations leadership (e.g., senior directors of training center), and the unions are also invited. The last one was in November. They have a regular list of incidents that are tracked on an on-going basis and they perform an on-going trend analysis of those incidents. When the statistics are reviewed, they primarily focused on any change (getting better or worse). Any significant incidents are also reviewed. The manager of FDAP and the manager of the ASAP also give presentations and statistics regarding their programs.

There was very little change during the last review, much the same as last year. They have been showing good trends.

There are focus areas, such as, turbulence injuries. They purchased and implemented the NWA turbulence plot program, and even enhanced the program, which has reduced turbulence injuries.

Runway incursions have also been a focus. The majority has not been the fault of SWA, but they are still tracked and they try to feed the info to the FAA.

The corporate leadership reviews the data at the monthly meetings and identifies action items. Sometimes a special team is convened for creating suggestions. An example is how to improve operations at a particular airport (e.g., San Diego).

He was also responsible for corporate response/site management at company accidents and incidents. He was also the corporate safety liaison with other operating groups (e.g., maintenance and dispatch). Some events cross over from flight ops to other areas of responsibility.

The information from the monthly meetings is used to trigger a more significant communication process. But the ASAP/FDAP program managers and the union have the option to send out information via SWAPA or company training/flight ops to educate the pilots at any time. This is an on-going process, but does not have to wait until the monthly meeting. There are various mediums such as Safety Bulletins, ASAP Programs and FDAP data bites. These are sent out when there is an issue but he (Logan) does review them first.

There have been meetings with corporate leadership regarding the accident.

He is in the process of writing a memo to the pilots regarding winter ops, braking action reports and the OPC. It should be out next week. This is a direct outcome of the accident.

In reference to the accident, there were 2 read before fly letters issued saying what happened. His department also has been communicating with the training center and the instructors to see if there needs to be a bigger focus on any particular issues. He is trying to be conservative at this point with regards to what the company is saying to the pilots about the accident. They are still in the analysis mode.

There has been a Flight Ops Team for the last 18 months. It is made up of the senior flight ops leadership and they meet every other week. If he (Logan) has an issue to bring up, this is a perfect opportunity. They also communicate to the pilots on a special web page.

There are no formal safety meetings for the pilot workforce but he was not aware if SWAPA had any meetings.

Pilot safety concerns are forwarded to management by way of irregularity reports (easiest) and through the ASAP program.

The ASAP program is under his department. An ASAP memorandum of understanding was filed and approved by the FAA. It was a lengthy process. However, it was accepted with minor language changes, and was the same as most carriers.

Industry sharing of ASAP and FDAP data is just beginning and SWA will be a part of it. NASA has helped to build a network to analyze data. Only 2 other carriers and SWA are submitting both ASAP/FDAP, most carriers only submitting one.

The most common irregularity reports received were aircraft damage and aborted take-offs.

The most common ASAP reports received were altitude deviations and course deviations/navigation errors.

The SNORT program helped resolve altitude deviations by changing the way the process was managed. SNORT came about after Burbank. SWA established ASAP on Sept 01, 2000. After about one year of data, it appeared their procedures were being contributory to incidents. They thought that their checklists were related to altitude deviations, runway incursions and stabilized approaches. They established a program to review all procedures from time of departure through time of landing.

The goal was to minimize checklist items during high workload times. Example: There was a lengthy taxi checklist that they felt was keeping the pilots eyes in the cockpit rather than outside. They cut the taxi checklist to 4 items.

New procedures developed by SNORT began in April 2004. FDAP identified an unstable approach rate that wasn't acceptable and the procedures were changed. There has been an 80-85% reduction in unstable approaches and in the severity of the unstable approach that still occur. They are now looking at specific airports where unstable approaches are still occurring and working with ATC to help prevent them.

SNORT has also helped reduce take off flap configuration and other issues.

There is no head of SNORT; it works as a committee although several pilots have taken the lead to make the program work. The findings went all the way up the chain to Kelley, as they were trying to change the culture of SWA. The FAA was involved in this process and he recollected that there was an FAA representative on the SNORT committee.

The relationship between SWA and the FAA is good. Every other month there is a safety review with the FAA and SWA shares the information they have gathered through their various programs.

The FAA has not reviewed any of the FDAP data so far, however, they are involved in the ASAP program and they are sent a quarterly report. The FAA performs ATOS inspections on a regular basis.

The last voluntary disclosure submitted to the FAA prior to the accident was a lightning strike. There have not been many voluntary disclosures under his watch and there have been no FAA violations under his watch.

He said the new FAA POI was much more involved than the last one. They have already had more meetings with the current POI and CMO than had had during the entire tenure of the last POI. They also have monthly meetings.

He has also done a lot of interface with Boeing.

The last suggestion from the FAA was to reduce aircraft damage reports. 2005 was a bad year in terms of aircraft damage. The FAA called them on the carpet, but they had already come up with suggestions. Taxi and winglets seemed to be an issue. FAA suggested that SWA put something out to the crew and SWA required a minimum of 10 feet of clearance between the winglet and any other fixed object.

The FAA did not suggest/request auto brakes implementation. It actually came out of SNORT. The maintenance group was initially most concerned about it because they thought it would cause extra wear on the brakes. However, the FDAP data showed that pilot manual braking was actually exceeding the deceleration rate of the auto brakes. The maintenance group then agreed that use of auto brakes would be a good thing.

He did not have concerns regarding the overall policy in which auto brakes were to be implemented. He thought they had done a great job looking at all of the possibilities. He would have liked to see a more proactive approach in terms of the timing, that is, not implementing their use during winter operations. However, the guidance provided to the pilots explained the system very well but the timing between the guidance and implementation could have been better.

He said he was confident that the pilot workforce could effectively use the auto brake system under adverse conditions based on the information received in the home study package.

There was not an internal safety audit program at this time but it is being contemplated. In a sense, LOSA, ASAP and FDAP function as a safety audit.

FDAP analyzes 30,000 flights per month to analyze.

When asked why there was no internal audit program, he said that one of the things that came out of Burbank was the VASI program. That program is up and running but there is a place for an internal audit and discussions are on going. The VP of Safety just started in August, and he's trying to establish that program.

He developed a 5-year plan when he became director and so far he is on target. He is adding safety analysts and an investigator position. The only thing that has been talked

about is to add a human factors expert at the corporate safety level and developing a UT Threat Error Management Model. He's hoping that the human factors person can do this.

Because of the accident, auto brakes implementation had been delayed. Also under review are braking action reports and decision-making. SWA is looking at the overall runway margin that they want to establish for takeoff and landing. His department had raised the issue of accepting risk with small stopping margins and that information is going to the chairman. They'd like to establish stopping margins for both take off and landing. This is going to the Chairman of the Board. It will be across the operation and there will always be a minimum margin built in the OPC. It will only affect 1/10<sup>th</sup> of 1% of total operations. Brian Gleason has already done this analysis. At smaller airports, they might have to reduce payload by blocking seats.

There is a significant on going discussion regarding use of reverse credit. His preference is to standardize across the fleet. His opinion was they should take the reverse credit on all of their models. He thinks it provides the pilots with better information than they had before and they have a better idea of the stopping margins.

The OPC has been pretty accurate. If we weren't already contemplating the margin, he might have a different opinion. Perhaps enhanced training for OPC would be another option he would like to see accomplished although he did not think that the current training was inadequate.

The auto brake training packet came through his office for review.

He did not believe the company philosophy was to require 500 feet of stopping distance. He believed that the FOM was stating that if the OPC gave less than a 500 foot margin, the next higher auto brake setting should be selected.

After Burbank, an outside firm conducted a safety audit. All of their recommendations were implemented. He was not sure who conducted this. An FAA SAT was also done with the POI.

MSW was not in their top 10 for runway incursion problems but it is moving up because other problem airports had been eliminated. There were more flap exceedance problems at MDW.

Regarding a culture change after Burbank, the company tried to slow down the pilots. Being on time was great, but not if you were going to increase incidents because of it. One change was that the airplane would not be moved until the flaps were confirmed at the takeoff setting. Crews accepted the changes and the FOs were given the power to be more assertive. There was never a conscious policy to speed up the operation, but it happened and was addressed.

When he came to SWA, he was told to check the taxi speeds of company airplane. He did and they averaged around 15-25, which was normal. SWA had the reputation, as being speeders but that was not true.

He did not think that on time performance carried over into a pilot making a bad decision as to whether or not to land under adverse conditions.

He thought that approaches should be planned to “end in a missed approach”, the pilot had to be convinced that a landing could be made safely to continue to land.

LOSA pointed out that their major problem areas were during climb and descent and taxi in and taxi out.

**Interview:** Hugh Barnes Pruitt, SWA Captain, Manger CRM  
**Represented By:** Declined  
**Time/Date:** 1330, Jan 24, 2006  
**Location:** Southwest Training Center  
**Present:** Kirchgessner, Lemos, Timms, James, Ratley

During the interview the Mr. Pruitt stated the following:

His title is Manager CRM & Leadership Training Flight Operations. He is not a full time management employee. He has worked for SWA for 10 years and upgraded about 5 years ago. He was previously employed as a Part 91 flight department pilot. He has had his current position for the last four years when there was a management administration change. He previously was new hire ground school instructor and was eventually qualified to give PTs, etc. His position doesn't require him to be present full time and he flies the line when not in the office. He trains new hire CRM; upgrade CRM and a new program called captain leadership.

SWA has added a line-oriented interview to the hiring process. Every year there will be a theme, such as pressurization problems. If a theme occurs more than 5 times on the line, they dissect the scenarios to learn more about them.

He does not have a degree in human factors and it was not required when he was hired into his position.

The content of the CRM curriculum are included in the flight operations training manual.

New hire CRM is a full day, and there are other instructors that can teach it. Upgrade CRM used to be a full day but now is half of a day. They get an additional day of CRM 6 months after completing upgrade so that they have a captain's perspective and they can tell their experiences to each other. The courses differ by emphasizing leadership topics in upgrade CRM. They learn the same CRM topics but from a leadership perspective.

Assertion receives the most attention in the CRM program especially for a new hire. Captains don't need the training as much as a new hire FO, although there have been captains in the past that needed help being more assertive. SWA notes the distinction between authority and leadership. Captains have the four stripes and they are expected to use them. They are expected to "lead" and "get the job done."

Captain upgrade CRM is usually around 20-24 people. Captain leadership is broken down to groups of 7-8 throughout the month so it's more intimate. There is a lot of discussion about issues. Dispatch, ground ops, and other departments are present during the course as are management personnel. The course requires active participation and is not just a sit and listen course. The supervisor of the appropriate department answers questions concerning MELs, crew issues, etc. It allows for "cross talk" between the departments. However, there are also Power Point presentations and videos.

The captain upgrade CRM course is critiqued as part of the total upgrade course. He said he actively asks for critiques from students and the critiques are usually positive. One comment he had seen was that the pilots would like to have formal CRM training every year.

If a pilot has a bad CRM experience while on the line, he can go and see the Professional Standards representative and then he can further with his complaint to the chief pilot. There is no special form for the pilot to fill out.

Since at SWA, he had worked with Dr. Helmreich from Houston on threat error management. He had participated with other airlines and shared CRM information with them. The airline transport authority (ATA) has disbanded them from the CRM working group and they haven't been able to participate in the last three years, but he still maintains contact with others on his own.

He doesn't want to bore line pilots with the background and research and focuses on the aspects that line pilots would use. He doesn't feel that the research detail is useful to line pilots unless distilled to a more simple level.

The initial CRM course starts with a review of the UAL 173 accident in PDX, other accident scenarios, NTSB safety studies and ASAP/FDAP data. They discuss OPC information, the BUR accident, near misses and other issues. The class is not just a scenario review though.

Recurrent EPT contains reviews of scenarios and they are trying to use scenario-based training more often.

Mixed runway surface breaking action reports are not discussed or addressed directly, however, SWA takes that approach that safety is the foundation.

They also do not directly address the issue of legality versus prudence. He thinks that the box SWA pilots operate in is the FOM and your personal comfort level is within the box, just don't let it go outside the box. In upgrade there is decision making and it's up to you.

There are many examples of people that didn't want to land that night and didn't. If it doesn't look good, don't do it. They try to instill in training to be conservative, especially in the first 6 months. Between the captain and the FO, you are looking at multiple experience levels and you will often see someone is more comfortable than the other. Pilots are taught to communicate and find out why one is more comfortable than the other.

There is no problem or retribution if a crew wants to go-around to discuss an issue, in fact, it had happened in the past. In that situation, you have 2 options: Go to a single pilot airplane, which we don't want, or go around and burn a little gas to discuss it. We want both pilots on the same page.

There is a transition period where a first year, an FO may not be as assertive as he was trained or should be, but it's just a reality of the job. That is a challenge for the entire industry.

He covered the Burbank accident for a year in EPT. They do not show it in upgrade because they have all seen it already. They show it to new hires to show how important it is to be assertive.

He is not familiar with a director of human factors position shown on the company management chart. He has left his position for 2 months but has now been asked to return.

**Interview:** Edward R. Uribe, SWA, Flight Training Instructor  
**Represented by:** Declined  
**Time/Date:** 0800, January 25, 2006  
**Location:** Dallas, TX (SWA Training Center)  
**Present:** Kirchgessner, Lemos, Perkins, Timms, James, Ratley

During the interview, Mr. Uribe stated the following:

DOH: 8 Feb 1993

He teaches the OPC and Emergency Procedures Training. There are a total of 4 OPC instructors. He also teaches takeoff and landing safety and anti-ice/de-ice. He was an American Airlines performance instructor for 10.5 years, and was a program manager for the KC-10 program at McDonnell Douglas. He was responsible for the training programs.

Pilots received dispatch training the day prior to the OPC day. During that day, a performance engineer comes in to present 1.5 hour on FAR requirements and how it relates to OPC programming. A dispatcher also comes in to talk about the dispatch aspects of a flight.

He takes pilots through how to actually use the OPC. There are 2 phases: A full flight from takeoff to landing (normal). Then he takes them through a full flight that is non-normal. By this time, he's covered every aspect of the OPC.

Then he covers special ops capabilities of the OPC. He finishes with the tab data, that is, if they go to FOM to calculate the performance data. Pilots are given a 50-question open-book take-home exam, and they turn this in the following morning. The average grade is about 98%, although passing is at 80%. It's open book to reinforce where the information is located in the FOM as well as the FRM. Their reading assignment prior to class is to read both FOM and FRM.

Afterwards, they are briefed to use the handout material to make problems of their own for practice. They can practice on numerous OPCs located throughout the building,

On training days 17-19, they are with a check airmen instructor who goes over the FOM aspects of the OPC. There is more instruction/practice at this time.

He then presented the power point that he uses to train the pilots for the 1-day course. The course is all day. Pilots follow along with a handout, which they are advised to read prior to class. Each pilot has an OPC during the class, so they can compute and re-calculate.

First normal problem is from ELP to AUS, and involved a diversion to DAL based on weather moving into the Austin area. Then the pilot would need to re-calculate based on more passengers, more weight.

There are four modules: Takeoff, Cruise, Landing and Dispatch Landing

(Note: Not all input categories and topics reviewed in this interview summary).

He first went through the Take-off portion of the program:

#### Take-off Input

- ❑ Wind Calm actually calculates with a 5 knot tailwind.
- ❑ Conditions: Dry, Wet-Good, Wet-Poor, Wet-Fair
- ❑ Clutter: Thin Clutter or .5 in clutter (there are definitions that pop up to assist pilots in this decision.) is available on take-off only
- ❑ Wet- with any suffix. Same description, in that at least 25% of the runway is covered with water. Braking action reported is only distinguishing factor.
- ❑ Take-off Power: Max or reduced (assumed temperature).

