Aviation Investigation Final Report

Location:	Charlotte, North Carolina	**Incident Number:**	DCA10IA015
Date & Time:	December 13, 2009, 22:46 Local	**Registration:**	N483A
Aircraft:	Boeing MD	**Aircraft Damage:**	Minor
Defining Event:	Dragged wing/rotor/float/other	**Injuries:**	115 None
Flight Conducted Under:	Part 121: Air carrier - Scheduled		

Analysis

Both pilots indicated that they had set up the navigation systems and briefed to fly an ILS Category III instrument approach to an autoland to runway 36C. The captain stated that,"sometime below 300 feet," he disconnected the autopilot and took manual control of the airplane, noting that the airplane was slightly right of the centerline of the runway with the nose pointed to the left and the airplane was drifting toward the left. As the captain maneuvered to correct the airplane's track, the bank angle aural alert sounded three times, once as the airplane descended below about 300 feet AGL, again at an altitude of about 200 feet AGL, and the last time at about 30-32 feet AGL. During the landing, the right wing tip, right slat and a landing light were damaged.

The operator's Flight Manual states, in part, that autolands may be conducted to CAT I / II / III designated runways provided that the procedure does not have a chart note or NOTAM which renders the localizer unusable inside the runways threshold. The 11-5A Jeppesen approach chart for the ILS 36C approach had a note listed on the chart face that stated: IDQG LOC 36C unusable for rollout guidance.

Relevant sections of the operator's Operating Manual stated that all Category III approaches are to be flown by the autopilot and to an autoland. In interviews with the MD80 Fleet Training Manager, the MD80 Fleet captain, and an MD80 APD (Aircrew Program Designee), each stated that the operator trains its MD80 crews to autoland all Category III approaches, rather than manually flying the airplane during the final descent to the runway.

According to the operator's DC-9 Operating Manual, the following conditions would require a go around from a Category III Approach:

1. Below 300 feet (RA), if satisfactory tracking performance was not maintained.

2. Failure of required airplane or ground equipment prior to DH (Cat II) or prior to touchdown (Cat III).

FAA Advisory Circular (AC)120-71A "Standard Operating Procedures for Flight Deck Crewmembers" Appendix 2, states in part:

An approach is stabilized when all of the following criteria are maintained from 1000 feet height above touchdown (HAT), or 500 feet HAT in VMC, to landing in the touchdown zone:

1. The airplane is on the correct track.

2. After glide path intercept, or after the FAF, or after the derived fly-off point (per Jeppesen) the pilot flying requires no more than normal bracketing corrections to maintain the correct track and desired profile (3° descent angle, nominal) to landing within the touchdown zone.

A stabilized approach means the airplane must be:

- At Approach Speed (VREF + additives).
- On the proper flight path at the proper sink rate.
- At stabilized (spooled up) thrust.

These requirements must be maintained throughout the rest of the approach for it to be considered a stabilized approach. If the stabilized approach requirements cannot be satisfied by the minimum stabilized approach heights or maintained throughout the rest of the approach, a go-around was required. The FAA Advisory Circular appendix goes on to state in part that normal bracketing corrections relate to bank angle, rate of descent, and power management and recommends ranges for the various parameters, noting that operating limitations in the approved airplane flight manual must be observed, and may be more restrictive. For bank angle the AC recommends a maximum bank angle permissible during approach is specified in the approved operating manual used by the pilot, and is generally not more than 30°; the maximum bank angle permissible during landing may be considerably less than 30°, as specified in that manual.

According to the operator's Flight Manual Supplement,there were six modes of the Ground Proximity Warning System (GPWS)function. Mode 6 provided optional callouts for descent through predefined radio altitudes between 2,500 and 10 feet AGL and excessive roll or bank angle warning. Bank angle warning provided over-banking protection during approach, climb out, and cruise. Additionally, the warning protected against wing or engine strikes during the landing. Further, the operator's DC-9 Operating Manual also stated in part that with the main landing gear compressed, the landing light will strike the runway at approximately eight and one-half degrees of bank, and that excessive bank angles should be avoided at low altitudes.

The operator had a no-fault go-around policy. Pilots were told to execute every approach with the presumption that a missed approach was a successful outcome, and asked to plan each approach through the missed-approach procedure and make the decision to land only when all criteria are safely satisfied. According to the operator's Flight Manual, the captain "should give every consideration to a recommendation by another cockpit crewmember that a missed approach be executed." The American Airlines MD80 Fleet Captain told investigators that the first officer could also call for a go around, and did not have to explain why.

