



Newark, New Jersey

Washington, DC

Buffalo, New York

DEMANDING AN END TO DÉJÀ VU DISASTERS



PARTICIPANTS:

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Recommendations & Accomplishments

MOST WANTED Transportation Safety Improvements Aviation Issue Areas

Legend:

-  = Unacceptable response
-  = Acceptable response, progressing slowly
-  = Acceptable response, progressing in a timely manner
-  = Being assessed, classification code to be assigned soon


 <i>Unacceptable response</i>	<p><u>Reduce Dangers to Aircraft Flying in Icing Conditions</u></p> <p>Action Needed by The Federal Aviation Administration</p>	<p>Use current research on freezing rain and large water droplets to revise the way aircraft are designed and approved for flight in icing conditions.</p> <p>Apply revised icing requirements to currently certificated aircraft.</p> <p>Require that airplanes with pneumatic deice boots activate boots as soon as the airplane enters icing conditions.</p>
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Recommendations & Accomplishments

Source: http://www.nts.gov/Recs/mostwanted/aviation_issues.htm

MOST WANTED Transportation Safety Improvements Aviation Issue Areas




 <i>Unacceptable response</i>	<u>Improve Runway Safety</u> Action Needed by The Federal Aviation Administration	<p>Give immediate warnings of probable collisions/incursions directly to flight crews in the cockpit.</p> <p>Require specific air traffic control clearance for each runway crossing.</p> <p>Install cockpit moving map displays or automatic systems to alert pilots of attempted takeoffs from taxiways or wrong runways.</p> <p>Require landing distance assessment with an adequate safety margin for every landing.</p>
 <i>Unacceptable response</i>	<u>Require Image Recorders</u> Action Needed by The Federal Aviation Administration	<p>Install crash-protected image recorders in cockpits to give investigators more information to solve complex accidents.</p>



Recommendations & Accomplishments

Source: http://www.nts.gov/Recs/mostwanted/aviation_issues.htm

MOST WANTED Transportation Safety Improvements Aviation Issue Areas

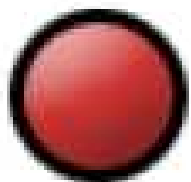
 <i>Unacceptable response</i>	<p><u>Reduce Accidents and Incidents Caused by Human Fatigue</u> Action Needed by The Federal Aviation Administration</p>	<p>Set working hour limits for flight crews, aviation mechanics, and air traffic controllers based on fatigue research, circadian rhythms, and sleep and rest requirements.</p> <p>Develop a fatigue awareness and countermeasures program for air traffic controllers.</p>
 <i>Unacceptable response</i>	<p><u>Improve Crew Resource Management</u> Action Needed by The Federal Aviation Administration</p>	<p>Require commuter and on-demand air taxi flight crews to receive crew resource management training.</p>
 <i>Unacceptable response</i>	<p><u>Improve Safety of Emergency Medical Services Flights</u> Action Needed by The Federal Aviation Administration</p>	<p>Conduct all flights with medical personnel on board in accordance with commuter aircraft regulations.</p> <p>Develop and implement flight risk evaluation programs.</p> <p>Require formalized dispatch and flight-following procedures including up-to-date weather information.</p> <p>Install terrain awareness and warning systems on aircraft.</p>



Recommendations & Accomplishments

Source: http://www.nts.gov/Recs/mostwanted/aviation_issues.htm

MOST WANTED Transportation Safety Improvements **Aviation Issue Areas**



*Unacceptable
response*

Reduce Dangers to Aircraft Flying in Icing Conditions

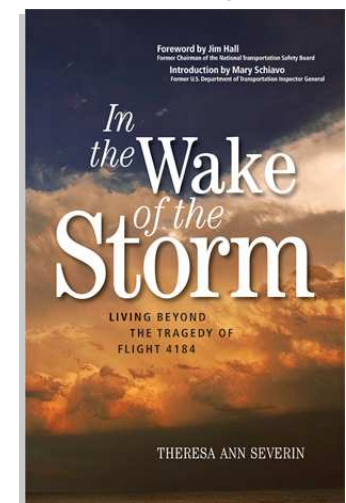
**Action Needed by The Federal
Aviation Administration**

Case Study: American Eagle

American Eagle Flight 4184
Avions de Transport Regional ATR-72
Roselawn, Indiana
October 31, 1994
Injuries: 68 Fatal.