- ❑ MEL Options: Engine/Cowl A1 Valves, Anti-Skid, Auto Spoiler System, PMC, and Reversers (both op or not op). The entire MEL list is in the OPC, although you would need to click each of these options manually (no interaction between performance program and MEL list).
- ❑ Warning comes up when certain unauthorized configurations are detected. For example, when both reversers and anti-skid are inoperative, or with Wet-Fair and anti-skid inoperative.
- ❑ There is a CDL list which allows pilots to see what the weight and landing speed penalty would be with/without.

#### Take-off Output

- ❑ Most of landing information is based on ATOG, which could be old information. Pilots can re-calculate with current winds, and if possible, renegotiate with dispatch to increase the weight.
- ❑ Runway information: They need to compare current notes with Jeppesen notes. OPC information takes precedence.
- ❑ Some flashing displays (asterisks around output) warn if they program detects and changes from your input or for non-standard information: Min Clean-Up, Flaps, and Min Clean-Up Height (MSL).
- ❑ Stopping margin is given when using reduced thrust.
- ❑ If there is a turn note (departure information), there is a box with red slashes titled “Turn Note”. If no turn note, the box is simply titled “Runway Information.”
- ❑ Advisory information provided cooling time for brakes, based on the estimated brakes on speed with a RTO.
- ❑ They can make adjustments to the loading schedule on-line with an addition/subtraction list.

#### Landing Output Screen (Done prior to take-off as a portion of Takeoff calculations)

- ❑ Pilots can adjust landing input to change something, but this was only meant for review.
- ❑ Any MEL and ATIS information is carried over to the landing output automatically.
- ❑ B prefix: The landing weight will exceed the quick turn weight. Then you need to check for advisories in the brake cooling schedule. In this case, they can call ahead to have the brake temperature measured while on the ground, and the FAR mandated delay isn’t required.

There are requirements regarding which page must be visible on the OPC during various phases of flight.

There is some instruction on inputting relevant OPC information in FMS.

There also is an enroute performance module. This assists with speed margins (buffet), maximum and optimal altitude. The 300/500 is normally buffet-limited, and the 700 is normally thrust-limited (because of wing). Assists with altitude decisions for optimizing and for decisions when altitude changes required for turbulence avoidance.

Enroute Module includes: Enroute, Drift down, Holding and Diversion Planning.

Enroute section provides fuel required to hold for various time periods. Holding allows them to determine the amount of fuel burned in a given period of time. Diversion planning allows them to plan from current lat/long to a divert location.

They are not required to use the OPC for performance figures, but they are recommended to do so. It is one of the tools at their disposal.

#### Landing Performance Module:

- ❑ No toggle for clutter. If clutter exceeds the max that dispatch had planned for, the pilots would determine if they'd have to go somewhere else by first asking for a braking condition report to determine which to toggle. He's not sure where there's no clutter in the option list.
- ❑ Mixed report is based on worse condition: "FAIR to POOR or POOR would both be a POOR input." Taught exactly prior to course: "If you hear POOR at all, you put POOR, if you hear FAIR at all, you put FAIR. You put the worse that you hear."
- ❑ No distinction made between where the braking reports are coming from. This is covered in 17-19 days.
- ❑ HGS AIII button: Only to be pushed if in fact an AIII approach will be conducted, because in following the flare cues, it adds 1000 feet to the landing.
- ❑ RVR<4000: Ops spec landing capability if RVR<4000. The pilots only have to consider this based on this visibility requirement. Dry runway plus 15%. This may affect your stopping margin. If dry plus 15% is still inside of other stopping margin, then it won't affect it.
- ❑ If AIII approach is going to be used, even if the captain chooses not to use the flare cue. If shooting a CAT 1 approach, even if the AIII mode is chosen, the pilot would still need to select the AIII mode on the OPC.
- ❑ There will be cases where you choose both the AIII and the RVR<4000. He has not had questions about these or sensed confusion from pilots on these issues. He believes it's because they're new hires.
- ❑ Minimum (2) can be used as long as there is no bracket or red coloring. If a negative number on Min, then pilots asked to increase flaps. If already at 40 flaps, increase to medium (3).
- ❑ Min 2 is braking at 80; medium 3 is braking after touchdown.
- ❑ "Thrust reverse not a factor in the 300/500, but it is in the 700." And there was a slide that said this.
- ❑ Flashing values if overweight.
- ❑ If anti-skid is inop, the stopping margin must be at least 1000 feet. Flashes "Consider use of BLEEDS OFF and/or alternate FLAP setting." The pilot can use the manual technique, but this will require more runway.

Non-Normal Scenario: From MSY o DAL, with poor visibility, windshear expected, WET-GOOD runway, MEL item is PMC #2 Inop, and a CDL Item. They also lose an engine en-route, and must use the drift down performance section.

Regarding stopping margins, “The policy at SWA is that if you don’t have at least 500’ stopping margin, you go to the next braking condition.” When further questioned, “If you don’t have 500’ under MAX, then you should consider changing your runway or configuration.”

When questioned regarding if there was any further specific instruction on the difference between models in TR, he says that he doesn’t usually address this in total, but that when reviewing the various scenarios (one with the –700 and one with the –300), he just mentions when talking about the numbers that this is “without reverse”, or “with reverse”. He assumes that pilots will know that the –300 figures are worse case scenarios. He teaches them to look at the final number, and he believes that this is the way that most pilots are interpreting the information.

The differences between the Landing Dispatch module and the Landing module were reviewed, as well as how to build an offline airport into the database as well (temporarily), what to do in the event of an OPC failure.

If using the FOM charts you use FOM Chapter 10. Use cockpit performance data cards, advisory information tables – normal landing, non-normal configuration landing distance table, brake cooling schedule and Max quick turn-around weight tables. There are also performance cards for each of the models, for take-off/cruise and descent/landing, which outlines checklists and various performance topics in tabular format. He reviews a sampling of the written tabular data with specific problems. For example, “What is the landing distance with minimum braking, landing pressure altitude of 1000 feet, wind is calm, flaps 30 degrees, landing weight 1000,000 (normal configuration). In the Corrected Brake Energy Per Brake chart, values are given with and without reverse thrust.

With new-hires, this is a full day of training, and they will do more example problems later. In recurrent (brand new program for 2006) they get something, as well as in captain upgrade.

He updates the OPCs at the center and maintenance updates them on the line. There is a 28-day cycle.

Revision highlights screen: Pilots are advised to check this EVERY day, even if they had flown the same aircraft the night prior (possible change of crew pairing). He maintains a record of the revision notes.

There is not a specific critique sheets for students but there is an overall one for the entire training.

The Land 15 button was added when a student suggested it. He had not received any other suggestion and he thought that was mainly due to the fact that everyone was a new-hire and not familiar with how the OPC was actually used on a day-to-day basis.

When auto brakes are implemented, he will be discussing any performance issues comparing manual with max braking, or related techniques and decisions.

OPC is used in sim training, in FTD training, all pre-brief rooms have OPCs, and the simulators have them as well.

How about updates for airports, is there an administrator that makes changes in weights to aircraft? Yes, Brian Gleason and their group do this.

Aware of any inconsistencies between how you understand OPC to work and the FOM? No, but if there is any inconsistency its because a bulletin hasn't come out, but at this point in time he knows of no situation like this.

Do you know when they plan to put out the auto brake revision in the FRM? It's in the FOM now. Doesn't see anything yet in the FRM.

How are you authorized to use this? The FAA must have given the authorization for them to use this, but he has not seen the actual approval letter. The OPC is on the MEL.

**Interview:** Scott Michael Van Ooyen, SWA, Checkairman  
**Represented By:** Declined  
**Time/Date:** 1130, January 25, 2006  
**Location:** Dallas, TX (SWA Training Center via teleconference)  
**Present:** Kirchgessner, Lemos, Timms, Perkins, James, Ratley

During the interview, Captain Van Ooyen stated the following:

His date of hire at Southwest Airlines (SWA) was February 25, 1993. Prior to working at SWA he flew four years at Midway Connection in the EMB-120 Brasilia and also at Air Wisconsin in the DHC-8. He upgraded to captain at SWA in March 1997. He was asked to become a checkairman at SWA in August 2001 and was qualified as a line checkairman in March 2002 and will soon be qualified for all checks. He flies the line full time gives no more than three checks per year on the average.

He has never failed a person on a line check. He has counseled people on little things during the new procedures changes. He has not observed difficulty with OPC calculations on the line. He considers standardization good at SWA, especially with the new procedures.

SWA line checkairmen remain standardized by meeting a couple of times per year and they also review FOM and FRM changes. He does quite a few IOE/UOE events so he stays on his toes. He is often asked questions about procedures by crewmembers at work.

He does not recall a line check that he observed Captain Sutherland. He keeps forms and notes in his bag and throws them out after a month. He enters the information on line now and doesn't keep notes.

His pass/fail rate is comparable to other checkairmen. He has never failed anyone on a line check. Only one or two checkairmen in Baltimore might have a fail rate. He attends checkairmen meetings, which are specific to the Baltimore crew base and are not system wide. John Miller comes in from Dallas to discuss system wide failure rate and specific failure items.

He feels that most pilots do not understand about the -700 OPC reverse credit and that it caught a lot of people off guard. He doesn't know how much reverse is considered in the -700 OPC reverse credit. He was probably aware of the fact that the -700 OPC considers reverse thrust in the calculation. He thinks that pilots want to know how much reverse is assumed so that they can better know the expected aircraft performance.

He considers mixed braking reports a gray area. He will always use the worst scenario if given a mixed braking action report. SWA pilots don't want to be the bad guys and stop the operation with a nil report. There is no exact definition of good/fair/poor when used in braking action reports. He doesn't know if most pilots know that they should use the worst condition in a mixed braking action report but thinks most probably do.

He would not consider general aviation (GA) braking reports as accurate as air carrier braking action reports because of the aircraft weight and the pilot's experience level. He would not land if a GIV landed in front of him and reported the braking action nil because a GIV is a heavy airplane. He would wait to get a better report if a Cessna reported braking action nil. He would not plug information into the OPC on short final and would go-around to reevaluate the situation. He would pay some attention to GA braking action reports, although these pilots only fly several hundred hours per year, but a heavier aircraft carries more relevance with him.

He thinks that the pilot group understands that autobrakes are not authorized for use. He considers the training handout good. He would be apprehensive about using max autobrakes in the accident conditions if it was his first time using them, but would use them if the OPC told him to.

He has not seen pilots forget to use thrust reversers on a line check. The -700 thrust reversers are a little more difficult to deploy, maybe an extra pound of force, but not that different than a -300.

He has diverted on various occasions. On one because ground radar went out when he was a FO. He has also diverted when the visibility went below minimums in MCI as a

FO. He diverted to TPA from JAX as a captain when an airplane crashed and workers were trying to find it.

He was aware that the accident aircraft landed firm and that the thrust reversers were not used until 18 seconds after touchdown from news reports. He would have set the aircraft down earlier in the touchdown zone and used thrust reversers if he was flying the accident aircraft. He would use full thrust reverser deployment and max reverse, which would be approximately in the high 80% range. Normal reverse thrust is in the 65-70% range.

Shields Jones came in initial training and discussed “what-if” braking action scenarios. Braking action is covered with Mu ratings in training but it is a gray area when discussing mixed reports.

He knows that there is a reverse thrust credit in the OPC but doesn’t know how much reverse thrust is considered. It would be nice to know, but at least the OPC tells you if you can do it. Landing in MDW is tight even on a good day. Midway stopping margins on a good day are 800-1000’, so it gets your attention. He would apply brakes earlier than normal. With fair braking action, 800’ would be considered tight and would make him slightly uncomfortable. He wouldn’t have landed the aircraft in MDW with 800’ if it were a -300. He would land if it were 1000’. It would change his opinion depending on the aircraft.

He finds the OPC performance conservative and usually finds more stopping margin than expected. Most pilots understand that the margins are going to be greater and more landing distance is required using the HGS AIII mode.

His opinion is that the autobrake system immediately starts braking and is faster than a pilot immediately applying brakes. When using them, he would land with them and override them with manual braking, as the procedures call for. If he didn’t think that the autobrakes were working he would use manual braking.

He has not heard pilots complain about autobrake training.

He has not looked at MDW accident performance in a -300. He does not consider 500’ an adequate stopping margin in the accident scenario and would not have landed.

<b>Interview:</b>	<b>Bobby M. Hedlund, FAA, SWA POI</b>
<b>Represented by:</b>	<b>Declined</b>
<b>Time/Date:</b>	<b>1500, January 25, 2006</b>
<b>Location:</b>	<b>Dallas, TX (SWA Training Center)</b>
<b>Present:</b>	<b>Kirchgessner, Lemos, Perkins, Timms, James, Ratley</b>

During the interview, Mr. Hedlund stated the following:

DOH with FAA was April 27, 1997

1987 he was working at a bank in Abilene, TX and working on aviation ratings, all the way through ATP, CFI, multi-engine. Completed ratings in 87-88 time frame. He flew corporate for JH Taylor in a Cessna 414. Managed other aircraft: King Air's, Beech, in the pilot service capacity.

1992 went full-time for FBO in Abilene, Abilene Arrow. He worked as a 135 Charter Pilot and left in 1997. He flew Beech A36 Bonanza, Baron, Seneca, Navajo, Chieftains, King Air B-200, and flew all as well as instructed during that time. In 1994 he was promoted to chief pilot of that organization. After management experience, he was named Director of Operations for the 135 certificate. Sister company was Lubbock Arrow, and he managed that as well.

He joined the FAA in 1997 and moved to Dallas. He was a GA inspector at Dallas-Love, basic aviation safety inspector training. He performed POI duties and was a flight instructor. He stayed at the Dallas FSDO until March 2000.

In 2000 he was the POI for Kitty-Hawk Air Cargo, a supplemental all-727 operation. They were in bankruptcy during that time. He had an assistant POI.

He became the POI for Mesa Airlines around Sept/Oct 2002. He oversaw all types of inspectors, including maintenance. He made the lateral move from Kitty-Hawk to manage a greater variety of aircraft. There was no assistant POI, but he had an APM and assistant APM for each fleet (CRJ, ERJ) and an APM on the -8 Turbo-Prop fleet.

Later he became the Mesa and Freedom Airlines CMO supervisor and was over 21 Aviation Safety Inspectors. That started around Jan or Feb of 2004.

In June of 2005, he took the supervisory role of POI for SWA.

He applied for this position as it opened. Previous POI accepted position as POI for Delta.

When asked how he reviewed the SWA operation after becoming POI, he said that there was no guidance on this, but he did have previous POI experience.

Manuals: He looked at the manual system, what manuals it had to comprise the manual system. There wouldn't be a lot of variation in the content and process, given the regulations, but there might be some carrier differences in how things are done. He would find out what/how.

Personnel: He reviewed who was the owner or the process-holder for each particular manual and who was responsible for what. Acquainting with daily business processes and making sure its within FAA guidance and policies. Find out how information is managed in-house prior to it getting to you.

This was a month-long process. From there he engaged management duties: manuals submission, oversight duties, etc.

CMO/ATOS environment is a risk-management approach. System safety designed into the process and is done with 2 types of inspections.

Former POI had already departed 3 months prior to his arriving. He spoke to the FSDO manager about what he had seen, what his wishes were. They didn't get into the process of on-demand submissions. They spoke about roles, and the lay of the land.

His initial impression after the briefing was pretty comfortable. SWA was a dynamic carrier, unlike other carriers with financial difficulties. Vibrant carrier on the edge of new and transitions consistently. His manager fosters teamwork, keeping him in the loop; he doesn't like to be surprised. Anything concern you after that briefing? No.