During post-incident interviews, the first officer stated that during the approach, neither pilot mentioned a go around. The captain stated in his interview that he did not consider a go around.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this incident to be: The Captain's failure to initiate a go-around from a Category III approach when satisfactory tracking performance was not maintained below the required altitude resulting in excessive bank angle maneuvers at low altitude.

Factors contributing to the incident were: The Captain's decision to execute a Category III autoland approach on a runway without rollout guidance contrary to company Flight Manual guidance, the Captain's decision to deviate from the Category III approach and continue it manually contrary to the company Operating Manual, and the First Officer's failure to call for a go-around when the approach became unstable.

Findings

Personnel issues	Incorrect action selection - Pilot
Environmental issues	Low ceiling - Effect on operation

Factual Information

History of Flight

Landing-flare/touchdown	Dragged wing/rotor/float/other (Defining event)

HISTORY OF FLIGHT

On December 13, at 2246 Eastern Standard Time, a Boeing MD-82, N483A, scraped its right wingtip while landing on runway 36 Center at Charlotte Douglas International Airport (CLT), Charlotte, NC. The flight was registered to and operated by American Airlines under the provisions of 14 Code of Federal Regulations Part 121 as a passenger flight. Instrument flight rules (IFR) conditions prevailed for the flight, which operated on an instrument flight rules flight plan. The flight originated at Dallas-Fort Worth International Airport (DFW), Texas at 2035 Eastern Standard Time.

The DFW to CLT leg was flown by the first officer. There were no mechanical issues listed in the logbook of the airplane. The captain reviewed the CLT weather and briefed the first officer on the likelihood of flying a Category III (Cat III)approach upon arrival into CLT.

Departure from DFW was normal, and both pilots ate while discussing the weather in CLT and the fact that the captain would likely be required to conduct the approach based upon American Airlines' policy. American Airlines requires the captain to conduct all Cat III approaches, and when the weather is below 4000' runway visual range or 3/4 mile visibility. At 2130 EST the dispatcher sent flight 1402 the weather and Notices to Airmen. The CLT surface weather observation valid for the arrival time of the flight called for calm winds, visibility of 1/8 statute mile, a 100 foot ceiling, a temperature and dew point of 7 degrees Celsuus, and a barometric pressure of 30.08 inches of mercury. and a deq point of

The crew continued to check the CLT weather, and the captain decided to brief the Cat III approaches to both runway 36R and 36C. The captain said he chose the Cat III approach briefing as a "worst case scenario". According to the first officer, they conducted these briefings referencing several manuals, and completed the briefing several hundred miles from CLT. The first officer also told investigators that the captain briefed him that he expected them to visually pick up the airport early, and he would disconnect the autopilot and land visually.

The captain stated that the last time he had performed a CAT III approach was 9 months previously in the simulator, and had not performed a Cat III approach during line operations in "10-12 years" and "he was a little concerned about it." The first officer stated that he had not flown a Cat III approach in line operations in the last "14-15 years".

Following the briefing, the first officer conducted the descent into CLT. Some time past the SHINE intersection on the arrival to CLT, the flight crew switched pilot flying (PF) duties from the first officer to the captain by switching autopilot and autothrottle controls to the captain. The first officer became the pilot monitoring (PM)and remained so for the rest of the flight.

When the airplane was established on final approach, the first officer said he checked for stable approach criteria and handled ATC communications. He said that ATC was busy launching airplanes and there was a lot of talking on the radio. The captain stated he believed the tower controller was clearing another airplane for takeoff while his flight was inside the outer marker, was concerned about it, but did not query ATC. The last reported visibility received by the flight crew was for an RVR of 1400' for runway 36C. There was no turbulence along the approach, and the crew stated the ride was "smooth" and normal.

The airplane was fully configured prior to arriving at the outer marker with the gear down, speedbrakes armed, and the airspeed about 170 knots. They slowed to approach speed after the outer marker. At about 1000 to 1500 feet on the approach, the first officer noticed a "momentary vibration" of the localizer needle, but there was no movement of the flight controls and no annunciator warnings, and he did not mention the needle movement to the captain. The captain saw the localizer "twitching" just before receiving a landing clearance from the tower at about 600 feet, but it was within limits according to the captain.

