

1982: B737 Washington DC

■ General context

- January 13, 1982, one of the worst blizzards in history to Washington, D.C.:
 - Businesses, schools closed early,
 - Even Congress recessed early .
- B737 departing aircraft
- 74 pax, 5 crew members
- Flight deck crew are 2 relatively young pilots enjoying their new jobs at Air Florida

1982: B737 Washington DC (con'd)

■ Airline context

- Very recent **merging** Air Florida and NorthWest
- New lines towards north of USA
- Winter flight conditions
 - × -15°C
 - × Ceiling 400'
 - × Visibility 300 to 1500m
- Crew face **unfamiliar** winter flight conditions

Noise Abatement procedure



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A/C Stall



1982: B737 Washington (con'd)

■ Operational context

- Airport congested by aircrafts on ground everywhere
- De-icing started, then **stopped**
 - tower instructed to expect a further delay
 - flight was number 11 for departure when the airport reopened
- De-icing ordered again **30** mn later
- Then, **28** mn hold before taxiing

1982: B737 Washington (con'd)

■ Operational context (con'd)

- Ground personnel report a "light dusting" of snow on the wings
- Reverses are used to help push back airplane (90") with the TUG (violation)
 - ➔ but only succeeded in sucking large amounts of ice into the engines
- 21 mn taxiing
- 49 mn between the end of deicing and take-off
- Anti-ice are kept **OFF** (despite temperature -20°C)
- Visibility **less** than 500m

1982: B737 Washington (con'd)

■ Operational context (end)

● 14 minutes before take-off:

- × Use the hot exhaust from the preceding DC-9's engines to melt the snow off the wings,
- × With the only effect of pushing it to the trailing portion of the wing to refreeze

● Take off

- × Engine readings **abnormal**,
- × But taking-off maintained
- × Despite FO **advisories**

● At rotation speed, the aircraft pitched up sharply Because ice buildup on the wings

- × (known characteristics of B737)

1982: B737 Washington (con'd)

■ Flight context

- Initial climb to 200 feet
- FO (PF)
 - ✗ Correct the nose-up attitude,
 - ✗ Stickshaker immediately began to sound
- Aircraft stall
- Hit 14th Street Bridge
- Plunge into the icy Potomac river

■ Consequences

- 4 survivors
- 1 CA survives (among 5 flight crew)
- 5 dead and 4 injured within 7 cars **crushed** on the bridge

1982: B737 Washington DC (end)

■ Analysis

- The crash results the combination of:
 - The crew's use of thrust reverse on the ground
 - ✗ the large amounts of snow and ice that were sucked into the engines during reverse thrust use was allowed to remain there,
 - The crew failure to active the engine anti-ice system
- The probe which measures engine power, can cause:
 - False readings,
 - Ice buildup on the compressor inlet pressure probe;
 - In the cockpit the showed Engine Pressure Ratio of 2.04, is in reality only 1.70 EPR (about 70% of available power)
- Two factors caused an immediate stall on takeoff:
 - The ice covered wings
 - Low power on the engines.