How many APMs? 1 with 2 assistants and he was briefed by them and it went pretty well. He already knew the APM and his personality, and their communication was good. They shared similar impressions. He asked for feedback about their preferences in doing the job – how they do it, etc. 1 assistant only deals with ASAP. Any cause for concern in any of these meetings? No.

He had 2 assistant POIs working for him.

He did not get a sense that the previous POI was not as involved as he should have been. There were different philosophical perspectives within the guidelines. He personally was very hands-on and viewed himself as more hands-on than the previous POI. Everything appeared to get done but perhaps he would do things in a different way.

Was the former POI as involved as much as he should be for a carrier of this size? He wasn't around to see him work. He didn't see anything that didn't meet guidelines or regulatory standards.

Example of what you would have done differently? The way documents are presented to the FAA for review. A possible way they did business was send it on email, get someone to look at it, and give approval based on a verbal, followed up with a hard copy final documentation. One thing he's changed is letting flight ops and dispatch know that he's willing to accept an email based on an initial notification, but that he still expects a formal submission so that he can print out and run it by others (maintenance specialist) as a double-check. The guidelines don't specify how something must be submitted (the format). He's had no pushback from SWA on this point.

How did initial contact with company management go? Within first 2-3 weeks, he, his manager, and Mike Mills, first met with Exec VP Aircraft Operations, Jim Wimberly. No specifics at that time. We went office to office with the APM and met everyone that he could potentially come into contact with.

What did you think when you saw the violation history? He said nothing abnormal stuck out, other than that he wondered why the self-disclosure rate wasn't as high as he had expected as busy as they are. He found that these showed up in the ASAP program. The assistant APM manages the ASAP program. Event Review Committee (ERC) met to discuss the accident. Asst APM brings any recurring events to his attention. Run of mill violations are handled according to the violation, others are brought to his attention so that they can discuss at a larger level.

None of the company or ASAP disclosures caused him concern.

From an observation standpoint, he hasn't observed yet active duty line operations. He relies on the folks doing this on the line to communicate back with him. Overall, he's impressed with the information he's received, and he hasn't received any pushback from suggestions or issues brought to their attention. He tries to approach SWA with the information regarding 1) why it's safe and 2) where it is in the regulations.

For flight training issues, he talks with Joe Merritt. For a line operations issues, I would start with the chief pilot.

He interacts with the safety department regularly. SWA holds monthly meetings for the FAA. On a quarterly basis the safety department will present last quarters review of ASAP and FDAP data. Via PowerPoint they show us what they've found in trends. They discuss the data or trends. He's usually impressed with their responses when he asks questions. Tim Logan will be the first one to suggest advising pilots of relevant issues. Tim Logan is pretty proactive.

Barry Brown the Flight Ops Director of Safety meets with him every several weeks. They are more of a global discussion.

Is SWA more/less/same forthcoming with information to you? Outside of ASAP, he had other carriers more forthcoming, but they didn't have the ASAP program. He hasn't felt that he could not get information if he wanted it.

Did APMs or Asst POIs have information for you regarding changes after Burbank accident? Yes and the context of this had to do with the development of the SNORT team. They reviewed all of the procedures and subsequent changes. The team is still in effect. He did not know if an FAA person was on that team.

What's your feeling on reverse credit? It is an acceptable performance calculation, or as a POI do you think it's not a good idea? He said there had been an in-depth review following the accident and he had been involved on educating himself on the matter.

There is still very good data being presented in that tool. He did not see it as a nightmare in training or its use. It appears as if it provides an acceptable safety margin. Documents regarding it's inception were no longer at the FSDO because of the 9 year rule.

There are other carriers that use reverse credit, although he was not sure exactly what data drives the programs. In 2002 when FAA provided guidance regarding electronic flight bags, he was aware that SWA had this. He recalls seeing this same difference between dispatch and actual landing data in other aircraft manuals (CRJ).

Are you being supported from FAA that there is nothing wrong with this avenue of performance calculation? We met about this from a week after the accident. We're still working on reviewing and defining the various requirements for the different sets of data. Current guidance says its acceptable, but they're looking at it, so he's not sure if it will change.

Ramifications if the RT was to be prohibited in the future? I can't speak for the industry. Based on the conversations I've had with SWA, this would result in a change of 1% of operations.

How have you followed up on the particulars of the accident itself? He was trying to take the facts as he knew them, and making sure that there are no violations and that SWA is safe. He hasn't seen anything that would alarm him yet.

A systems analysis team (SAT), part of the ATOS process, was convened to identify what are the risks, procedures and rules. At end of day, if something needs to be changed, in an effort to mitigate risks, we'll do it, so long as it fits within the rules. There is no paper trail; the information is done electronically through ATOS. & areas of risk were identified. He was not sure if he could supply the NTSB with that information but would check on it.

The SAT is a collaborative effort, 26 members, between the FAA (4-5 members) and SWA. This comes about because of the ATOS system that they're under.

Auto-brake system: Did you look at the study package that went out to the pilots? APM did this (under his direction). SWA had been doing some studies for a while, and were validating the numbers. Late November time-frame changes to manuals were requested and materials submitted.

Use of the system is on hold at SWA direction because of the accident.

He said home study is a valid way to teach certain areas of instruction. He did not have any heartburn about what carriers do with home study courses. None of his subordinates had expressed any concern regarding the auto brake issue.

He described his relationship with SWA as professional and cordial. He said he considered them to be compliant.

**Interview: Fred Michael Clemovitz, SWA, Manager of Flight Standards**

**Represented By:** Declined  
**Time/Date:** 0730, Jan 26, 2006  
**Location:** Southwest Training Center  
**Present:** Kirchgessner, Lemos, Perkins, Timms, James, Ratley

During the interview Captain Clemovitz stated the following:

His date of birth is September 26, 1954. Southwest Airlines (SWA) hired him in February 26, 1954. He was a line pilot and checkairman before being hired into his current position, Manager of Flight Standards, in June 2005. He flies about once a month on the line to maintain currency.

His experience prior to SWA was in the Air Force. He graduated from the Air Force Academy in 1986. He flew F-4s in Nellis AFB in Las Vegas for two years. He was an instructor/evaluator in the T-38. He has worked as a chief of safety.

He upgraded to captain at SWA in 1992 and checked out as checkairman in 2000 after being asked by Milt Painter. He has worked on revamping the QRH and began the process in 1996. He was involved in editing the FRM when it changed to the new format and did some publishing work.

He has held his current position, which came about when the Director of Standards went back to the line, since June of last year. John Miller took the Director of Standards job and created the slot in June of last year.

He assists John in the day-to-day activities. He answers line pilot questions about procedures, fuel saving measures and autobrakes. He changed the performance card to make it better, increased checkairman standardization, revamped the PC profile to increase standardization, and developed facilitated debriefs. That took a lot of time. He works closely with checkairmen.

He was asked by flight operations management to develop the autobrakes policy, along with Rick Jockomello maintenance, Steve Swauger of SWAPA, Ted Lawson of SWA Safety, Brian Gleason for SWA Performance, and Kevin Ferguson, a SWA checkairman. Len Legge, who wanted to include those specific groups, including Boeing, selected the members.

They decided to implement autobrakes since the -200s were now gone. For some of the -200's, the control boxes had been taken out and wires clipped. They wanted to standardize the fleet so they waited.

After the AA accident in Little Rock, the NTSB recommended autobrakes, which management decided to implement.

When he initially started the autobrake project there were pilot misconceptions about its use. He and another checkairman got permission to go out and fly -300s and -700s to do

stop and go landings with autobrakes 1 to max to a complete stop and check for aggressiveness and deceleration. They decided that level 3 was the best for stopping, ran the numbers, accounted for tailwinds, and had good correlation.

He had discussions regarding implementation time and solicited involvement from all checkairman. They got 140-150 data points on touchdown points in all conditions. There were a lot of landings beyond 1500', so they came up with a long landing distance of 500'. 40% of the landings were past 1500', where actual landing distance was approximately 2000'. It seemed that an additional 500' was a good cushion for using the autobrakes. The concept was to get the brakes on early. The 500' then became the threshold for minimum braking at autobrake 2.

If all 3 numbers in the OPC were bracketed you are not authorized to land. He stated that the 500' is a minimum stopping margin also because, when using autobrakes there is a difference in technique between pilots in the transition from auto to manual. It is also true that braking on the final 500' can be less reliable.

He came up with the autobrake language and much of it was a reprint of the Boeing manual. He put together the training package and a four-page survey for usage for the checkairmen. FOs were paired with checkairmen who reviewed the training package. This was for first round of testing and evaluation of training products. They excluded IOE and captains under UOE and used line-qualified crews to get the data.

Information was sent to check pilots included an instruction page, authorization letter from Greg Crum and the FAA, classic and next generation FRM manual portions, a log sheet for landings and a survey for subjective impressions. SWA received data back and went through it. SWA had an aircraft in MHT where the autobrake disarm wouldn't extinguish with the switch off. There was not a required kit around to fix them so SWA limited cities to only those with a maintenance base.

The biggest problem noted in the feedback from the first survey was that pilots experienced difficulty disarming the autobrakes in the -700 because of the amount of pedal pressure. The other was a pilot disarm call below 80 knots, which changed to any time during the landing roll to monitor failure and promote situational awareness (as opposed to in the final stage of the rollout). Other feedback was about the training package. 4 of about 250 survey inputs (about 1300 landings) said FOs delayed reverse thrust during their first landing with autobrakes, although it didn't happen with captains. No reason was listed as why; although the interpretation was that it was because they were distracted when paying attention to the reaction of the autobrakes. There were no complaints that the autobrakes were rough. The percentages and force listed on the training package were from Boeing. They didn't want pilots to get sloppy so they emphasized touchdown point.

There were 212 complete surveys and 270 partial portions that came back. To summarize the first survey, the disarm call was awkward, the text was not clear, and there were instances of delayed thrust reverser input so they came up with a new package.

Based on this feedback, they incorporated changes in the package and redid the autobrake evaluation. The FOM handout said to use reverse thrust as per normal operations so as to not increase brake wear. The autobrakes are a tool added to standard procedures. They sent a summary pack with notes to the checkairmen.

The second package had new language which expanded on autobrake 1 nonuse, improved language in the training handout and added next generation vs. classic disarm emphasis. There was 97-99% satisfaction on the language change. There was discussion regarding the correlation from autobrakes 1, 2, and 3 to min, med, and max. Concerns were attributed to not fully reading the training package. It made sense when OPC modifications were out on line. There were other proofreading issues.

For the second trial, out of 1000-1200 landings and 100 surveys, there was one FO who delayed, not forgot, the use of thrust reversers. The FO was concentrating on the feel of the autobrakes and forgot or got distracted from using thrust reversers immediately.

He was working on other projects such as single engine taxi and deice at the time. The entire project came together and they rolled everything into one FOM revision. They added a new performance card, which added helpful information and removed unnecessary info. He was involved with the whole training center and SWAPA to implement new procedural changes.

The decision for the method of training was from the training center group and the department of safety group. They decided that no additional training other than the home study package would be required. He did not open the question to checkairmen.

The delay in implementation was due to the FRM revision coming out. The intent was to pre-position the new cards similar to the implementation of the new SNORT procedures, but retain the old card stock on the airplane. On the day of implementation, SWA would have been sent notes to captains to remove the old card stock from the airplanes. The work order to maintenance was somehow changed, and instead of adding to the old card stock, they removed and destroyed the old card stock. The FOM revision was not yet out.

Notification was placed on the dispatch release and a RBF was issued for crews to not use new the procedures. The new checklist included an autobrake item. Maintenance destroyed the old cards so flight operations decided to go ahead with the new cards and supplemented them with additional items for current procedures at the time. A RBF was issued December 8 that indicated that autobrake usage would start on the 12<sup>th</sup>. They decided to delay on the 12<sup>th</sup> because that weekend they found out that the FOM revision had not been put out yet because it was still at the printer.

He occasionally sees problems in the simulator when people try to pull the thrust reverser levers up too quickly. He noticed that people try to get thrust reversers past interlock and can't but retry and are okay.

People have looked at the OPC reverse thrust credit. It is what it is and not much thought is given to the calculation.

There is a working group to implement new procedures; in transition he contrasted the difference between the new versus the old philosophy where one person used to make implementations decisions. Now people get more people involved in the implementation decisions. SWA includes more people and testing when implementing new procedures. If he could do anything differently than how the implementation went for autobrakes he would make sure that all of the products and procedures were in place before implementation began, and would ensure that the maintenance work order was done properly.

There were a few days where information was not on the release. There was a letter that was supposed to be attached to the release, which was formatted very poorly. They spoke to Dallas and had ground operations print the letter through their system and order them to attach it to the release.

There were wet runways recorded in the surveys. There was a question on the survey regarding stopping margin. The response that came back was that OPC numbers were too conservative.

He was not sure that autobrakes were used in the MDW accident

He had no concern about implementing auto brakes during wintertime.

**Interview:** Richard C. Shaw, SWA, Simulator Instructor  
**Represented By:** Declined  
**Time/Date:** 0900, Jan 26 2006  
**Location:** Southwest Training Center  
**Present:** Kirchgessner, Lemos, Timms, Perkins, James, Ratley

During the interview the Mr. Shaw stated the following:

DOH August 1996

Prior to working for SWA, Captain Shaw was in the military for over 20 years. He was a pilot in the SAC for 15 years and flew the KC-135.

His current title for SWA is a Lead Instructor. He was hired on as a flight instructor by SWA, and moved in a lead position in 2003. He was asked to move up. No one reports to him in this position, but sometimes they specialize more than the standard instructor position. He helped to develop the training program for the -700, using the Boeing program as a base, and he became one of four sim check airmen for the instructors in 2004.

When asked to provide the basics of how he teaches pilots to deploy the reverse thrust, he said that as soon as they feel the mains touch down (no need to wait for the nose wheel to touch), they make sure throttles are at idle, pull up on the reversers, look for the lights to indicate reversers have unlocked (out of corner of your eye), and pull up to 65% or more depending on the runway condition.

He is not sure why its not the responsibility of the PNF not to monitor this, although he believes that this is a two-pilot operation, and that both should be monitoring everything, regardless of whose legal responsibility that it is.

When queried, he said that he's not sure if others teach this methodology (to monitor the reverse thrust lights). He believes that some do, but is not aware if all of them are.

When asked his thoughts on whether it should be a definite procedure for the PNF to monitor the thrust reverser, he responded that his method of flying is the "hear, feel, see" method, such that when you have experience with an aircraft, you don't have to specifically see something. "You can feel it, you can hear it."

When asked if he was aware of pilots having difficulty in the sim getting the thrust reverser back, he reported that he had not. The only time they may have difficulty is when he causes a malfunction.

He's never had an instance where a pilot forgot to deploy reverse, although he thought that it likely had happened here, he just wasn't aware of an instance.

He confirmed that the throttles need to be at idle prior to deployment of the speed brakes.

He was not aware of the point at which the throttles need to be forward of the idle detent to prevent the thrust reverse from engaging. He's never had an issue with that, as it's always been at idle.

He believes that pilots are adequately trained on use of thrust reversers.

He doesn't believe that there are any differences between the models in the amount of effort required to engage the reversers between models (300/500/700).

He is aware of the differences in thrust reverse credit between the 300/500/700, and he has noticed the minor calculation difference in the OPC in TR. Pilots are trained on the OPC in the sim, but not for all of the scenarios. He typically has them do the calculations for the first takeoff and first approach, and after that he does the data for them but has them check the data in an effort to save time.

When asked if he has ever heard of the mentality, on the part of a pilot, that because the reverse thrust is not included in the calculations, that the stopping margin will actually be larger because they have the use of the reverse thrust, he responded that he has. His

response to that is typically to remind them that they're not guaranteed to work, and that as a personal guideline, he wouldn't factor that in his decision to land or not land.