"The National Transportation Safety Board determines the probable cause(s) of this accident as follows:
...Contributing to the accident were: 1) the French Directorate General for Civil Aviation's (DGAC's) inadequate oversight of the ATR 42 and 72, and its failure to take the necessary corrective action to ensure continued airworthiness in icing conditions; and 2) the DGAC's failure to provide the FAA with timely airworthiness information developed from previous ATR incidents and accidents in icing conditions,3) **the Federal Aviation Administration's (FAA's) failure to ensure that aircraft icing certification requirements, operational requirements for flight into icing conditions, and FAA published aircraft icing information adequately accounted for the hazards that can result from flight in freezing rain, 4) the FAA's inadequate oversight of the ATR 42 and 72 to ensure continued airworthiness in icing conditions;** and 5) ATR's inadequate response to the continued occurrence of ATR 42 icing/roll upsets which, in conjunction with information learned about aileron control difficulties during the certification and development of the ATR 42 and 72, should have prompted additional research, and the creation of updated airplane flight manuals, flightcrew operating manuals and training programs related to operation of the ATR 42 and 72 in such icing conditions."





Recommendations & Accomplishments

Safety Recommendations

A-96-54 (FAA)

Issued August 15, 1996

Added to the Most Wanted List: 1997

Status: Open—Unacceptable Response

Revise the icing criteria published in 14 [Code of Federal Regulations] CFR Parts 23 and 25, in light of both recent research into aircraft ice accretion under varying conditions of liquid water content, drop size distribution, and temperature, and recent developments in both the design and use of aircraft. Also, expand the Appendix C icing certification envelope to include freezing drizzle/freezing rain and mixed water/ice crystal conditions, as necessary. (Source: *In-flight Icing Encounter and Loss of Control Simmons Airlines, d.b.a. American Eagle Flight 4184 Avions de Transport Regional (ATR) Model 72-212, N401AM, Roselawn, Indiana, October 31, 1994* [NTSB/AAR-96-01]).

Issued August 15, 1996
Status: Open—
Unacceptable Response

A-96-56 (FAA)

Issued August 15, 1996

Added to the Most Wanted List: 1997

Status: Open—Unacceptable Response

Revise the icing certification testing regulation to ensure that airplanes are properly tested for all conditions in which they are authorized to operate, or are otherwise shown to be capable of safe flight into such conditions. If safe operations cannot be demonstrated by the manufacturer, operational limitations should be imposed to prohibit flight in such conditions and flight crews should be provided with the means to positively determine when they are in icing conditions that exceed the limits for aircraft certification. (Source: *In-flight Icing Encounter and Loss of Control Simmons Airlines, d.b.a. American Eagle Flight 4184 Avions de Transport Regional (ATR) Model 72-212, N401AM, Roselawn, Indiana October 31, 1994*. [NTSB/AAR-96-01])

Issued August 15, 1996
Status: Open—
Unacceptable Response

A-07-14 (FAA)

Issued February 27, 2007

Added to the Most Wanted List: 2008

Status: Open—Unacceptable Response

Require manufacturers and operators of pneumatic deice boot-equipped airplanes to revise the guidance contained in their manuals and training programs to emphasize that leading edge deice boots should be activated as soon as the airplane enters icing conditions. (Source: *Crash During Approach to Landing, Circuit City Stores, Inc., Cessna Citation 560, N500AT, Pueblo, Colorado, February 16, 2005*. [NTSB/AAR-07-02])

Issued February 27, 2007
Status: Open—
Unacceptable Response

A-07-16 (FAA)

Issued February 27, 2007 (Superseded A-98-100)

Added to the Most Wanted List: 2007

Status: Open—Unacceptable Response

When the revised icing certification standards and criteria are complete, review the icing certification of pneumatic deice boot-equipped airplanes that are currently certificated for operation in icing conditions and perform additional testing and take action as required to ensure that these airplanes fulfill the requirements of the revised icing certification standards. (Source: *Crash During Approach to Landing, Circuit City Stores, Inc., Cessna Citation 560, N500AT, Pueblo, Colorado, February 16, 2005*. [NTSB/AAR-07-02])