As the airplane descended through 300 feet above the ground, the captain began to acquire the runway environment visually, and noticed that the airplane was slightly right of the centerline of the runway with the nose pointed to the left and the airplane drifting toward the left. The captain disconnected the autopilot at that time and began flying the airplane manually. The bank angle aural alert responded as the airplane was being hand flown by the captain. The first officer looked inside the airplane to verify their altitude at about 200 feet, then looked out and noticed the airplane was then left of centerline and maneuvering with "a good amount of bank" to the right. The bank angle aural alert sounded again at about "30-32 feet" while the airplane was in a right correction back to the centerline. The airplane touched down approximately 1000 to 1500 feet down the runway to the left of centerline with the right wing tip coming into contact with the runway surface, and the left main wheels touching down in the grass adjacent to the runway.

At gate arrival, the captain entered "no items" in the maintenance logbook while the first officer began a post flight walk-around of the airplane. During his exterior inspection of the airplane, the first officer noticed minor damage to the right wing tip, right slat and a landing light. He returned to the cockpit and advised the captain. The captain made a logbook entry reflecting the "right wingtip touch" on landing. Neither pilot advised ATC of the incident.

FLIGHT CREW INFORMATION

The captain and first officer had flown together numerous times prior to this pairing. The incident flight was the fourth flight of the day, and occurred on the first day of a four day trip

paring.

Both pilots had the proper flying and medical ratings for the incident flight. And, both pilots had successfully completed their last training and proficiency checks. A review of the Accident/Incident Data System and Enforcement Information System revealed no prior accident, incident or enforcement actions for either pilot. On December 14, 2009, the day after the incident, the flight crew was administered a drug and alcohol screening by an American Airlines contract laboratory. According to American Airline's Manager of Flight Safety, both test results for both pilots were negative.

The captain's flight times are as follows:

Total pilot flying time	15,793 hours
Total flying time last 24 hours	7 hours
Total flying time last 30 days	73 hours
Total flying time last 90 days	159 hours

The first officer's flight times are as follows:

Total pilot flying time	11,251 hours
Total flying time last 24 hours	7 hours
Total flying time last 30 days	52 hours
Total flying time last 90 days	188 hours

AIRCRAFT INFORMATION

According to post-incident interviews with investigators, neither pilot observed a failure in the autoflight computer system, the yaw damper system, the pitch control system or the flight director system at the time of the incident. The first officer stated that he successfully performed a Cat III autoland ground test on both sides of the DFGS prior to their departure from DFW to CLT.

Regarding the instrument landing system (ILS) ground transmitters, the CLT Tower Facility log revealed that between the hours of 2100 EST and 2400 EST on December 13, 2009, there were 21 arrivals to runway 36C at CLT. Entries into the log showed no PIREPs (Pilot Reports) or notations indicating anomalies with the ILS for runway 36C at CLT.

Copies of the FAA Technical Performance Records (FAA Form 8750-24 "LOC-Normal Radiated Parameters" and FAA Form 8750-23 "LOC-Normal Ground Check") covering the dates July 21, 2009 to December 18, 2009 for the CLT Runway 36C showed no abnormalities in the signal for the ILS 36C.

A search of the ASRS database covering reports for the CLT airport using "CLT", "CLT.AIPORT", "CLT.TOWER", "CLT.TRACON', and "ILS 36C" as search field criteria yielded no safety reports

submitted from January 2005 to February 2010 concerning the ILS 36C at CLT.

ORGANIZATIONAL AND MANAGEMENT INFORMATION

During his post-incident interview, the captain stated that he disconnected the autopilot "sometime below 300 feet," and manually flew the airplane to landing.

American Airlines Airplane Operating Manual, Volume 1, page 40.1, stated that all Cat III approaches are to be flown by the autopilot and to an autoland. In interviews with the MD80 Fleet Training Manager, the MD80 Fleet captain, and an MD80 APD (Aircrew Program Designee), each stated that American Airlines trains its MD80 crews to autoland all Cat III approaches, rather than manually flying the airplane during the final descent to the runway.

Cat III Autoland Restrictions

American Airlines Flight Manual Part 1, Section 10, page 31, 7.1, "Use of Autoland" states, in part that autolands may be conducted to CAT I / II / III designated runways provided that the procedure does not have a chart note or NOTAM which renders the localizer unusable inside the runways threshold. The 11-5A Jeppesen approach chart for the ILS 36C approach to CLT had a note listed on the chart face that stated: IDQG LOC 36C unusable for rollout guidance.