He does not cover braking action reports in the sim, but only during the pre-flight brief. When asked what he would tell a pilot to do with a POOR-FAIR report, he said that he is a pessimist; he'd go with POOR. When asked if this is the standard here, he reported that he believes it is. When asked if this was only subsequent to the accident, he reported that he didn't believe so.

When asked if, based on his experience here, he feels that the majority of pilots understands that for mixed braking condition, you would take the worse case scenario, he responded that he didn't know for sure, but that he's always been happy with the answer he received when asking that question. Most, if not at all times, pilots say they'd take the worse case scenario. He doesn't believe, however, that this is spelled out anywhere in the FOM.

The only type of runway contamination that he puts in his profiles is for takeoff where clutter is concerned, because you can't put both in at the same time (clutter and FAIR). He believes that clutter is more significant than the POOR in terms of data or changes in output.

He believes that new-hires have a good understanding of the OPC, and receive just about the right amount of training time.

If a pilot were confused about when to use the AIII button, he would tell them to select all things that apply. For example, if the AIII box applies, check this, and if the RVR<4000 applies, check this also. Each button is an individual decision.

His understanding when using the AIII mode is that if you're flying an AIII approach, you must check AIII also in the OPC, even if its for practice, that you can't disregard the landing cue for a practice. Procedurally, you would always select the same setting on the HUD and OPC.

If they break out and are going to go visual, they would still need to follow the flare cues. Once the runway is in sight, some pilots do better than others in following the flare cue. The reason for also selecting the AIII mode on the OPC is because if you follow the cues, you have the extra space to do so. For some pilots, they end up following the cues all the way through the flare even if they do have the runway in sight.

When asked if he's ever seen problems with pilots in looking past the cues, he said that he hasn't, although only perhaps if they had the lights up too bright. Most of the pilots he works with in the sim stay with the HUD, regardless of which HUD mode they are in. They may make a composite crosscheck, but this still follow the cues to the ground. That said, most of the sim scenarios have the pilots going to minimums, versus breaking out at 700-800 feet.

With regards to seat position when flying the HUD, some pilots fly higher and closer to controls than they would under normal circumstances. In the sim, they do talk about what they should be seeing through the HUD and where the position is. Some pilots use this new position as their standard position from that point forward.

He has not noticed differences or problems in use of the thrust reverser for those that have repositioned themselves. He believes that inch or two isn't usually that much of an issue.

He has not had previous experience with the autobrakes. He was only generally familiar with the way they are being implemented here because he was on vacation when the training package came out, and he hasn't yet had time to review it. Therefore, he can't really speak to whether it covers what it needs to cover. On the surface, it doesn't look like it's that complicated of a task, that anything more in terms of training materials would be necessary.

He was not polled on the content of the training materials, nor were the other instructors, to his knowledge.

When asked if he has issue with auto brakes being used the first time on the line in poor weather, he said that any system like that he would rather try out in conditions that are favorable to him prior to trying it out in weather conditions.

He does not give demonstrations of auto brakes in the sim, outside of RTO demonstrations. If and when the program is implemented, he would be surprised if it weren't a part of the curriculum.

He was asked to expand on a statement from earlier regarding how pilots might consider the -300/-500 versus -700 thrust reverser credit differences in their landing decisions. Specifically, to expand this to an example with the -700, he responded that he doesn't believe that pilots would look at data for the -700 and consider that they really have no extra margin because of the fact that thrust reverse is included in the calculations.

When asked to define "Jam", he said that to his knowledge this is a thrust reverse failure. When asked to define "Lockout", he said that this is his own terminology, nothing he's seen elsewhere. (He may have used these specific words in previous responses).

When asked to define an AIII approach, he said that it is an approach mode on the HUD. CAT III and special approaches require use of the AIII. Crews are certified for CAT III mode. When asked if pilots are taught to follow the cues the whole time, he said that if they have the runway lighting cues, and if they see the runway they don't have to follow the cue.

It is common for the OPC to be used in the briefing room versus the sim directly.

He doesn't see any differences in misconceptions with the OPC in new-hires versus upgrade candidates. Nothing stands out either way.

He wouldn't be comfortable with a 1-2' stopping margin. If he saw anything less than 500' he would be very alert to where he was touching down.

When asked if he had any idea regarding how much runway he would need to do a rejected landing after a 5-6 second delay post-touchdown, he said that he wouldn't personally after waiting that long, as the engines are spooled down. If he did, his guess was that he'd need about 1500' concrete to get off the ground.

At this time, rejected landings after landing are not taught in the sim. They only teach a rejected landing from 50 feet in the air on approach. He doesn't know of anyone who teaches this at this time, either. He does believe that the proposed profile for the next PT does have one.

He believes the OPC output to be an approximation, and that it will vary according to the aircraft, which is why he's not happy with 1-2' stopping margin. Even if the pilot did everything by the book, the OPC is a computer model and even though flight test information is valid, it's only a source of information and an approximation.

When asked what they teach a pilot to do when they hear a take-off warning horn, he reported that he would hope the pilot does nothing more than stop the aircraft.

In terms of what speed they teach pilots to fly from the marker to touchdown, they teach pilots to compute the target speed, which is based on configuration. With a flap setting of 40, which is recommended, they'd be at  $V_{ref} + 5$ , plus any for ice and wind issues. As they descend they would bleed off speed so they'd be at  $V_{ref}$  when crossing the threshold.

He's not sure how much carrying additional speed would increase your distance. He's not heard of the rule that it would be 100 feet per knot.

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## **Simulator Session 2**

**January 26, 2006**

**Present: Dave K., Ratley Lawson, SWA simulator instructor**

**B737-700, #579**

**Accident Parameters:**

MDW Airport, 31C Landing weight 119,700#, Wind 090/11, RVR 4500, ceiling 400, Temp -5°C, Altimeter 30.07, Auto brake MAX (Armed but disconnected after touchdown)

### **Approach 1**

Full manual braking and reverse thrust at touchdown, *FAIR* conditions, Touchdown at 1500 feet

- Able to stop about 700 feet from end. (OPC on accident airplane gave 560 feet runway remaining after stop)

### **Approach 2**

Full manual braking and reverse thrust at touchdown, *POOR* conditions, Touchdown at 1500 feet

- Able to stop about 100 feet from end. (OPC on accident airplane gave 50 feet runway remaining after stop)

### **Approach 3**

Full manual braking and reverse thrust delayed 15 seconds after touchdown, *FAIR* conditions, Touchdown at 1800 feet

- Able to stop about 100 feet from end.

### **Approach 4**

Full manual braking and reverse thrust delayed 15 seconds after touchdown, *POOR* conditions, Touchdown at 1800 feet

- Off end of runway and stopped about at the barrier fence location.

Following are observations and answers from SWA personnel in simulator:

- Reverse N1 only came to 79% but seemed to approximate full reverse thrust.
- Simulator cannot duplicate the anti-skid cycling after touchdown.
- HUD cues observed.
- Reverse levers in 700 are no more difficult to deploy than the Classics. There is a bit of a different feel and it feels more electronic (700) than mechanical (Classics). However, functionally, they are identical in all airplanes.
- If throttles out of idle detent by about ¼ inch, the reverse levers could not be pulled up. (BA is currently doing tests to get the exact measurement.)
- Auto spoiler deployment is on the squat switch and independent of the throttles being at idle. However, there is a spoiler auto-stow detent in the throttle quadrant

past which you can get neither thrust reverse nor auto spoilers. That detent seems to be close to 1 1/2 inches forward of the idle detent.

- There have been no problems with pilots lifting the reverse levers during simulator training. Sometimes, however, they try and yank them quickly past the interlock and they will not immediately deploy. But after waiting 1-2-3 seconds, pilots are able to deploy them.
- Pilots taught to keep forearm on throttle knobs to keep throttles at idle and they are taught to smoothly come to the interlock, wait/hesitate and then pull the levers into reverse.
- Thrust reversers jammed, inoperative, or failed at touchdown are not scenarios that are taught during simulator training.

**Interview:** Gary H. Fick, FAA, Assistant POI  
**Represented By:** Declined  
**Time/Date:** 1300, Jan 24 2006  
**Location:** Southwest Training Center  
**Present:** Kirchgessner, Lemos, Timms, James, Ratley

During the interview the Mr. Fick stated the following:

DOH Sept of 89

Active AF for 10 years, 4 years as DOD technician, and then transferred to FAA. He was hired as an ASI at DFW FSDO and Worked on AA certificate. Then he became a geographic ASI. He transferred to SWA unit before it was a CMO. It became a CMO about 97-98, just prior to the ATOS process. He currently is the APOI.

His actual position is APOI ATOS. He is responsible fro making sure that the ATOS part of the office is doing what they need to do. The other person does a little more field inspections, and he is more in the office. They do each other's jobs though. Only a year ago they made this differentiation. In the past 17 years, however, he has been out on the line quite a bit.

Describe what you saw here at SWA prior to the Burbank acc and subsequent. He said that was difficult to answer. It's a continual changing environment due to the growth of the company and there had been different model aircraft changes, HUD changes, and 700, etc.

Prior to and after BUR, SWA was looking for ways to change things for the better. We've always had a good working relationship. Because he was on the enforcement side, he couldn't get too involved in the teams post-Burbank, but someone at FAA was on the SNORT team.

He tried to head off problems prior to it reaching the enforcement criteria.

The company's attitude towards compliance has always been good. Any non-compliance in the past had been inadvertent. Some individuals didn't follow the program, although there are not a large number of them.

Manual reviews are a part of ATOS. The system is set up so that you have performance assessments. Last done within 6 months, and some coming up for review again. If he had any concerns regarding the manuals he would bring them up.

He had found areas of inconsistencies in the manuals in the past and they are dealt with a formal request and letter. They usually only have to make one request for compliance.

When he was out on the line conducting inspections, he described the company as compliant and they had a little higher standard than what is required.

He noticed that the icing program needed revising, informed the company and worked with them on the improvements and revision about 1999-2000 time frame.

SWA was one of the original ATOS carriers. It was more of a change of the way of doing things, and SWA didn't understand at first what it might mean. Through time they came to a better understanding of the program.

When riding the jumpseat, the pilots comply with company procedures.

Ever seen pilots forget to deploy thrust reversers or have difficulty while on the line or in simulator? No.

There are unique problems (not more) at out stations in different areas. Those problems are addressed and dealt with. Any trends that are seen are also dealt with.

ATOS is a safety based oversight system with 2 types of inspection. There are 47 SAIs and EPIs. The EPIs are done in the performance assessment periods. The frequency depends on the criticality of each one. Semi-annual is most that you'd get. High-criticality areas have the most frequent inspections.

His major concern at the moment is ground operations and congestion in the gate areas. In the past, it was in carry-on baggage and exit row seating.

Pilot training has a 0-criticality mark, which means it is not an FAA concern.

There are both contract and SWA employees in those areas, and he was concerned with the entire area, not just a specific part. The pilots who recently had the winglet mishaps while taxiing are currently under the ASAP program.

He meets formally with the POI every 2 weeks and informally, 5-10 times a day.

There is an open door policy with the CMO manager but he would follow the chain of command before going to the manager.

He understood how reverse thrust credit worked and how it worked in the OPC. This is the first time he was aware of that particular problem.

The APM was in charge of revision reviews. All the inspectors review it and then give their comments to the APM.

He saw the auto brake training materials about 4-5 months ago, and didn't have a problem with anything that he saw.

Home study packages are sent to the CMO for review. SWA tells them what they're going to put in it prior to developing it. This allows us be involved along with way, so its no surprise when we get the final. All the Ops inspectors and the maintenance inspectors had input into the program.

When asked what his take was on the 500 minimum stopping distances, he said that only applied to the choice of which braking level to choose between min2 and med3.

He said it would be a pilot's discretion to land if the OPC calculated only one foot of runway remaining.

He was typed on the 737 prior to SWA and he maintains his currency in the simulator.

Neither he nor the CMO are contemplating any changes regarding the accident.

Voluntary disclosures come to the POI and he distributes it as necessary. He's working on a couple of them now.

Both the former and current POI were compliant-oriented although their management styles were different. The company equally accepted each of them.

Any violation trends are picked up through the ASAP program.

He is staying up to speed on the accident issues.

When asked if there were anything from the FAA standpoint that might have prevented accident, he said that was outside of his expertise to answer. The CMO was not contemplating any changes at this time; they were still in the investigative phase.

**Interview:** Phillip N. Lerum, FAA, APM  
**Represented By:** Declined  
**Time/Date:** 1400, Jan 26 2006  
**Location:** Southwest Training Center

**Present: Kirchgessner, Lemos, Timms, James, Ratley**

During the interview the Mr. Lerum stated the following:

DOH October 8, 1985

He was an Air Force B-52, KC-135, helicopter pilot, and taught Iranian pilots to fly helicopters. He came to FAA in 1985. He was hired as a geographic inspector in Cincinnati for 2 years. He moved back to Dallas as geographic inspector in the DC-9 until 1988-1989 when he became SWA APM. His daily duties are to handle checkairman and checkairman training, and conduct two-year checks.

He works closely with training, the people who develop manuals and the MEL. He is also on aircraft evaluations and flight standardization board for the 737. There are 3 APDs and he meets with them every year but also at quarterly checkairman meetings and two year check when they conduct a PC. SWA hires pilots with type rating so it's not a very active project. They hire very few instructors, maybe 2 per year. They conduct the ride with me monitoring the event. The three APD are very highly qualified and have very high standards. They are line pilots and checkairmen.

He has seen many changes in SWA training. When he first arrived they had 65-70 airplanes and the instructor staff was very small. They had a poor quality assurance program. They have added some quality control to the program. He has no concerns about training right now.

The last major change he required in SWA training program? The pilots were just randomly answering questions. Now they have a formal process for assessing students in ground school. This system is used in recurrent training. The students were doing it orally previously and he wasn't comfortable with that. Now the student is forced to listen and uses an electronic keypad to answer questions. That keeps them focused on the class. SWA was very receptive to changes.

He observes in the simulator 2-4 times per month on the average. He doesn't often have to council a checkairman.

He has not seen nor heard of any problems with pilots deploying the thrust reverser in the simulator or on line.

He thinks that the majority of the pilots understand the OPC reverse thrust credit. It is in their manual and is taught in school.

He is not familiar with the accident information. He has read the SWAPA safety alert and thinks that there may be some valid points.

He has not noticed any difference in lifting the thrust levers in the 700 versus the 300. He has never heard of difficulty lifting reversers out of the detent.

He looked at the autobrake training package and his input was the 500' cushion but they already had the 500' addition to the Boeing 1000' so they left it where it was. There is no cushion in the OPC performance data.

He has no opinion regarding the complexity of the autobrake system. He was asked by the POI and the consensus was that the autobrake training package was adequate. He thought that the autobrake implementation timing was not a concern. He has not heard of pilots being apprehensive about them.

He has seen students going for ATP type ratings have problems with activation of the thrust reversers but not SWA pilots.

He characterizes the flight training at SWA as very good. He is not involved in pilot training.

He is aware of a pilot who had to be retrained in a missed approach on a PC. Retraining is typically done on the spot. He has seen an out and out failure of a PC. SWA does have a failure rate. He will call up and find out the reason for a failure. An individual didn't do very well and I came in to observe the recheck recently.

When people fail it is generally because the whole ride was sloppy and not just one maneuver. If the calls are not in accordance with the FOM they will not pass. The failure rate is about 2%. There are no trends. He would be concerned if the failure rate was 5-6%. He has been involved in recheck failures. The student will go back to training again and the student will get a 709 ride. He watched and when the pilot failed the third recheck he was terminated. He does not know of any pilots who have failed three rechecks and not been terminated.