Issued February 27, 2007
Status: Open—
Unacceptable Response



Unacceptable
response

**Reduce Dangers to
Aircraft Flying in Icing
Conditions**

**Action Needed by The Federal
Aviation Administration**

Case Study: Comair

Comair Flight 3272
Embraer EMB-120RT
Monroe, MI
January 9, 1997
Injuries: 29 Fatal

"The National Transportation Safety Board determines the probable cause(s) of this accident as follows:

The Federal Aviation Administration's (FAA) failure to establish adequate aircraft certification standards for flight in icing conditions, the FAA's failure to ensure that at Centro Tecnico Aeroespacial/FAA-approved procedure for the accident airplane's deice system operation was implemented by U.S.-based air carriers, and the FAA's failure to require the establishment of adequate minimum airspeeds for icing conditions, which led to the loss of control when the airplane accumulated a thin, rough, accretion of ice on its lifting surfaces...."



Case Study: Ebersol Crash

Global Air Flight 73

Canadair, Ltd., CL-600-2A12

Montrose, CO

November 28, 2004

Injuries: 3 Fatal, 3 Serious



Case Study: Teterboro

Platinum Jet Management, On Demand
Bombardier Challenger CL-600-1A11
Teterboro, NJ
February 2, 2005
Injuries: 2 Serious, 9 Minor



"The National Transportation Safety Board determines the probable cause(s) of this accident as follows: the pilots' failure to ensure the airplane was loaded within weight and balance limits and their attempt to takeoff with the center of gravity well forward of the forward takeoff limit, which prevented the airplane from rotating at the intended rotation speed.

Contributing to the accident were: 1) **PJM's conduct of flights (using PJM pilots and airplanes) without a Part 135 certificate from the Federal Aviation Administration**; 2) **the pilots' failure to ensure the airplane was loaded within weight and balance limits in accordance with the FAA's requirements**; 3) **the failure of the FAA's Flight Standards District Office to provide adequate surveillance and oversight of operations conducted under Darby's Part 135 certificate; and 4) the FAA's tacit approval of arrangements such as that between Darby and PJM.**



Case Study: Circuit City

Martin Air, Inc./Circuit City Stores, Inc.

Cessna Citation 560

Pueblo, CO

February 16, 2005

Injuries: 8 Fatal

"The National Transportation Safety Board determines the probable cause(s) of this accident as follows: the flight crew's failure to effectively monitor and maintain airspeed and comply with procedures for deice boot activation on the approach, which caused an aerodynamic stall from which they did not recover. **Contributing to the accident was the Federal Aviation Administration's failure to establish adequate certification requirements for flight into icing conditions, which led to the inadequate stall warning margin provided by the airplane's stall warning system.**"



Case Study: Colgan

Continental Connection/Colgan Air Flight 3407

Bombardier Q400

Clarence Center, NY

February 12, 2009

Injuries: 50 Fatal



NTSB
SAFETY ALERT
National Transportation Safety Board

★ Activate Leading Edge Deice Boots As Soon as Airplane Enters Icing Conditions

Thin amounts of ice, as little as 1/4 inch, can be deadly

The problem

- As little as 1/4 inch of leading-edge ice can increase the stall speed 25 to 40 knots. The danger is that some 1/4-inch accumulations have minimum impact and pilots become over confident.
- Sudden departure from controlled flight is possible with only 1/4 inch of leading-edge ice accumulation at normal approach speeds.
- For 60 years, pilots have been taught to wait for a prescribed accumulation of leading-edge ice before activating the deice boots because of the believed threat of ice bridging.
- In theory, ice bridging could occur if the expanding boot pushes the ice into a frozen shape around the expanded boot, thus rendering the boot ineffective at removing ice.
- The Safety Board has no known cases where ice bridging has caused an incident or accident, and has investigated numerous incidents and accidents involving a delayed activation of deice boots.
- Ice bridging is extremely rare, if it exists at all.
- Early activation of the deice boots limits the effects of leading-edge ice and improves the operating safety margin.
- Using the autopilot can hide changes in the handling qualities of the airplane that may be a precursor to premature stall or loss of control.
- Many airplanes still require pilots to visually identify ice on the wings and its thickness, which can be difficult to see from the cockpit.
- Many pneumatic deice boot systems only provide a means to manually cycle the system and have no provision for continuous operation.

What should pilots do when they encounter leading edge ice?

- Leading-edge deice boots should be activated as soon as icing is encountered, unless the aircraft flight manual or the pilot's operating handbook specifically directs not to activate them.