The captain stated in his interview with investigators that he briefed a Cat III approach to both runways 36C and 36R at CLT. Title 14 Code of Federal Regulations (CFR) Part 121.603(a) states, in part that before beginning a flight, each pilot in command shall obtain all available current reports or information on airport conditions and irregularities of navigation facilities that may affect the safety of the flight. After the incident, on December 17, 2009, American Airlines issued an F473 message to append all flight plans and flight releases sent to all MD-80, Boeing 757, 767 and 777 aircraft with the following message statement (in part):

Subject: FM Part II Caution Re: Localizer Rollout Guidance Notes
AA Aircraft are not authorized to autoland on a runway where the following note is published in the notes section, as a ball note, or anywhere else on the approach chart: Localizer unusable for rollout guidance. AA Aircraft authorized to perform Cat II manual landing are also authorized to conduct Cat II manual landings on runways whose approach charts contain the reference note, provided that all FM-1 and airplane Vol. 1 operating manual requirements are satisfied.

Practice Autolandings and Cat III Practice Approaches

American Airlines Flight Manual Part 1, Section 10, page 31, 7.1 "Use of Autoland or 737 CAT III HUD" states in part:

A. Captains qualified on airplane types having autoland or CAT III HUD capability should make every effort to execute at least one such landing each month in the course of line

operations in order to maintain familiarity and confidence with the system. These autolandings or HUD approaches should be made after considering factors including scheduled arrival time, traffic, etc. When conducting an autoland (including VMC) all CAT III crew coordination procedures must be followed to ensure all tracking and monitoring requirements are satisfied.

The captain stated in his post-incident interview that "he hadn't flown an autoland in 10-12 years, or one in the sim [simulator] in 9 months," and further added that "he didn't feel comfortable with it". The first officer stated in his interview that, while crews would see a Cat II and Cat III in recurrent simulator training "every 9 months", he personally had not flown a Cat II or Cat III approach in line operations in "14-15 years". The MD80 Fleet Captain told investigators that they [American Airlines] encouraged crews to do FCCs for their own confidence in the autoland system of the airplane, but there was no requirement to do it. Following this incident, the MD80 Fleet Training Manager sent internal company bulletins to the MD80 crews reminding them to conduct Cat III approaches "to remain current".

Go Around Policy

American Airlines had a no-fault go-around policy. Pilots were told to execute every approach with the presumption that a missed approach was a successful outcome, and asked to plan each approach through the missed-approach procedure and make the decision to land only when all criteria are safely satisfied.

According to the AA Flight Manual, Section 10 "Approaches and Landing," the captain "should give every consideration to a recommendation by another cockpit crewmember that a missed approach be executed." The American Airlines MD80 Fleet Captain told investigators that the first officer could also call for a go around, and did not have to explain why.

During post-incident interviews, the first officer stated that during the approach, neither pilot mentioned a go around. The captain stated in his interview that he did not consider a go around.

Conditions Requiring a Missed Approach

According to the AA DC-9 Operating Manual, Section 40.6 "Approach-Landing-Go-Around", the following conditions would require a go around from a Cat III Approach:

1. Below 300 feet (RA), if satisfactory tracking performance was not maintained.

2. Failure of required airplane or ground equipment prior to DH (Cat II) or prior to touchdown (Cat III).

Approaches and Landings

The MD80 at American Airlines was authorized to conduct approach and landing operations to

Category III minimums. The lowest RVR value authorized for the fail passive autoland system on the MD80 was 600 feet RVR. Cat III approaches could be flown to an altitude of 50 RA. This altitude was considered a decision height (DH) at which the captain (pilot flying on a Cat III approach) would make a decision to allow the airplane to land automatically or go around, based on whether or not he/she had the Touchdown Zone or the Touchdown Zone Lights in sight.

The American Airlines DC-9 Operating Manual, Section 40.6 "Approach - Landing - Go-Around" stated that when the airplane arrived at the decision height (DH), the first officer (Pilot Monitoring) would call out "minimums". The captain callouts would be:

1. If the required visual reference for-a successful landing is satisfied:
Call out - "Landing"

2. If the required visual reference for a successful landing is not satisfied or subsequently lost:

Call out - "Go-around" and execute missed approach.

American Airlines DC-9 Operating Manual, Section 20.1 regarding standard callouts stated that the pilot flying would make the following callouts:

"Landing" or "Go Around" at DA, MDA, or DH as appropriate on instrument approaches.

During the incident, the first officer did not make the required "minimums" callout, and the captain did not make a "landing" or "go around" callout.