He believes that thrust reversers are not required to be monitored during the unlock phase because it hasn't come up yet. He would rather let the SNORT team and Dr. Barshi make the determination of what procedures should be required.

He has not seen any problems with reverse thrust deployment or OPC use out on the line.

He does not feel that there are any areas where SWA could improve training. He has never had to file a violation about training other than the 609 rides.

He was on the Delta NASIP inspection and saw how Delta conducted their training. He felt very comfortable coming back to SWA and how they conducted training.

POI will look at home study packages and farm it out to him. He will farm it out to the other inspectors. They will make recommendations and if changes need to be made they will call SWA and make them. The POI will issue the final stamp of approval.

There are levels of training in the inspector's handbook with program hour requirements.

The HUD has been institutionalized since he has been involved with SWA. They did CBT and then flew with checkairman for 3 legs and then fly 10 Cat III approaches in VFR. It was a package. It was assigned the highest level of training, possibly level D.

He does not know how the training was rated because he was not involved in the deice portion. He thought it was assigned a training level B.

**Interview:** Keith Baumgart, Captain, Altria Corporation  
**Time/Date:** 1130, Monday, January 9, 2006  
**Location:** NTSB Headquarters  
**Present:** Dave Kirchgessner

During the interview, Captain Baumgart stated the following:

He was piloting the Gulfstream 4 (G4) that landed immediately prior to SWA flight 1248 the night of the accident. He was in the right seat and was the non-flying pilot. The company operates under Part 91 but he feels their procedures were more like Part 135/121.

They held for 30-45 minutes prior to their approach to 31. The weather was monitored during this time as well as the tower frequency. All other flights did not appear to have any problem landing at MDW. ATIS at that time was reporting ½ mile visibility and RVR of 4000. A possible diversion to their alternate was discussed in the holding pattern but they did not hear anything on the frequencies that would warrant a diversion.

He could not remember the exact winds when they were over the final approach fix but remembered that the wind was strong and not what was being reported on the surface.

They broke out of the clouds fairly early on the approach and had ground contact around 800-1000 feet AGL. The runway was in sight about 400 feet AGL and it was snowing “pretty heavy.” He estimated the RVR at that time to be 6000+ and when “over the fence” they could almost see to the end of the runway. The airplane was configured with full flaps (39 degrees) and the Vref speed was 130 knots.

The braking action report issued by the tower was FAIR for the first ½ of the runway and POOR for the second ½. His company did not permit landing with a NIL braking report.

The stopping distance was calculated by the FMS. The pilot enters whether or not spoilers and the anti-skid system are operational and the FMS calculates the stopping distance and landing field length requirement. The use of reverse thrust is not used in the FMS calculations.

He said that the runway was snow covered and they touched down about 500-700 feet past the displaced threshold. The thrust reversers were deployed after the main gear was

on the ground. Since he was not the pilot flying, he did not know if maximum braking was applied but he felt the anti-skid system begin to cycle almost immediately after touchdown. Maximum reverse was initially used but they were out of maximum well prior to the company limitation of 70 knots. They exited the runway at taxiway Alpha and the airplane was well under control at that time. Neither of them had any apprehension during the rollout that they would be unable to stop on the remaining runway.

He said they probably would have considered diverting to their alternate if they were heavier and had a Vref speed that was 8-10 knots higher.

He could not remember if they gave a braking action report to the tower.

The co-captain on that flight was Jodie Doeden.

**Interview:** Paul Mark Brastauskas, SWA, Captain  
**First Officer for Flt. 1830, Landed MDW Prior to Flt 1248**  
**Represented By:** Richard H. Donahue  
**Time/Date:** 0930, December 19, 2005  
**Location:** Teleconference  
**Present:** Kirchgessner, Lemos

During the interview, Captain Brastauskas stated the following:

He was hired by SWA on July 1<sup>st</sup>, 1999. He is a "Lance Captain", which refers to the fact that he has received upgraded training as a captain, yet doesn't yet hold a captain's line. He mentioned that the top 8% of first officers at SWA are provided this opportunity. This allows him to pick up additional flight time and to fly the left seat.

The night of the accident, he was flying in the right seat.

When asked about the adequacy of the initial OPC training, he reported that it lasted about two hours, and that he feels it to be adequate training. On-the-job training continues with everyday use of the aircraft. When asked how he would handle a mixed braking condition report when utilizing the OPC, he said that he would enter the worse case condition. He said that this was taught in the OPC class, although he didn't believe it to be written anywhere. When asked if he had ever had the occasion to do that, he said that he hadn't, although he has had more of an issue with wet runway surface conditions that with good to fair braking conditions.

When asked what sort of guidance is provided in terms of how much runway remaining is needed, in the OPC, he said that you must have a positive value; any positive value would suffice. In fact, technically, you could make a landing with only 5' remaining. When asked about his personal limits, he reported that he would like as much as 200' remaining, although this may depend on the condition. If only 5' were remaining, he

would take into consideration the maximum tailwind component allowed. He believes that with a GOOD to FAIR surface condition report, the tailwind component is limited to 10kt.

In his tenure with SWA, he has had the opportunity to divert about 6 times, or about once per year. All of the diversions were related to weather, but because the minimums were too low, not because of braking conditions. Prior to December 8<sup>th</sup>, he has not had to divert because of slick runways, or snow and ice. He has, however, landed on runways that were snowy and/or wet, and in fact landed at BWI in such conditions about a week prior to the accident. In that case, the braking was good.

When asked to report on what the criteria is for a stabilized approach, he reported that you need to be on the target airspeed and glide slope, with a sink rate of about 700' – 800', or no greater than 1000'.

When asked what the standard callouts are for the pilot-not-flying (PNF), assuming a decision height of 200', he reported that he would call out 1000', 500', 400', 300' (approaching minimums/going outside), 200' (decision height), 150', 30', and 10'. He would also call out deviations in sink rate, airspeed, and glide slope/localizer. For airspeed deviations, he would call out if it were –5/+10 from the target. For glide slope deviations, he would call out if it were more than a dot, and for the localizer, for more than a 50% deflection.

When asked if the reverse thrust is included the OPC performance computations, he reported that it was never included, regardless of the model 737. When asked if he has ever, as a captain or a first officer, had trouble engaging the thrust reversers, he reported that he has not had a problem with it catching at the interlock, although sometimes they're slow to engage. He said that he would resolve the situation by getting on the brakes.

When asked if he has used the autobrakes prior to working for SWA, he said that he had. He feels that the training package provided by SWA on this topic is good, and that he wouldn't have a problem using them today if they were authorized for use. He is waiting on the final authorization from SWA in writing prior to using them.

When asked about the checklist protocol at SWA, he reported that it is good, especially the past 1½ years with the new checklist, which has more inclusive and promotes better flow. He has never flown with a captain who has not used the checklist. His previous experience is with the military as a transport pilot.

When asked about the pressure required to disengage the autobrakes, he reported that it differs between the –300 and –700 models. The PNF is supposed to monitor the autobrake disconnect light.

Captain Brastauskas was asked to describe their flight on the night of the accident from the touchdown onward (he was the pilot flying). He reported that they didn't delay in

getting the nose on the runway, they used max brakes and deployed the reversers in a normal manner, and that their touchdown was between 1000' and 1200'. They appeared to be decelerating well for the first half of the runway. At about the point when they were passing 4L/22R, they both felt a lack of deceleration, perhaps a sheet of ice, although the directional control remained good. At about 80kts he started to come out of reverse smoothly, to approximately 50%, the captain called for max reverse thrust. He (Brastauskas) smoothly added another 25% (to approximately 75%). He was on full brakes the whole time, and slowed until they were at about 8kts ground speed. He never noticed the anti-skid. The only time that they talked to one another during this time is when the captain asked him to come back with the reverse thrust.

He reported that the visibility was about what had been called, 5000 RVR. He couldn't see the end of the runway at touchdown, nor could he see the markings on the side, but was focused on the centerline, which he could see intermittently. He said that he based his estimate of the touchdown point on their having the runway numbers in sight and the 500' mark early on, and then at 100' altitude he could see the 1000' mark. He adjusted his pitch to get down early.

He then reported what he recalled seeing of the accident aircraft. He was holding at 4L/22R, facing the approach end of runway 31C. When he first saw the accident aircraft, it was just prior to 4R/22L, and it had already landed. On the airport diagram, it was already down by the number "6", in "6522". It appeared to be going fast, and he remarked to the captain, "This could get ugly." He didn't hear the reversers, but couldn't see them. The only thing that stuck out in his mind was the fact that they appeared to be going fast.

When asked why they landed with the standard ILS, and not the ILS Z approach, he reported that they were illegal to land when toggling the HGS on the OPC (out of limits with the added flare), as the button assumes that HGS AIII mode will be used.

When asked how the approach would be conducted if the minimums were at 3000, he reported that they would do the standards callouts, and then hand fly with the HUD. They would transition to the HUD at the glide slope intercept, which was at 1700'. He reported that this is written in the flight manual, and that there is never a time in which you would use the AIII on the HUD but not program this into the OPC. When using the IMC HUD mode on the standard ILS to 31C, the flare cue is simply a "+" sign on the wings – it is not centered in the cursor. Therefore, it only tells you when to begin your flare, although you are not required to use it. It assumes you are using visual cues to make your landing. He was taught, however, that if using the AIII HUD mode, you are required to follow the flare cue.

He considered their training on the HUD to be good, and he felt confident by the end of the 5 or 6 simulator sessions, and prior to taking his check ride.

On the night of the accident, they reviewed various inputs on the OPC. They were calling for 5000' RVR, and with GOOD to FAIR surface conditions. The tailwind component

was at about 6kts, and they figured they would use the ILS 31C, which is a CAT I approach. They input with and without the HUD/AIII mode selected. He didn't recall the actual numbers output, he did recall that the landing would require their use of max braking, and that the minimum and medium braking categories were red/bracketed.

When asked how he would characterize braking surface conditions on the runway at the time of his landing, he would say that the first half was GOOD, POOR for a mid-section, and then FAIR to POOR for the final 1000'. He did not report this to ground or another controller because they didn't ask.

He has previously used the HUD to make an approach, but only into CAT I conditions. When asked if there were differences in using the HUD in a simulator versus in an aircraft on the line, he reported that in real life you may encounter gusty conditions, and that in the simulator the conditions are usually stable with low visibility.

**Interview:** Bobby Hedmen, FAA, POI for SWA  
**Accompanied By:** Dan Diggins, FAA; Tony James, FAA  
**Time/Date:** 1400, January 11, 2006  
**Location:** Teleconference  
**Present:** Benzon, DeLisi, Lemos

During the interview, Mr. Hedmen stated the following:

SWA started looking at use of the OPC when they committed to buy the next generation equipment (737-700) back in 1994. In 1996 they made a request to begin a validation period with a group of 12 Check Airmen. SWA presented data to the CMO regarding the OPC (e.g., how it works, information provided. It was expected to be on-line by October 1997.

In the summer of 1996 the various groups at SWA worked together to prepare for the validation, which involved the maintenance folks for interface issues, and the operations group, which looked at it from the AFM and data validation perspective. The validation period commenced November 1996. This process captured various anomalies and minor events, which were reported to the CMO and corrected. The appropriate manual changes were made, including procedural guidelines in the FOM, software changes in the FRM, and segments of training in the FTM. A letter of approval came from the CMO in May of 1997.

He is not aware of any other major changes to the program since that time with regards to the manuals and procedures to use the OPC, other than that later on they digitalized the MEL as well as the CDL configuration list.

Prior to the Burbank accident in 2000, and several other subsequent runway overruns (onto paved surfaces), the OPC landing data output were provided as stopping distances. Following this, it was modified to approximate stopping margin.

The most recent change was to bring the OPC into the Class 1 as an EFB, which was around the 2002 time frame. It was approved as a Class 1 EFB.

The data that's presented on the OPC is a compilation of AFM performance data, but its presented through a binary software program: APG software and DPI software. The APG (Aircraft Performance Group) software provides runway analysis information, with regards to obstruction clearance. The DPI (Digital Performance Information) is provided by the manufacturer, and is advisory performance information.

An OPC is installed on every aircraft. If inoperative, the pilot is to gain information by using the OPC from an aircraft at a neighboring gate, or they can call dispatch (installed on desktop computers). As a final option, the crew can consult the performance charts in the flight manuals, which are consolidated and tabular data from the OPC.

Updates are received every 28 days, to ensure current runway information from APG. Brian Gleason (SWA) checks the new software for glitches by running a set of exemplars through the program. He has performed these calculations routinely on all new versions of the program.

OPC training for new employees consists of a 2.5-hour training module. There is an electronic slide show that explains the system to a new employee. They also cover the topic in recurrent training.

He confirmed that for the 737-700, the landing distance output does include the use of thrust reversers (TR), but for the -300 and -500 models, it does not, and that this is highlighted in the FOM.

The DPI is advisory only, and has come about over the years to provide the pilots with information with a greater degree of precision. Although first provided for only the next generation aircraft, this same data as is now being provided for the classics. Therefore, if the operator, including SWA, chooses to purchase the additional data for the -300/-500, they could do that.

When asked if it is legal for a SWA pilot to perform the landing if the landing margin is 0 feet, he responded that because the data is advisory in nature only, it has no bearing on the legality of the flight. Three categories of stopping distances provided based on the level of the braking effort: minimum, medium and maximum. There are some company guidelines regarding when landing is inappropriate, for example, that in conditions less than GOOD you should have at least 500 feet stopping margin for either minimum or medium braking levels to land, or that in POOR conditions, you shouldn't have a tailwind component of more than 5kts.

When asked what the pilots are trained to do if the TR do not deploy, he stated that he's not sure. However, he's found that the performance numbers are even more conservative than those required by regulation.

When asked for his thoughts as to how, for this accident, after inputting numbers into the OPC and the crew having received a positive stopping distance of over 500 feet, how is it possible that they came nowhere close to this, he responded that he cannot answer the question without looking at the specific data that was entered into the OPC.

When asked if other airlines are allowed to use the TR credit for performance calculations, he responded that he is not sure, as all of his research has been with SWA. Dan Diggins added that he had looked at this when Boeing put out the BPI on the FOM, and he believes that American Airlines is also using it, although SWA is the only one that has institutionalized the information by using the OPC. This type of advisory data is available for most all next-generation aircraft, and with time, it should also be available for most all of the classic aircraft.

When asked if he believes that SWA is contemplating using this information for the –300 and –500 models, he (Hedman) reported that it is not yet official whether they'll be doing this yet.

When asked why the OPC performance output for landing changed from landing distance to stopping margins, he responded that he cannot say why, that he is only aware of the events that prompted this change (Burbank and other overruns).

He stated that the certificate holder (dispatch) has to make the calculations for the takeoff weight for planning purposes. Once the aircraft departs, the dynamics of the situation change (e.g., airport conditions, fuel), and there is nothing to regulate the calculations en-route. The only regulation is the maximum allowable calculation for landing weight. The dispatch calculations do not include TR.

When asked why the use of TR is prohibited for calculations in dispatch but not for operational calculations, he reported that the calculations provided by dispatch are much more conservative than in real life conditions.

When asked what the OPC looks for the crew to input regarding the runway condition, he responded that it requests information on weather (e.g., temperature, wind, dew point, altimeter setting) and runway condition (DRY, WET-GOOD, WET-FAIR, WET-POOR). There also is a category for RVR<4000, which takes into account the 115% rule that dispatch must follow for landing weight (but does not alter the distance output), and for the HGS/AIII mode for low visibility landings.

When asked how a pilot might input information from a PIREP into the OPC, he stated that the definitions of the four runway condition categories are listed in the manual. The FOM also states that pilots are to take into account the type of aircraft, and to only consider a PIREP from another 121 operator, and try to seek a like aircraft in making landing judgments.