2

- If the aircraft flight manual or the pilot's operating handbook specifies to wait for an accumulation of ice before activating the deice boots, maintain extremely careful vigilance of airspeed and any unusual handling qualities.
- While icing conditions exist, continue to manually cycle the deice system unless the system has a provision for continuous operation.
- Turn off or limit the use of the autopilot in order to better "feel" changes in the handling qualities of the airplane.
- Be aware that some aircraft manufacturers maintain that waiting for the accumulation of ice is still the most effective means of shedding ice.

Need more information?

- Visit the NTSB website at <http://www.ntsb.gov> to access the following documents:
 - Accident brief addressing a non-fatal landing accident of a Cessna 500 on March 17, 2007, in Beverly, Massachusetts (NTSB Identification: NY07LA081).
 - Crash During Approach to Landing, Circuit City Stores, Inc., Cessna Citation 560, Pueblo, Colorado, February 16, 2005 (NTSB/AAR-07/02).
 - In-flight Icing Encounter and Uncontrolled Collision with Terrain, Comair Flight 3272, Monroe, Michigan, January 9, 1997 (NTSB/AAR-98/04).
- NTSB's Most Wanted List icing recommendations:
http://www.ntsb.gov/Recs/mostwanted/air_ice.htm
- FAA Advisory Circular 25.1419-1A
- Professional Pilot Magazine: "NTSB advises immediate activation of deice boots on entering icing conditions," December 2008.
http://www.proflightmag.com/archives/2008/Dec08/A2_icing_p1.htm

SA-014
December 2008

**DECEMBER
2008**



Recommendations & Accomplishments

Source: http://www.nts.gov/Recs/mostwanted/aviation_issues.htm

MOST WANTED Transportation Safety Improvements **Aviation Issue Areas**



*Unacceptable
response*

Improve Runway Safety
**Action Needed by The Federal
Aviation Administration**

Case Study: Tenerife Collision

Pan Am Flight 1736/KLM Flight 4805

Boeing 747-121 & Boeing 747-206B

Los Rodeos Airport (now known as Tenerife North Airport)

March 27, 1977

Injuries: 574 Fatal, 34 serious, 36 minor



Case Study: Northwest Collision

Northwest Flight 1482/Northwest Flight 299

McDonnell Douglas DC-9-14 & Boeing 727-251

Romulus, MI (Detroit-Metropolitan Wayne County Airport)

December 3, 1990

Injuries: 8 Fatal, 10 Serious, 26 Minor, 154 Uninjured

"The National Transportation Safety Board determines the probable cause(s) of this accident as follows:

...CONTRIBUTING TO CAUSE OF ACDNT WERE (1) DEFICIENCIES IN ATC SVCS PROVIDED BY DETROIT TWR, INCLUDING FAILURE OF GND CTLR TO TAKE TIMELY ACTN TO ALERT LCL CTLR TO PSBL RWY INCURSION, INADQT VIS OBS, FAILURE TO USE PROGRESSIVE TAXI INSTRNS IN LOW-VIS CONDS, & ISSUANCE OF INAPPROPRIATE & CONFUSING TAXI INSTRNS COMPOUNDED BY INADQ BACKUP SUPERVISION FOR LEVEL OF EXPERIENCE OF STAFF ON DUTY; (2) DEFICIENCIES IN SURFACE MARKINGS, SIGNAGE & LGTG AT ARPT & FAILURE OF FAA SURVEILLANCE TO DETECT OR CORRECT ANY OF THESE DEFICIENCIES; (3) FAILURE OF NORTHWEST AIRLINES TO PROVIDE ADQT COCKPIT RESOURCE MANAGEMENT TRNG TO LINE AIRCREWS. CONTRIBUTING TO FATALITIES WAS INOPERABILITY OF DC-9 INTERNAL TAILCONE RLS MECHANISM. CONTRIBUTING TO NUMBER & SEVERITY OF INJURIES WAS FAILURE OF CREW OF DC-9 TO PROPERLY EXECUTE THE PSGR EVACUATION.





Recommendations & Accomplishments

Safety Recommendations

A-00-66 (FAA)

Issued July 6, 2000

Added to the Most Wanted List: 2001

Status: Open—Unacceptable Response

Require, at all airports with scheduled passenger service, a ground movement safety system that will prevent runway incursions; the system should provide a direct warning capability to flight crews. In addition, demonstrate through computer simulations or other means that the system will, in fact, prevent incursions. (Source: Recommendation letter to the FAA regarding runway incursions, July 6, 2000.)