Stable Approaches Criteria

FAA Advisory Circular AC 120-71A "Standard Operating Procedures for Flight Deck Crewmembers" Appendix 2, states in part:

An approach is stabilized when all of the following criteria are maintained from 1000 feet height above touchdown (HAT), or 500 feet HAT in VMC, to landing in the touchdown zone:

1. The airplane is on the correct track.
2. After glide path intercept, or after the FAF, or after the derived fly-off point (per Jeppesen) the pilot flying requires no more than normal bracketing corrections to maintain the correct track and desired profile (3° descent angle, nominal) to landing within the touchdown zone.

A stabilized approach means the airplane must be:

- At Approach Speed (VREF + additives).
- On the proper flight path at the proper sink rate.
- At stabilized (spooled up) thrust.

These requirements must be maintained throughout the rest of the approach for it to be considered a stabilized approach. If the stabilized approach requirements cannot be satisfied by the minimum stabilized approach heights or maintained throughout the rest of the approach, a go-around was required.

The FAA Advisory Circular appendix goes on to state in part:

Normal bracketing corrections relate to bank angle, rate of descent, and power management. Recommended ranges are as follows (operating limitations in the approved airplane flight manual must be observed, and may be more restrictive):

Bank angle: Maximum bank angle permissible during approach is specified in the approved operating manual used by the pilot, and is generally not more than 30°; the maximum bank angle permissible during landing may be considerably less than 30°, as specified in that manual.

Excessive Bank Angles

According to the American Airlines Flight Manual Supplement, Section VII.1, there were six modes of the Ground Proximity Warning function (GPWS). Mode 6 provided optional callouts for descent through predefined radio altitudes between 2,500 and 10 feet AGL and excessive roll or bank angle warning. Bank angle warning provided over-banking protection during approach, climb out, and cruise. Additionally, the warning protected against wing or engine strikes during the landing.

American Airlines DC-9 Operating Manual, Section 55.5 "Approach-Landing-Go-Around" stated in part:

With the main landing gear compressed the landing light will strike the runway at approximately eight and one-half degrees of bank. Excessive bank angles should be avoided at low altitudes.

Information

Certificate:	**Age:**
Airplane Rating(s):	**Seat Occupied:**
Other Aircraft Rating(s):	**Restraint Used:**
Instrument Rating(s):	**Second Pilot Present:**
Instructor Rating(s):	**Toxicology Performed:**
Medical Certification:	**Last FAA Medical Exam:**
Occupational Pilot:	**Last Flight Review or Equivalent:**
Flight Time:	

Aircraft and Owner/Operator Information

Aircraft Make:	Boeing	**Registration:**	N483A
Model/Series:	MD 82	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Transport	**Serial Number:**	
Landing Gear Type:	Tricycle	**Seats:**	
Date/Type of Last Inspection:		**Certified Max Gross Wt.:**	
Time Since Last Inspection:		**Engines:**	2
Airframe Total Time:		**Engine Manufacturer:**	
ELT:	Installed, not activated	**Engine Model/Series:**	
Registered Owner:	American Airlines	**Rated Power:**	
Operator:	American Airlines	**Operating Certificate(s) Held:**	Flag carrier (121)
Operator Does Business As:		**Operator Designator Code:**	AALA

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument (IMC)	**Condition of Light:**	Night
Observation Facility, Elevation:		**Distance from Accident Site:**	
Observation Time:		**Direction from Accident Site:**	
Lowest Cloud Condition:		**Visibility**	
Lowest Ceiling:	Overcast / 300 ft AGL	**Visibility (RVR):**	1400 ft
Wind Speed/Gusts:	/	**Turbulence Type Forecast/Actual:**	/
Wind Direction:		**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:		**Temperature/Dew Point:**	
Precipitation and Obscuration:			
Departure Point:	Fort Worth, TX (DFW)	**Type of Flight Plan Filed:**	IFR
Destination:	Charlotte, NC (CLT)	**Type of Clearance:**	IFR
Departure Time:	20:35 Local	**Type of Airspace:**	

Airport Information

Airport:	Charlotte Douglas Intl CLT	**Runway Surface Type:**	Asphalt
Airport Elevation:	748 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	36C	**IFR Approach:**	ILS
Runway Length/Width:	10000 ft / 300 ft	**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	5 None	**Aircraft Damage:**	Minor
Passenger Injuries:	110 None	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	115 None	**Latitude, Longitude:**	35.363887,-80.943054

Administrative Information

Investigator In Charge (IIC):	Benzon, Robert
Additional Participating Persons:	Victoria E Anderson; Federal Aviation Administration; Washington, DC
Original Publish Date:	June 27, 2011
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=75163