When asked how Mu readings are interpreted and used by pilots, he reported that there is a conversation table in the FOM (3.23.3) and on a quick checklist.

He was asked if the following topics are covered in training (other than simply being presented in the FOM): mixed surface/braking conditions, thrust reversers in performance calculations, and the definition of various braking efforts. He responded that he is not familiar with the training presentation and course, but does know that the course materials include an FOM.

He was asked if he was aware of the date that the FOM first mentioned the difference in performance calculations between the models in the use of TR. He reported that he has the current version, but that he is not familiar with previous versions.

He was asked to follow up with an earlier statement he made regarding guidance provided by SWA that in conditions less than GOOD, pilots shouldn't accept a landing if the stopping margin is less than 500 feet for minimum or medium braking. Specifically, how is the rest of the guidance in that same section/paragraph then to be interpreted, which states that so long as a positive margin is produced with maximum braking, than the landing may be attempted? He reported that he would interpret this in the same manner, that so long as a positive stopping margin is produced, the landing may be attempted.

When asked to follow up with his statement of earlier that the performance calculations are more conservative than required, he responded that he was not referring to the operational calculations, but the dispatch calculations, that the dispatch calculations are more conservative than the operational calculations.

When asked if all SWA pilots are rated to fly on any of the three models, and if they do so interchangeably from day to day or leg to leg, he reported that they do.

Although he is aware that selection of the AIII mode on the OPC adds 1000 feet to the landing distance, he is not aware of where the flare cue diverts from the standard glide slope.

When asked if he thought that a recommendation to exclude the use of TR for advisory performance calculations is a good idea, he responded that he could not speak to that without knowing the nature of the question.

**Interview:** Brian Gleason, SWA Director Flight Ops Technical  
**Accompanied By:** Ted Lawson, SWA Manager Flight Safety  
**Time/Date:** 1200, January 11, 2006  
**Location:** Teleconference  
**Present:** Benzon, DeLisi, Lemos, Sears

During the interview, Mr. Gleason stated the following:

The history behind the OPC is that it got introduced into SW operations in summer of 1997, and at that time there were three aircraft types: -200/-300/-500. They took delivery of the -700 in November of 1997, introduced into service in April of 1998, and this was when the OPC was incorporated.

The OPC has two different landing calculation modules. The Dispatch Landing Module provides for weight calculations, following the FAR requirement for field length and weight, and is predicated on NOT using thrust reversers (TR), which is normal for certification requirements, and is according to the flight manual. The Operational Landing Module is for pilot use when en route, after knowing the specifics for weather, weight, configurations of flaps, etc. Entering the actual conditions into the OPC provides approximate landing distances that will be required to stop the aircraft.

Prior to the OPC, they used a paper system, so the OPC introduced a new concept.

In 1997 when the OPC was introduced, there were three different landing distances, based on minimum, medium, and maximum braking efforts (three deceleration rates). These calculations were based on stopping distances from the AFM autobrake chart, which is labeled "advisory data". The data said that it was applicable with or without the use of TR (no TR included in this chart). At the time, this was the only data provided by Boeing in relation to TR, and the baseline was NO TR. With the introduction of the -700, they entered a new era of how performance data is provided by the mfg. In lieu of a performance section in the AFM (Section 4 from earlier models), there is a software program provided via disk that generates the FAR required data.

Boeing actually provides two pieces of software. One software program is the AFMDPI (Airport Flight Manual Digital Performance Information), which is the official aircraft performance data for certification, and does not include TR. The other program, the Boeing Landing Module, is operational, and with input regarding airport data, etc., provides landing output. (There is also a Boeing Takeoff Model). With a different user interface, they incorporate these programs into the OPC.

The advisory information for the autobrakes provided the data with/without TR. It specifically states: "Use of the reversers are allowed by certification." Seeing as the information is only advisory, nothing prevents using this. Therefore, with the -700, the TR was incorporated only with the WET runway surface condition calculations (not with DRY). They also have the landing configurations options, and for all abnormal configurations, the use of TR is always included. In fact, everything except normal and DRY landing included TR. You would have to deselect TR to not have it in the calculation.

When asked if a stopping margin of 0 feet would be an acceptable distance to make a landing, he responded that they (SWA) have left this up to the crew to determine if they (crew) are comfortable with that. From a performance calculation perspective, predicting performance is difficult to do, as is so dynamic. Part of what they've done with the OPC

is added some factors in to help reduce the estimation, for example, by basing the landing output on the aircraft's position at 50ft AGL over the threshold, and touching down at 1500 feet. Although the figures for the Dispatch Landing Module assume a touchdown of 1000 feet, they believe this is not reasonable.

When asked if the FAA would say it is legal for SWA to attempt a landing with 0 feet remaining on the OPC, he responded that they aren't violating any FARs by attempting to land in that scenario.

When asked what the OPC assumptions are for how quickly the TR will deploy, he responded that the answer needs to come from Boeing, as timing numbers are built into the Boeing Landing Module.

When asked if SWA pilots are trained that their OPC landing distance calculation is going to assume TR deployment, he responded that they are, that this information is in the FOM.

When asked if the -700 pilots are provided with any training advice in the event a TR does not deploy, he responded that he is not aware of what is included in the training on this topic.

When asked if pilots can calculate the landing distance without the TR credit, he responded that they could through the MEL page on the OPC. The TR selection method in the OPC assumes that both TR are either operating or inoperative. It is an all or nothing calculation.

When asked what the OPC choices are regarding current runway condition, he reported that there are four: DRY, WET-GOOD, WET-FAIR and WET-POOR.

When asked what criteria is used in entering the runway condition, he reported that this is based on braking action reports, although he didn't know the specific guidance that is provided to crews regarding when to select one versus the other.

When asked if the crew were to select DRY, if the OPC calculation is going to assume TR, he reported that originally it did not, but that now it does (changed in 1999). Currently all calculations for the -700 include TR.

He was asked if he had discussed with SWA the possible economic impact if the FAA would not allow SWA to use TR credit throughout the fleet. He reported that he had not. In looking at the dispatch landing distance, which impacts release, theoretically, the weights at which we dispatch aircraft will not change. It might, however, impact operations, in that they may decide to suspend operations at an airport a bit sooner based on deteriorating conditions. This may also be true in the summer, if the runway is wet and slippery.

He explained that if the tailwind component is exceeded, the OPC highlights that tailwind (reverse video in red), indicating to the pilots that they've exceeded a limit. The information regarding what limit has been exceeded is always annunciated on the bottom of the screen. The same is true for if the runway landing distance exceeds the available runway.

In terms of testing the OPC, the program has a self-test feature built into it, such that every time a computer is turned in, or a change tail numbers is entered, it automatically runs a CRC check, to make sure there is no corrupt data. This is the only testing on the device themselves. Malfunctions are treated as a mechanical issue, in which case the dispatcher is notified. Dispatch has an identical module and can run the numbers. All aircraft types and any tail number are included in each of the OPC units. They are interchangeable.

He has not spoken with colleagues at other airlines to determine specifics regarding other performance calculation programs that they might be using.

When asked who at the FAA is most familiar with OPC, he reported that it would be Phil Larren, one of the safety inspectors at the local office.

He was asked why he thought that the accident aircraft didn't come close to stopping when the accident crew did a calculation allowed them to stop on the runway. His opinion was that runway conditions must have gotten a lot worse, and more quickly than the crew anticipated. One of the difficulties with performance calculations is how to incorporate subjective (runway surface) information. The program must assume that the entire runway is of consistent condition, which is not realistic.

He was asked if he thinks that the TR played a role. He responded that it is difficult to determine what that effect was, although it likely played a role. The hardest part is making assumptions with the performance calculations, which have to assume a consistent runway condition from one end to the other.

He was asked to clarify a previous comment that suggested there is a 500-foot buffer by their calculating touchdown at 1500 feet. He reported that this is not considered a buffer, and that pilots are not taught to land at 1000 feet, but that landing at 1000 feet seemed unreasonable, even though this is what the dispatch landing calculations are based on.

In dispatch calculations, the forecast whether determines whether the 115% rule applies (for wet runways).

When asked to describe how "clutter" is incorporated into the OPC, he said that this is only an option in the Boeing Takeoff Module, as it affects other weight and speed calculations. SWA does not incorporate this data for the landing output, as it actually shows a better stopping distance than for WET.

When asked to clarify when the OPC will bracket versus highlight stopping margin output, he reported that when the stopping margin is less than 0, it will be bracketed, and that when it is less than 500 feet, it will be highlighted (reversed). Both used to occur at values less than 0, and the differentiation is a recent change.

He was asked to clarify the effect of selecting RVR<4000. He reported that selecting this box has absolutely no bearing on the stopping margin output, but is simply a operations spec requirement based on weight. It will determine if the field length is longer than is available, based on dispatch field length requirements.

**Interview:** Bruce Sutherland, SWA, Accident Captain  
**Represented by:** Dave McCracken  
**Time/Date:** 0900, February 9, 2006  
**Location:** NTSB Headquarters  
**Present:** Kirchgessner, Lemos, Perkins, Ratley, Timms, Laurenzano

During the interview, Captain Sutherland stated the following:

Captain Sutherland was asked to report more detail than was provided from his first interview regarding his activities in the 72 hours leading up to the accident. He reported that he has not tried to think about it, and he wasn't sure that he could add anything factually.

To the best of his recollection he woke up around 0830 that morning, and would have left the house at about 1000 to make the 1125 flight. He woke up too late to make a local appointment, and recalls making breakfast, packing and heading out to the airport directly. He slept through the alarm because he didn't feel like getting up. He liked to make sure had a good night's sleep prior to his trips, especially if they were PM shifts. He said that he felt good that morning.

He was unable to recall any exciting or specific activities from the day prior – just simple and routine activities – no parties or playing golf. He wasn't able to recall when he woke up on the morning of the 7<sup>th</sup>, or when he went to bed on the evening of the 6<sup>th</sup>. He didn't recall any specific activities during the four days prior to the event, and perhaps only went to the drycleaners, as he can walk to everything in the village that he lives in.

Waking up at 0830 is typical for him, depending on if he works the AM or PM trips. PM trips usually end between 2230-0100 the following morning, and even sometimes 0200 central time. He would usually preview his upcoming trip and make sure to get a good night sleep accordingly. He would make sure to get plenty of rest for the west coast trips. He would adjust by sleeping in, or getting up later.

He prefers the PM shifts and bids them. The accident trip schedule was a PM shift. For the accident trip schedule, he would have gotten in around 2200 Salt Lake City time.

Although he bids more for the days off than the actual schedule, and so sometimes bids the AM shift.

He felt rested on the day of the accident.

Captain Sutherland is married and has 3 children and 2 grandchildren, none of who live nearby. One of his children lives in Long Island, one in Austin, TX, and the other in England.

There have been no financial changes for him this past year, for the positive or the negative, and no other noteworthy major life events, either positive or negative (e.g., no deaths in the family). However, his wife had been ill at the beginning of year with pulmonary emboli. He had to cancel a few trips as a result. This was the previous January and February. She was feeling better in December, and she had some follow-ups in January (of this year), and was hopeful that she could get off Cumadin. However, that was resolved, and she was feeling better, so he felt that this was not a factor.

He is in good health, and has not had any changes over the past year. He is a non-smoker, although he has an occasional cigar on the golf course. He does drink alcohol, and it is usual for him to have a glass of wine in the evening, when he takes a walk with his brother in the village. He makes beer. He is not a big drinker, and he doesn't always drink in the evening. There have been no changes in his smoking or alcohol habits over the past year.

He reported that there have been no changes in his sleeping pattern over the previous year, and that he feels rested during the day. He said that as you get older you have to get up more often to go to bathroom, but that it wasn't affecting him.

He has been on Lipitor for a couple of years, but he prefers to avoid all medications if he can. He also takes a baby aspirin and a vitamin per day.

When asked if he believes that anything affected his performance on the day of the accident, he said that he did not.

He was reminded that in the first interview, he said that he told the FO on the night of the accident that he wasn't comfortable with using the autobrakes because he has only had the opportunity to use them in the simulator. He was asked to expand on why he felt uncomfortable. He reported that it is because it was a new procedure, and that he had not used them before. He had originally thought he had used them for a landing demonstration in the sim, but he had not, only RTO in the sim. He hadn't used them at all outside of the sim. He didn't feel comfortable going into Chicago in those conditions and not having used them before.

When asked if, prior to the accident night, if he had heard comments from any other pilots regarding their perceptions of how the autobrakes function, negative or positive, he reported that he had heard second hand discussions from either check airmen, or FO's

that had flown with check airmen, that the autobrakes were fantastic. The comments were only positive.

He first read the autobrakes training materials when they provided them to the pilots several weeks prior to that night, and read the FOM revision on the accident flight. They were in the process of updating the revisions, and he hadn't looked at them prior to then.

He was asked if, based on this information, he felt that he had a clear understanding of how autobrakes work, the performance differences between manual and autobrakes in varying conditions, and the guidelines for use. He reported that they provided a good outline of how they worked, and felt comfortable with that. He felt that the materials were sufficient.

He was asked, in considering whether to use autobrakes on the night of the accident, in what ways did he think that use of the autobrakes would affect his stopping performance. He thought that use of the autobrakes would enhance their stopping performance, and that they would start braking sooner than they could, so it would give them a jump on the start of braking. After that, he felt as if the performance would be similar whether autobrakes or manual braking was used.

He was asked what conditions or requirements were met that led him to believe that autobrakes were required. He said that, based on the guidance received, if the revision was in the book and the checklist was in the airplane, he believed it was then required. He put the revision in that night. The stopping margins required the use of auto brakes, based on information from the guidance as well as in the OPC.

He was asked if he recalls any notices regarding timing for the implementation of autobrakes on the release on that night or on previous flights. He said that there had been on an RBF a notice not to use them until the revision and checklist were out, but didn't recall the date. He didn't recall the information ever being on a release, although they had an extensive discussion about the autobrakes that night. They went over the training pamphlet, and it said on that not to use them, although there was no date on the pamphlet (referring to implementation).

He said that it was not on the release that night, but that perhaps it was on the weather package, as they had a discussion of that, but then was unsure about which of these two the information was on, or if it was on for previous flights.

In discussions regarding these guidelines with one another that night, they referenced both the operational handout (training) and the FOM.

He doesn't recall seeing a date of implementation on a previous RBF, but doesn't recall if it said a date. He doesn't recall seeing an RBF on the 8<sup>th</sup> that referred to the auto brakes.

He was asked if he recalled when he first attempted to apply manual braking, and he said that it seemed like it was a short period of time after the antiskid stopped, and there was a

lack of deceleration. He looked but couldn't see the autobrakes disarm light, as he had his seat up too high for HUD positioning. Perhaps about the time that the FO said, "Are you on the brakes?" It wasn't immediately, he first noticed the antiskid and the lack of deceleration, and it was perhaps 10 seconds or less after landing.

Captain Sutherland wears corrective lenses that are progressive trifocals. The bottom portion is corrected for reading, the middle for intermediate vision, and there are no corrections for far vision. He wears the same glasses for flying and for everyday.

When focusing on the HUD symbology, he believes that he uses something between the intermediate and far vision (nothing) portion of his glasses, and perhaps nothing when looking out at visuals, although he's not really conscious of this. He has never had difficulty in focusing on the symbology.

When using the HUD in the AIII mode, he focuses on the symbology in the center, the energy, and cross checks for airspeed, ground speed, and other information in the periphery. He typically focuses on the same things when in other HUD modes as well.

He generally uses the AIII mode, the IMC mode, or the visual mode. He uses the IMC mode a lot, however, and prefers this because it's more forgiving and less sensitive than the AIII mode. If it's gusty or if it's bumpy, it's easier to get an approach warning, and you'll over-control with the AIII.