Issued July 6, 2000
Status: Open—
Unacceptable Response

A-00-67 (FAA)

Issued July 6, 2000

Added to the Most Wanted List: 2007

Status: Open—Unacceptable Response

Amend 14 *Code of Federal Regulations* (CFR) Section 91.129(l) to require that all runway crossings be authorized only by specific air traffic control clearance, and ensure that U.S. pilots, U.S. personnel assigned to move aircraft, and pilots operating under 14 CFR Part 129 receive adequate notification of the change. (Source: Recommendation letter to the FAA regarding runway incursions, July 6, 2000.)

Issued July 6, 2000
Status: Open—
Unacceptable Response

A-00-68 (FAA)

Issued July 6, 2000

Added to the Most Wanted List: 2007

Status: Open—Unacceptable Response

Amend FAA Order 7110.65, "Air Traffic Control," to require that, when aircraft need to cross multiple runways, air traffic controllers issue an explicit crossing instruction for each runway after the previous runway has been crossed. (Source: Recommendation letter to the FAA regarding runway incursions, July 6, 2000.)

Issued July 6, 2000
Status: Open—
Unacceptable Response

A-07-45 (FAA)

Issued August 28, 2007

Added to the Most Wanted List: 2008

Status: Open—Acceptable Response

Require that all 14 *Code of Federal Regulations* Part 91K, 121, and 135 operators install on their aircraft cockpit moving map displays or an automatic system that alerts pilots when a takeoff is attempted on a taxiway or a runway other than the one intended. (Source: *Attempted Takeoff From Wrong Runway Comair Flight 5191 Bombardier CL-600-2B19, N431CA Lexington, Kentucky August 27, 2006*. [NTSB/AAR-07-05])

Issued August 28, 2007
Status: Open—
Unacceptable Response

A-07-57 (FAA) (Urgent)

Issued October 2, 2007 (Superseded A-06-16)

Added to the Most Wanted List: 2007

Status: Open—Unacceptable Response

Immediately require all 14 *Code of Federal Regulations* Part 121, 135, and 91 subpart K operators to conduct arrival landing distance assessments before every landing based on existing performance data, actual conditions, and incorporating a minimum safety margin of 15 percent. (Source: *Runway Overrun and Collision Southwest Airlines Flight 1248 Boeing 737-74H, N471WN Midway Airport Chicago, Illinois, December 8, 2005*. [NTSB/AAR-07-06])

Issued October 2, 2007
Status: Open—
Unacceptable Response



Unacceptable
response

Improve Runway Safety
Action Needed by The Federal
Aviation Administration

Case Study: US Air/Skywest Collision

US Air Flight 1493/Skywest Flight 5569

Boeing 737-300 & Fairchild SA-227-AC

Los Angeles, CA

February 1, 1991

Injuries: 34 Fatal, 13 Serious, 17 Minor, 37 Uninjured

"The National Transportation Safety Board determines the probable cause(s) of this accident as follows: THE FAILURE OF THE LOS ANGELES AIR TRAFFIC FACILITY MANAGEMENT TO IMPLEMENT PROCEDURES THAT PROVIDED REDUNDANCY COMPARABLE TO THE REQUIREMENTS CONTAINED IN THE NATIONAL OPERATIONAL POSITION STANDARDS **AND THE FAILURE OF THE FAA AIR TRAFFIC SERVICE TO PROVIDE ADEQUATE POLICY DIRECTION AND OVERSIGHT TO ITS AIR TRAFFIC CONTROL FACILITY MANAGERS.** THESE FAILURES CREATED AN ENVIRONMENT IN THE LOS ANGELES AIR TRAFFIC CONTROL TOWER THAT ULTIMATELY LED TO THE FAILURE OF THE LOCAL CONTROLLER 2 (LC2) TO MAINTAIN AN AWARENESS OF THE TRAFFIC SITUATION, CULMINATING IN THE INAPPROPRIATE CLEARANCES AND THE SUBSEQUENT COLLISION OF THE USAIR AND SKYWEST AIRCRAFT. **CONTRIBUTING TO THE CAUSE OF THE ACCIDENT WAS THE FAILURE OF THE FAA TO PROVIDE EFFECTIVE QUALITY ASSURANCE OF THE ATC SYSTEM. (NTSB REPORT AAR-91/08)"**



Case Study: Singapore Airlines

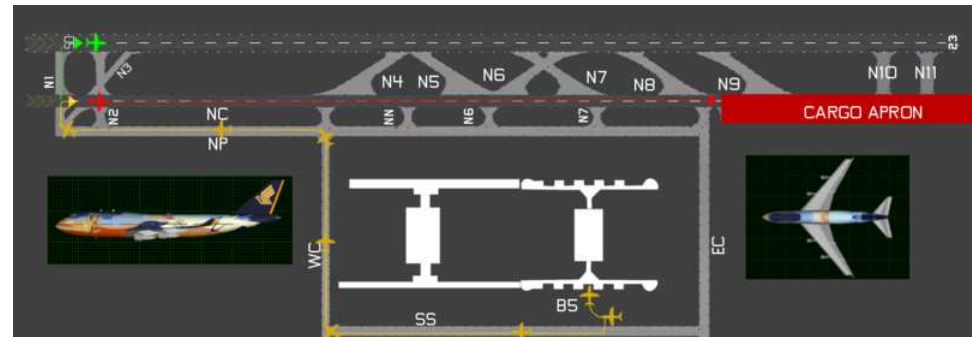
Singapore Airlines Flight SQ006

Boeing 747-400

Taipei-Chiang Kai Shek Airport,
Taiwan

October 31, 2000

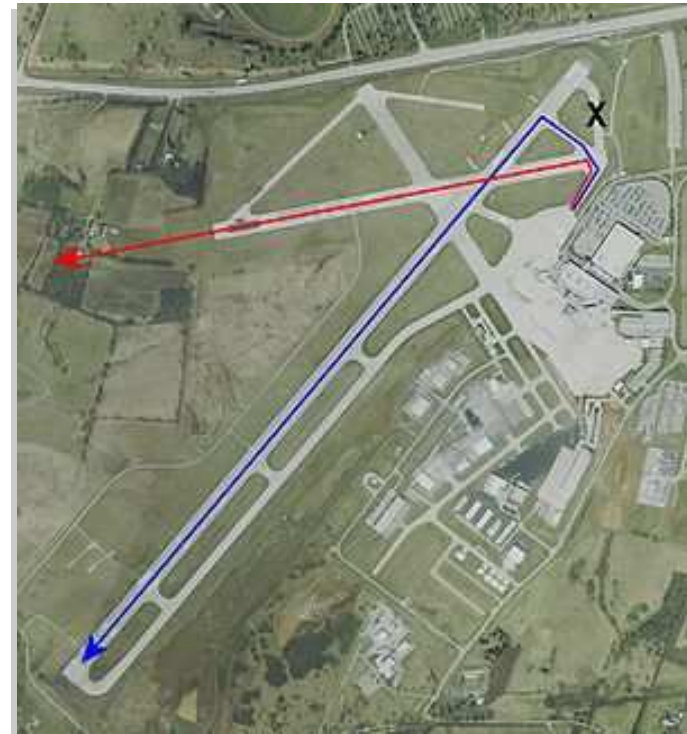
Injuries: 83 Fatal, 39 Serious, 32
Minor, 25 Uninjured



Case Study: Comair Overrun

Comair Flight 5191
Bombardier CL-600-2B19
Lexington, KY
August 27, 2006
Injuries: 49 Fatal, 1 Serious

"The National Transportation Safety Board determines the probable cause(s) of this accident as follows:
the flight crewmembers' failure to use available cues and aids to identify the airplane's location on the airport surface during taxi and their failure to cross-check and verify that the airplane was on the correct runway before takeoff. Contributing to the accident were the flight crew's nonpertinent conversation during taxi, which resulted in a loss of positional awareness, and the **Federal Aviation Administration's failure to require that all runway crossings be authorized only by specific air traffic control clearances.**"



The NTSB isn't always right...

- The party system does not seek truth, but parties seek to assign blame elsewhere.
- Manufacturers have too much power – providing personnel to assist in conducting the investigations.
 - Who do you think is leaking pilot error rumors on the Continental 3407 crash?
- The NTSB always seeks one cause with contributing factors – easiest to blame are those who cannot defend themselves.