He first qualified to use the HUD at SWA in January or February of 2001, and estimated using it between 20 and 30 times in actual IMC conditions. Two or three of these times were with conditions requiring the AIII mode. He reported that he uses it also in VFR conditions, and that he is comfortable in doing so. In fact, he uses it for almost every approach, visual or not. He likes to use the HUD.

Even if he uses it often, he still needs to log some of the approaches to meet currency requirements. He logs this on the sheet the operations agent brings for them to log their times on after each flight. He tries to log the first flight of every month.

He's not sure of the timeframes for currency, but he receives a "maestro" message when it is 30 days from due. This requires his logging an AIII landing and an AIII take-off.

He did not use a HUD in the Air Force.

He is comfortable in his ability to use the HUD to make an AIII approach down to CAT III minimums.

In terms of the seat position, he usually has his seat at a different position when en route than during landing. He said that it would be fair to say that for landing, his seat is always in the same position, as he uses the HUD almost every time.

He was asked what his understanding was on the night of the accident regarding how RVR < 4000 would affect the landing output on the OPC. He reported that it puts the touchdown point 1000 to 1500 feet longer than what it would normally be in visual conditions. He speculates that this is because, when flying an approach to low visibility minimums, you're following the glide slope, and they don't want you to duck under so you land longer. When asked if this was related to the AIII mode on the OPC, he said that this was not.

He was asked if on the night of the accident he recalled receiving an approach warning, and if so, at what altitude. He did not recall receiving one that night.

When asked what the SWA policy is regarding which pilot (if not both) is supposed to have an approach plate in front of them when the captain is carrying out an HGS approach, he reported that they both should have one.

He was reminded that in the first interview, he reported that the accident night was the worst weather that he had experienced, and that he had estimated between 12-15 previous poor weather experiences. When asked if these experiences were all at SWA, he reported that they must have been all at SWA, as he would have reported a larger number had he included his experiences while in the AF.

When asked at which airports he recalls previously experiencing poor weather since having worked for SWA, he listed: MDW, BUF, ISP, PVD, LAS, which includes thunderstorms, rain, low visibility and gusty winds.

He has landed where the braking conditions were reported as POOR, although he doesn't recall where. He also has landed where the braking conditions were reported as FAIR. He doesn't recall the source of the braking action reports, and although they were likely from a mix of either Mu readings or pilot reports, PIREPS were probably the most predominant source.

He was asked to describe the extent to which he takes into account weather reports from various sources (GA vs. heavy, company versus other similar aircraft). He said that he takes all into account, but gives more credence to company 737, and then to the same type of aircraft but for other major carriers. He does take GA reports into account, but has to interpolate the type of aircraft and estimated experience level, and would have to guess. He wouldn't trust the reports of one of the other major carriers more than another.

He was asked if, on the night of the accident, he considered asking for a different runway. He said that he didn't, as he and the FO discussed using RWY 13, and it was not available. He couldn't land on 13 because the weather was below minimums, and it had also been denied to another aircraft (he believed they had heard another aircraft ask for this and it had been denied). He has been in this position before, and his perception was that the MDW landing runway direction was based on ORD operations. It crossed his mind but it didn't seem to be an option.

He was asked to characterize the actual runway conditions on the night of the accident. He said that there was snow, and that it was patchy. When asked how he would have reported the runway conditions on the night of the accident, had he reported it after his landing, he said that it was hard to tell if it looked like FAIR or POOR, that it would be hard to make a differentiation.

Captain Sutherland was asked to expand on his comment from the first interview that about 5 years ago there was “company pressure” to be on time and to land. He reported that about 5 years ago, although it may have been further back from that, there wasn’t tremendous pressure, but SWA was competing for on-time awards, and they wanted to get back on schedule; it was the culture that when you come in you do things certain ways. The company took a look at this and tried to change the culture.

When asked how he knew that there was a change, or effort towards a change, he reported that there was a conscious effort by the training department to emphasize the safety aspect over the on-time arrival. Some of the data showed problems that the company was having, in terms of unstable approaches or pressing for the field (which happens sometimes anyway). They (SWA) felt that this was because of the emphasis on on-time arrivals, and the effort was made to emphasize safety. They came out with guidance that if you are not within the parameters to go around.

When asked if at any point during the accident flight he considered diverting (even if this was not voiced), he said that he did, that they discussed if they had to divert where they would go. They also discussed the parameters in which they wouldn’t land, which was if the braking conditions were POOR.

When asked if at any point during the approach he considered a go-around (even if this was not voiced), he said that he did not, not at that point. He said that it was a smooth approach, and the conditions were such that they could land. At around 1000’ they saw the ground, and at about 700 feet they saw the lead-in lights.

When asked if he considered a go-around after touchdown, he said that there was no consideration of this after they were on the ground and the antiskid had started.

He was asked how much leeway SWA captains are given in going outside of SWA procedures or guidelines when or if they feel uncomfortable with a particular situation, or feel it unsafe. He said that the company expects them to use their best judgment, and that the company would back you if had to deviate from regulations.

He was asked to recall a time when he had to deviate from the guidelines in the interest of safety, and he provided the example that you sometimes have to violate the sterile cockpit rule in talking with flight attendants if the situation changes. He couldn’t recall a situation in which he had to intentionally deviate from company guidelines in the interest of safety.

He was asked if, after the aircraft came to a stop, but prior to shutdown, if he recalled a PA being made by either himself or the FO. He said that there was no PA made from the cockpit.

He was asked to walk through the events from the time the aircraft stopped to the time the evacuation command was made, to the best of his recollection. He reported that after they came to rest by the highway he spent the first few moments taking a personal check of if he could move, if he was okay. He then shut down the engines, and popped off the battery switch, and then put the battery back on. The tower then called to ask if they were clear of the runway, and the FO said that they had gone off the end of the runway. He prefers to use the hand microphone, and it was under his seat. He got up off of his seat and looked through the window and he saw a policeman right there. He thought, "Where have I been? There is already a policeman here?" He then saw a bloody man holding a baby, who was yelling at him. He saw the condition of the aircraft, closed the window, and then got up and went to the cabin to talk on the megaphone. He made a report to the passengers. He then returned to the cockpit, saw the aircraft angle, was looking for a safe spot, saw the traffic enclosure along the highway, and then went back out of the cockpit to tell everyone to go out the front of the aircraft. The passengers exited calmly and quickly; he took bags as people came up to the front of the aircraft with them.

When asked to expand on the runway conditions the night of the accident, he said that it was snow covered and patchy, but that he can't say if it was icy because it was snow covered. It looked plowed.

When asked if he had ever received a mixed braking action report prior to that night, he reported that he thought he had, although he couldn't remember how he had programmed the OPC in those cases. He does recall having a report where the end of the runway was different.

When asked to talk about his thought process that night, why he used FAIR and not POOR, he said that based on the reports they had, they had FAIR to POOR, and that the end was POOR. He didn't believe that this was unexpected, as even when the runway is dry the end is not as good as the beginning. He felt that they would be able to stop prior to the end.

He felt that they would be okay on the second half, because a previous GA aircraft reported FAIR to POOR. After the report, the tower asked him if they could turn off at the halfway point and they could. He made the evaluation that if they could turn off that early then it can't be that bad. His understanding was that if it was POOR for the entire runway they couldn't land.

He was asked if he has had time to look in the FOM regarding the reverse thrust credit, since the time of the accident. He said that he has had the time to look in the FOM, although he was told to relax for the healing process, and has been staying away from

that. That said, he didn't see it in the FOM and only in the FRM that thrust reverse was a part of the computation for landing.

He confirmed that on the accident night, upon landing, he felt the throttles in the idle position, that he felt them hit the stops. He said that he took them back and felt the stops when he started to flare. When his hands were on the throttles, they were down and they felt normal. He thinks his hands were on the throttle. He's not sure where his arm normally rests when his hands are on the thrust reverse levers.

He did not attempt to deploy the reverse thrust prior to touchdown. When he pulled up on the reverse thrust lever, it did not do anything. There was some play; perhaps  $\frac{1}{4}$  to  $\frac{1}{2}$  inch, but that was it. A little play then resistance. It was nowhere near the interlock.

When asked if he retried to deploy the reverse thrust, he said that he felt the lack of deceleration of the aircraft, which felt like an increase in speed, and that is when he stopped thinking about the thrust reverse.

It seemed like a short period of time. He got on the brakes.

The FO then took his hand off and tried the reverse thrust. He (the captain) knows that he didn't put them up. He told the FO to get them up.

He reported that he didn't say anything to the FO about not being able to deploy the reverse thrust.

He has had this same experience with the thrust reverser before, a few times, that sometimes if you're too quick you'll have to retry. One time on a flight with a check airman it happened, and the check airmen told him to relax and that they come when they're ready. He reported that he may be too quick to try, so he relaxes and gives them time to come up, but that he is always able to get them up. He didn't think that there was a problem with the airplane, but that for some reason he tried too soon or didn't do it hard enough.

He was asked if he believed the focus on autobrakes diverted his attention away from the normal landing progression. He said that he thought about this a lot, and that he was very in tune with what the autobrakes would do when they landed, and conscious of looking for that. He said that this may have had something to do with it, especially when the aircraft stopped decelerating.

When asked if he considered not using the autobrakes, he said that he had, but that they were required, and the OPC said to use them. As he and the FO discussed it, he became more comfortable with using them because of the better performance.

He was asked what his normal technique is when he goes from the throttles to the reversers, if his arm is still on the throttles. He said that he's not really thought about this, that he doesn't know.

When asked if, during a normal landing, if he monitors the TR lights, he said that he doesn't think that he does, and he didn't that night.

He was asked to explain his recollection of the FO struggling with the reversers. He said that he saw him grab the reverse levers, make several attempts to get to the interlock, and then he made a couple more attempts at the interlock to get them into reverse. He said that he was looking straight ahead but then glanced at the FO's hands.

He was asked if he and the FO had a discussion about the tailwind for this landing, and he said that they did a lot of "what if" with the OPC. He took the OPC after the FO did the calculations, and they looked at WET-FAIR, and WET-POOR, and that they wouldn't land with POOR because of the 5-kt tailwind limitation, which gave only 30ft stopping margin. This was outside of his comfort limits and he wouldn't land.

When asked if during the autobrake discussion, the FO had the revision in, he said that they put them in enroute and went over everything.

When asked if the OPC landing data are hard numbers or approximates, he said that he thought they are good numbers, but are based on what you put in (garbage in – garbage out).

He confirmed that he believed the thrust reversers were not a part of the landing calculations.

He said that on touchdown, and after the nose was down, he felt the antiskid, then the spoilers. Then the antiskid stopped, and he didn't expect it to. He felt the lack of deceleration and thought he knocked the autobrakes off. He couldn't see if it was off, he went on manual braking and there was no change.

The FO is supposed to call if the autobrake disarms.

He believes that the FO had trouble getting the reverser out of the stowed position. It seemed like forever, but it must not have been that long.

He was asked if it was a single autopilot approach or if both were coupled. He said that they don't normally use both.

He was asked what the runway looked like prior to landing, and he said that they saw snow, darkness, and patches of snow. When asked if they could see asphalt on the runway, he said that he couldn't say that they did, that he can't recollect. He confirmed that it was all white at the end of the runway, and that it looked different than at the approach end.

He confirmed that, at SWA, they are taught to put the nose wheel down prior to deploying the thrust reverse. They are taught to put the nose wheel down and then the spoiler, but that the thrust reverse definitely comes after the nose wheel is down.

When asked if there was any ratcheting in his bringing the throttles to idle, he said that there was not, that they came back smoothly and he felt them hit the stop.

When asked if the levers were symmetrical, he said that he didn't notice them not to be, and that when the levers came up a little, they also then didn't feel asymmetrical.

He was asked if the difficulty with the TR felt more like a mechanical or if it was like a binding, and he said that it didn't feel like a binding, but like they were not ready to come back yet, as if they weren't unlocked yet. For example, sometimes you have to pull a couple of times and then release. Both TR levers stopped at the same position- they seemed symmetrical.

After touching down and thinking about the autobrakes and antiskid, he didn't recall having any control difficulties, no winds, nothing.

He was asked if one wheel was braking more than the other, or if he felt he was fighting a lateral problem, and he reported that the antiskid felt as if it was working in a symmetrical manner, that he had no lateral problems.

When he was asked to characterize how the FO moved his hand, he said that he didn't feel it, and that he wasn't aware of it. He didn't recall this happening other than what the FO said to him afterwards.

When asked if he welcomed the assistance from the FO, he said that he did, that he didn't feel angry, and only thought, "Get them up there!"

He saw the FO struggle with the levers. Once past the interlock he saw a gap, one lever was back a little and one was up a little. He didn't recall which side was up.

When asked to characterize the time that it took for the reversers to deploy, he said that it seemed like an eternity, longer than normal, but that this could have been because they came from low speed. When deployed, the levers looked to be all the way back.

When asked which autopilot is normally used, he said that the captain uses A and the FO uses B.

When asked if, when using the HUD, he tends to focus on the symbology or between the symbology and outside, he said that on approach he typically focuses 80 percent on the symbology and 20 percent outside, and that on final and upon landing this is reversed, with 80 percent outside.

He confirmed that on the rollout he looked down at the FO's hands on the thrust reverse levers, versus just seeing this with his peripheral vision.

**Interview:** Steven Oliver, SWA, Accident FO  
**Represented by:** Dave McCracken  
**Time/Date:** 1100, February 9, 2006  
**Location:** NTSB Headquarters  
**Present:** Kirchgessner, Lemos, Perkins, Timms, Ratley, Laurenzano

During the interview, First Officer Oliver stated the following:

He said that his best recollection of a 72-hour history prior to the accident flight was best told in his first interview. He had 2 children that acted as his alarm clock. His one-year-old daughter typically awakened him around 0700 each day. He also had a 4-year-old son. He usually went to bed around 2200-2300 each night and tried to ensure 8 hours of rest. He did not watch TV after going to bed; he went to sleep. He had no recollection of his activities the day before the accident, or for several days leading up to the accident; there was nothing significant in his activities. He also was unable to recall any specific times for going to bed or for waking up. However, his sleeping pattern in the days prior to the accident was not unusual.

The day of the accident his assigned line of flying was a PM reserve line and he had already been given a trip. He knew the check-in time had to be early but did not remember specifics. He had to be in BWI for his reserve check-in and went to his crash pad to do laundry, watch TV and take a nap. That was better than sitting at airport for 4 hours. He normally bid PM reserve lines.

Whenever the kids woke him up, he did not have trouble going back to sleep. He said that this did not affect him during the day, that he did not feel tired, and that his sleep regime had not changed in the previous year. He was not tired and said that fatigue was definitely not a player in the accident.

There had been no financial changes in his life the past year, or any significant positive or negative events concerning his family or close friends; the only major event had been the birth of his daughter.

His personal health was good and he went to the gym 3 times a week.

He was a non-smoker and had a glass of wine with dinner around 3 times a week. He said he was not on any prescription or non-prescription medications the day of the accident and that has not changed in the previous year. He sometimes takes cold medication, but he did not have a cold during the time of the accident.

When asked if he believes that anything affected his performance on the day of the accident, he said that he did not.

When asked if he had heard comments from any other pilots regarding their perceptions of how the autobrakes function, he said that he had heard no negative comments and that this was a positive thing

He first read the autobrakes training materials several times in his crash pad after he received it. He read the FOM revision during the accident flight. He said he was really comfortable with the information and he understood it. He said there was nothing confusing in the operational packet they were sent, but that the FOM revision was more informative. He did not recall watching the CD-ROM and was not sure he even received it.