The Revolving Door

- After 5 years of failing to act on the NTSB recommendations previously mentioned, Administrator Jane Garvey left the FAA to join Bombardier (the manufacturer of the airplane which crashed in Buffalo), which benefited from lax certification requirements.
- Captain Steve Chealander is leaving the NTSB to join Airbus.
- These are merely two examples of hundreds of instances of the revolving door between manufacturers and government safety regulators.

Case Study: Training Flight

Business Express/Delta Connection

Training Flight

Beech 1900C

Block Island, RI

December 28, 1991

Injuries: 3 Fatal

"The National Transportation Safety Board determines the probable cause(s) of this accident as follows:

THE INSTRUCTOR PILOT'S LOSS OF ALTITUDE AWARENESS AND POSSIBLE SPATIAL DISORIENTATION, WHICH RESULTED IN THE LOSS OF CONTROL OF THE AIRPLANE AT AN ALTITUDE TOO LOW FOR RECOVERY; AND COMPANY MANAGEMENT'S LACK OF INVOLVEMENT IN AND OVERSIGHT OF ITS BEECHCRAFT 1900 FLIGHT TRAINING PROGRAM. CONTRIBUTING TO THE ACCIDENT WAS THE INSTRUCTOR PILOT'S EXERCISE OF POOR JUDGMENT IN ESTABLISHING A FLIGHT SITUATION AND AIRPLANE CONFIGURATION CONDUCTIVE TO SPATIAL DISORIENTATION THAT AFFORDED THE PILOTS LITTLE OR NO MARGIN FOR ERROR."

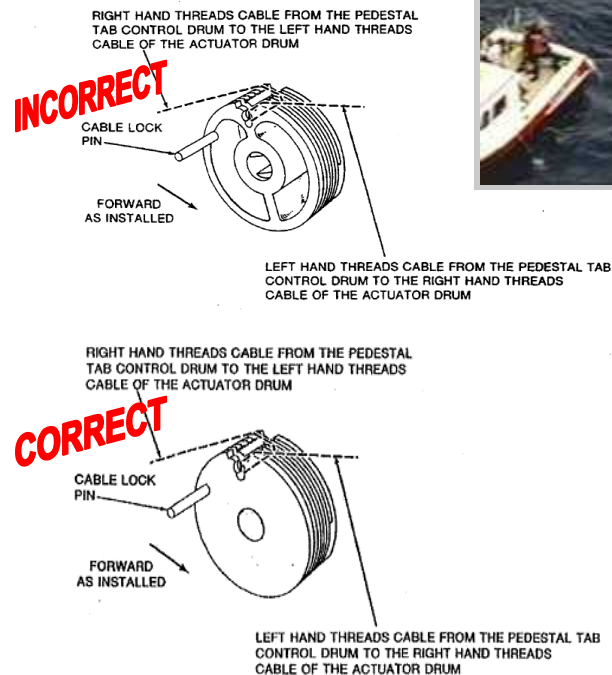


However, a 1992 ALPA (Airline Pilots Association) accident report concluded that **the right engine separated during flight. The free engine struck the tail of the aircraft, damaging most of the horizontal surfaces. This event also led to the separation of the right wing panel outboard of the engine. As a result, the aircraft pitched down, rolled right, and struck the water inverted.**

Case Study: Colgan Air

Colgan Air Flight 9446
d.b.a US Airways Express
Beech 1900D
Yarmouth, MA
August 26, 2003
Injuries: 2 Fatal

“The National Transportation Safety Board determines the probable cause(s) of this accident as follows:
The improper replacement of the forward elevator trim cable, and subsequent inadequate functional check of the maintenance performed, which resulted in a reversal of the elevator trim system and a loss of control in-flight...**the aircraft manufacturer's erroneous depiction of the elevator trim drum in the maintenance manual.**”



Case Study: Pinnacle Airlines

Pinnacle Airlines Flight 3701
d.b.a. Northwest Airlink
Bombardier CL-600-2B19
Jefferson City, MO
October 14, 2004
Injuries: 2 Fatal

"The National Transportation Safety Board determines the probable cause(s) of this accident as follows:
...Contributing to this accident were **(1) the core lock engine condition, which prevented at least one engine from being restarted, and (2) the airplane flight manuals that did not communicate to pilots the importance of maintaining a minimum airspeed to keep the engine cores rotating.**"