He said he felt comfortable after reading the information; he was not confused and he did not feel that he needed more information.

When asked what his understanding was of the effect of autobrakes on their stopping performance that night, he said that the auto brakes could initiate braking before he could and that was positive. If the auto brakes were inoperative, manual braking could achieve the same result. The auto brakes were as good or better than they were.

He believed they needed to use the auto brakes that night because they were told not to use them unless the new checklist was on the airplane and the FOM had been inserted in their manual. Both of the conditions had been met so they could use them. Also, there used to be a note about not using the auto brakes attached to the weather package. That night, the note was not there. There was no question in their mind that auto brakes were required for landing because the runway was wet and would result in less than 500 feet remaining. It was black and white. They read the packet and it was definitely required. He did not recall seeing it in the OPC, but was later told that it was there.

The material they referenced regarding the auto brakes were the operational packet and the FOM. Some of the conversation took place about 10 minutes prior to when the CVR began operation. He wished the CVR were 10 minutes longer because it would help clarify things better.

He said he checked the RBF file that day but the RBF that was issued on the eighth was not in there yet. He did not go back and look for the other RBF regarding auto brakes but he did recall reading it some time in the past. However, he could not remember what information was on it. He only checked for current RBFs on the day of the accident. He said there were 2 ways to check this file, either by the book in operations or the web site. He did not check the web site that day; he used the book. When he checked the book after the accident and saw the previous RBF regarding auto brakes, and said it "broke his heart." He only looked for the new ones that day.

He said that he applied brakes before the thrust reversers were deployed. The sequence after landing was brakes, speed brake deployed, and then thrust reverse; this was his

standard sequence on every landing. There was no tiller on his side so he had to make sure of directional control.

He was confident they made a firm landing but he did not feel the anti-skid cycle. After touch down, he felt a normal deceleration and went outside to check the centerline and make his callouts. He had a good feeling on touchdown. That good feeling lasted 5-6 seconds and he could then tell they were not slowing down as quickly as needed.

When asked what effect checking RVR < 4000 on the OPC has on the landing output, he said he was not sure what effect this has on either the landing performance output or the crosswind limit. He tried the calculations both ways, with and without RVR < 4000, and kept RVR < 4000 checked, as a worse case scenario. However, he could not recall if the numbers were different.

He was asked if on the night of the accident he recalled receiving an approach warning, and if so, at what altitude. He did not recall receiving one that night, although during the briefing prior to the approach, they agreed to disregard the approach warning. That night was breezy but not bumpy and he was not looking for it.

He was not sure he ever landed with POOR surface/braking conditions while at SWA, but was fairly certain he had at a previous airline.

He prefers to get field condition reports on the ACARS, as the ATIS is old information as soon as it is out. He would take a company aircraft's report ten out of ten times over a report from a general aviation aircraft, because he trusts that SWA pilots would want to take care of other company flight. He would consider a general aviation aircraft's report if a company report was not available. He would consider company reports the most valid, followed by similar aircraft types and, as the lowest validity, other aircraft types.

Much braking action reports were common in his previous career. He doesn't recall hearing them from the tower during his career at SWA, but he has seen them in company field condition reports. There were less than 10 times that he was in weather where he needed them.

The night of the accident, he thought about requesting a different runway into MDW, but didn't because he heard another airline being told by ATC that another runway was unavailable.

He could see the ground at 1000' and the airport at 700', which was earlier than expected. He characterized the runway as snowy, what he would normally expect. He didn't recall if the runway was totally covered with snow.

He always considered a go-around as something that he kept available to himself, although there was nothing that night that would have required him to ask for a go-around as they were inside parameters. He was happy with the touchdown. He would have been happy to do a go-around if necessary up to 5-6 seconds after touchdown. He

believed that initiating a go-around at the 5-6 second timeframe would have resulted in a more tragic outcome than the one that occurred.

He was asked how much leeway SWA captains are given in going outside of SWA procedures or guidelines when or if they feel uncomfortable with a particular situation, or feel it unsafe. He can't say if there is any leeway for a SWA captain to go outside guidelines. Once a procedure hits the book, you must do it. If you are not happy about a procedure you can tell the company about it. The captain is the final authority. Pilots have some latitude, such as a deviation around a thunderstorm, but can't blatantly disregard procedures.

He doesn't recall a PA prior to the aircraft being shut down after it stopped. However, there was a time when he was doing the checklist where he missed what the captain did.

After the aircraft came to a stop, he had his head down for a second or two. He asked the captain if he should do the checklist and the captain told him yes. The tower asked if they needed any assistance. When he responded that they did, the tower said that folks were on the way. He then did the last two steps of the checklist. He stood up, put on his coat, and saw the captain sitting in his seat with the window open. He saw Mr. Woods with a bloody nose standing outside. The captain did some things that he wasn't aware of. Specifically, the captain may have exited and returned to the cockpit prior to this time, although he could not recall this nor could he say that this didn't occur. When he heard a police officer say that they were leaking fuel, he grabbed the captain's arm and told him that they should get the people out. He doesn't remember who got out first but thinks that he did. The captain asked him to go down and help during the evacuation.

He couldn't say specifically what a previous attachment to flight weather packages said regarding autobrakes, although he recalls that it said that autobrakes could not be used until the FOM revision was posted and the checklists were in the airplane. He doesn't recall if the attachment was on weather packages in the trip immediately preceding the accident trip. The attachment was not on weather packages the night of the accident, and that caught his attention. The FOM revision was in his company mailbox and the checklist was in the airplane. He stated that he truly believed that he had to use the autobrakes.

He stated that he has had time to review the manuals for information on the reverse thrust credit since the accident, and that there is conflicting information regarding the OPC reverse thrust credit in the manuals. One section mentions that reverse thrust is not included in landing data and another section mentions that it does. He did not know that at the time of the accident.

He did not see the captain have trouble with the thrust reversers and was not looking at his hand. He doesn't look at the thrust reverser lights during deployment because there is no procedural requirement, but wishes that he did the night of the accident. He usually tries to monitor everything. The FOM section says to verify speed brake deployment and

make a callout at 80 knots. There was no asymmetrical deployment. The captain did not tell him that that he had trouble getting into reverse that night.

He was comfortable with the touchdown point and was focused outside at touchdown to make sure that they did not land long. He heard the speed brake deploy. The landing seemed normal but his attitude changed 5-6 seconds down the runway when he felt the deceleration decrease. The airspeed/distance did not seem right to him. The first thing that he did was step on the brakes and he mentioned it to the captain. He was focusing on his PNF duties and did not want to do anything wrong. He made sure that the speed brake was up.

His eyes went to the captain's right hand during the landing and he thought that the captain's hand was resting on the thrust levers with his fingers curled around the thrust reversers.

He went for the thrust reversers rather than calling them out to the captain because he could do it faster himself. He quickly knocked the captain's hand out of the way and the captain's hand moved quickly and easily. The thrust reverser handles were fully down, stowed and symmetrical. The thrust reverser handles did not release from the fully stowed position and were stuck in the intermediate position. He tried to pull the levers three to four times until he could get them into the interlock position and there was also a delay there. He couldn't remember if the thrust reverse levers stopped in the reverse position. It seemed like a long time to him. He has had the thrust reverser levers stick once in a while where they don't come out of the stowed position. He thought that it might be a '700ism' similar to electrical gremlins in other airplanes that he flew. Neither thrust reverser lever would move from the stowed position. They seemed to be symmetrical. He felt that he was in full/emergency thrust and would have pulled the levers off if he could.

There were no lateral deviations during landing and the aircraft tracked perfectly straight all the way down the runway. He was standing on the brakes as hard as he could with his hand on the overhead handle and his left hand on the thrust reversers. He tried to hit the PA button to say "Brace" but he was on COM 1. He did not adjust his seat during the landing but he did hold the overhead handle.

He can't recall who stowed the thrust reverser handles or speed brakes after stopping, although he knows that the speed brakes were down. He remembers the captain shutting down the engines.

He had been shown several RBFs since the accident. He remembered two RBF letters regarding autobrakes. The second letter, dated December 8, was not in book when he started his trip. He didn't know about second one at that time.

He believed that the runway remaining numbers in the OPC were exact and not approximate. He would not have landed the night of the accident if he had known that reverse thrust was part of the landing calculations. He entered both FAIR and POOR

conditions into the OPC and interpolated the stopping margin. He added 560 and 30, then divided by 2 and arrived at approximately 300 feet. He didn't use the numbers for just FAIR braking action but went between the two. He reasoned that a touch down prior to 1500 feet would help them make the 500-foot minimum-stopping margin. There was no SWA procedure that requires interpolation of landing distance. He may have done that in his previous career.

The captain was not aware that he (FO) interpolated landing distances, as he did not verbalize this to him. He was not aware what reasoning the captain used.

He did not interpolate the winds. The last winds reported was 090/9, which is a 5 knots tailwind. The ATIS tailwind was 8 knots, which is what he entered in the OPC.

The last braking action was not POOR; it was FAIR to POOR. The crew briefed that they could not land with POOR braking action.

He had read about the 500' stopping margin in the autobrake training pamphlet. He was happy with it because the company was happy with it. He wouldn't land with a 30 foot stopping margin and personally wanted 500 feet.

**Name:** Tom Stachiw, Previous SWA POI  
**Represented by:** Tony James, FAA, AIA-100  
**Time/Date:** 1300, February 9, 2006  
**Location:** NTSB Headquarters  
**Present:** Kirchgessner, Lemos, Perkins, Ratley, Laurenzano, Timms

During the interview Mr. Stachiw stated the following:

He had been the SWA POI for four years give or take a month. The FAA hired him in 1998 into the SLC FSDO as a Geographic inspector. In 2000 he transferred to the SWA certificate in Dallas. He served a couple of POI jobs for other carriers in the FSDO and then took over the POI job at SWA. He doesn't know why the former POI left and went to CSET. He had previous FAR 121 experience as a captain in the 727 for Eastern and Kitty Hawk as well as a captain and checkairman for Air South.

He found that the relationship with SWA was good when he took over the SWA certificate. This occurred after SWA had experienced an accident in BUR and SWA was compliant and open to suggestions. Changes to normal operations and the checklist were a joint effort with the FAA. FDAP and ASAP showed that there were not many problems at SWA but when there were, SWA was more than willing and anxious to solve them.

Flight training was one of the lowest weighted items in ATOS when he was the POI. The training product was good, everyone came with a type rating, and they were getting

experienced people who were familiar with the airplane. Standardization at SWA was as good as, if not better than any other FAR 121 carrier.

There were items that he had concerns with during his tenure, such as currency issues with the HUD. He made a case with supporting data and SWA was agreeable to the changes. There were no glaring issues unresolved and no glaring safety issues.

He left the SWA POI position for personal reasons and would like to be back in Texas. The Delta POI position opened up because there was a lot of movement and expansion in the certificate management office when they split off Comair and ASA.

He has not spoken to the new SWA POI. The APM and Assistant POI are the same people who he worked with at SWA and he felt that they could bring the new POI up to speed because they had a lot of corporate knowledge and experience.

SWA was just beginning the development for the use of autobrakes when he left. SWA didn't do single engine taxiing when he was there and he was not familiar with changes to the deice procedures.

He cannot recall any major program changes at SWA. There was additional emphasis on FMC usage and everyone came back for a day of training.

The OPC was already a part of the SWA operation when he became POI. There were two guidance documents that prompted him to look at the OPC. There was an HBAI in 2002 that talked about placing emphasis on landing distance remaining due to a FedEx accident in EWR and SWA placed special emphasis on the OPC in recurrent that year. There was another, possibly in 2003, when there was guidance about electronic flight bags. He called AEG to validate the SWA OPC data for accuracy and the outcome was satisfactory as the information provided was valid.

He was not familiar with the reverse thrust credit as pertained to contaminated runway when acting as the SWA POI. Every one of the contaminated runway charts that he sampled at Delta requires full use of reverse thrust.

He had not gone through Delta simulator training program. He did confirm that DAL crews were aware of the landing distance charts and that they were available. He did not believe that there was the option of using a different chart. The assumptions on the charts are full manual braking and reverse thrust. They charts are in a Delta format but he imagines that they are sourced from Boeing. The notation on the chart is full reverse thrust and not specifically #2 detent.

He required SWA to perform additional OPC training because there was an action item regarding the 2002 FedEx accident, which he assigned to the APM. They did an evaluation of the training program and found that data was being interpreted correctly. He remembered taking action on that notice and followed through with whatever was required but he can't remember for sure.

He did not know whether the thrust reverser credit was included in SWA OPC calculations.

He monitored the pass/fail rate of SWA pilot checks. He received notification of any check failures and passed them on to the APM who decided if more follow up was required. The failure rate was cyclical and there was not any one particular quarter or month that was outstanding. He can't guess actual rate but it was not too high or low enough to alarm him.

**Interview:** Donald Stephen Tilden, Manager Flight Operations Publications  
**Accompanied by:** Declined  
**Time/Date:** 0830. January 26, 2006  
**Location:** Southwest Airlines Training Center, Dallas, TX  
**Present:** Kirchgessner, Lemos, Perkins, Timms, Ratley, James

During the interview, Mr. Tilden stated the following:

His date of hire at Southwest Airlines was June 19, 2003. He was hired into his current position of Manager Flight Operations Publications.

He worked for Champion Air as a contractor and previous to that he worked for Northwest Airlines as a technical writer. He is a private pilot with instrument and ground instructor ratings, although he has not maintained currency. He reports to John Miller (Director of Standards and Publications). They have daily, and sometimes hourly, contact since their offices are next to each other. He works side by side with Mike Clemovitz, Director of Flight Standards.

A publication specialist and a technical writer both report to him. His responsibility is getting manuals to print. In doing so, he submits specific requests to the SWA POI, Bobby Hedlund. Bobby is a little more formal than the previous POI, but is very good. He feels as if he has a good working relationship with the FAA, and that, in general, SWA does also. This is a different relationship than that which he experienced when working for Champion Air, who had more of an adversarial relationship with the FAA than SWA. He's had to relearn the relationship with the FAA in this position.

NWA has multiple aircraft types and many different aircraft manuals. He felt that the SWA manuals were organized when he started working here. Upon starting this position, he had to learn the FOM, because everything from uniforms to company procedures approaches is in there. The FRM still needs a lot of work. He standardizes the manuals and checks them for consistency.

He was involved in the development of the autobrakes operational procedures, in that he made sure the surveys were compiled and put together in the checkairman autobrake

packages. His department gets documents in draft form and he suggests language changes to make the writing as precise as he can. He then puts the documents in Frame Maker and generates draft documents for review. In the case of autobrakes he was supporting Mike Clemovitz. Changing the wording is a collaborative process.

For the decision regarding whether to implement changes for pilots in groups of changes or individually, they usually consult with Dr. Barsi (NASA Ames). Specifically for the autobrakes procedures, Dr. Barsi suggested that it was better to come out with significant changes at once (in a group) rather than a single new procedure all the time. He felt as if this would be a better way to present these types of changes to pilots (autobrakes with the de-icing and single-engine taxi changes). The de-ice cards get changed every year so they were coming anyway.

They rolled out a new de-ice card last fall. The last big major change was the April 2004 SNORT changes. The SNORT group decided the concepts that they wanted. Between June 2003-April 2004 he was busy with SNORT.

The autobrake and other changes had been talked about frequently and people (pilots) were aware that it was coming.

He sometimes receives direct feedback via email from pilots regarding wording or consistency issues in the manual. The feedback was mostly positive about the autobrakes procedures implementation.

He did not hear why SWA determined the 500-foot stopping margin for autobrake usage.

He ensures manual consistency by doing a search for keywords. He also reads the manuals since a keyword search would not adequately ensure consistency.