Mike Bardou – NWS WFO Chicago (Romeoville)

Robb Kaczmarek – NWS FAA Chicago Air Route ATC (Aurora)
Center Weather Service Units (CWSU)
NTSB WEATHER RELATED ACCIDENTS BY WEATHER CONDITION
1994-2003

19,562 total accidents
4,159 (21.3%) weather related
Main cause = wind
Figure 5. Wind Accidents by Phase of Flight 2003–2007

Not mutually exclusive. Total number of wind citations = 1,149.

Source: NTSB Aviation Accident and Incident Database
FAA HAS TO MANAGE HIGH VOLUME AIRPORTS ...... WHICH ACCOUNT FOR 80% OF U.S. AIR TRAVEL.
FAA HAS TO MANAGE HIGH VOLUME AIRPORTS ...... WHICH ACCOUNT FOR 80% OF U.S. AIR TRAVEL.
TAKE A LOOK A SOME AIPPORT SPECIFICS...

STARTING WITH SFO – SAN FRANCISCO
AIRPORT ARRIVAL DEMAND CHART (AADC)

Real-Time airport arrival demand information as received from FAA facilities. The AADC chart displays the latest arrival demand metrics for selected airports.
# OF AIRCRAFT PER HOUR THAT AIRPORT CAN ACCEPT... 60 AT SFO ON SUNNY DAY.
AIRPORT ARRIVAL DEMAND CHART (AADC)

Real-Time airport arrival demand information as received from FAA facilities. The AADC chart displays the latest arrival demand metrics for selected airports.

**ONCE CLOUDS <=3000’ OR VIS <=5SM ...** LOSE VISUAL APPROACHES

# OF AIRCRAFT THE AIRPORT CAN LAND DROPS IN HALF FROM 60 TO 30....
AIRPORT ARRIVAL DEMAND CHART (AADC)

Real-Time airport arrival demand information as received from FAA facilities. The AADC chart displays the latest arrival demand metrics for selected airports.

FAA HAS TO DO SOMETHING WITH ALL THE SCHEDULED AIRCRAFT TO LAND THAT EXCEED THE AIRPORT LANDING RATE OF 30..
GROUND STOPS, GROUND DELAY PROGRAM, INCREASED AIRBORNE SPACING – MIT.
TAKING A LOOK AT THE BIG CHICAGO AIRPORTS
SIMUL 9 TO WEST FLOW AT ORD
OHARE = WEST or EAST LANDING AIRPORT.

(West Flow) = 114 AC/HR

(EAST Flow) = 92-106 AC/HR
OHARE = IF CANNOT LAND WEST or EAST BIG PROBLEMS.

(West Flow) = 114 AC/HR

(EAST Flow) = 92-106 AC/HR

South Flow Configuration (STRONG SOUTH WINDS) = 56-64 AC/HR
A Few ORD Weather Scenarios

** FAA NEEDS SEVERAL HOURS LEAD TIME (PLANNING TIME) ON CHANGING CEILINGS/VISIBILITY and WINDS
NOW ORD HAS SIGNIFICANT SURPLUS AC
56-64 Arrival rate due to
DUE TO STRONG GUSTY SOUTH WINDS
A QUICK LOOK AT MDW
FOUR POSSIBLE CONFIGURATIONS.
MDW MAY ONLY LAND ONE ARRIVAL RUNWAY AT A TIME!
AC PER HOUR 28-32.
AIRPORT ARRIVAL DEMAND CHART (AADC)

Real-Time airport arrival demand information as received from FAA facilities. The AADC chart displays the latest arrival demand metrics for selected airports.
Midway favors landing from the south (4R or 31C) because they are direct approaches.
** IF LANDING SOUTH . CEILINGS drop BELOW 1500’ or VIS below 5SM
MDW unable to make this circle approach .
WEATHER DAY
WHY THUNDERSTORM AVOIDANCE HAZARDS!
Figure 25. Thunderstorm Citations by Phase of Flight 2003–2007

Not mutually exclusive. Total number of thunderstorm citations = 42.

Source: NTSB Aviation Accident and Incident Database
Downburst (Prescott Valley, AZ) 1999—Photo by Jacob Neider
Downburst (Prescott Valley, AZ)  
1999—Photo by Jacob Neider
Downburst (Prescott Valley, AZ)
1999—Photo by Jacob Neider
Thunderstorm Hazards – Hail
Hailstones grow by collision with supercooled water drops with ice nuclei.

*** UPDRAFT STRENGTH OF APPROX. 55MPH IS NEEDED TO SUSPEND 1” HAIL ALOFT. (SPEEDS CAN APPROACH/EXCEED 100MPH!)

HAIL CAN BE LOFTED UP AND OUTSIDE, AWAY FROM THUNDERSTORM AS IN THE FOLLOWING PHOTO.
JET ROUTES FIXED
Arrivals and departures
Impacted Area or Flow: ORD JVL/BDF STARS

Facilities Included: ZAU/ZMP/ZDV/ZLC/ZSE/ZOA/ZLA/ZAB/ZFW/ZHU/ZME/ZID/ZKC

Instructions: REROUTE ANY AIRBORNE TRAFFIC AND INTERNAL DEPARTURES VIA THE FOLLOWING ROUTES.

Remarks: ROUTE NON-RNAV AIRCRAFT OVER MZZ VIA: MZZ MZZ344033 OXI OXI STAR
... “SUNNY DAY” SYNDROME... CHICAGO AIRPORTS & WEST
Impacted Area or Flow: XYYYYX

Facilities Included: ZBW/ZNY/CZY/ZMP

Remarks: THIS ROUTING REQUIRES AREA NAVIGATION CAPABILITY.
SUPERBOWL 2012
Figure 13. Turbulence Citations by Phase of Flight 2003–2007

Not mutually exclusive. Total number of turbulence citations = 114.

Source: NTSB Aviation Accident and Incident Database
TURBULENCE: “NOT” A FUNCTION OF STRENGTH OF JET STREAM, BUT RATHER A FUNCTION OF THE STRENGTH OF THE SPEED AND DIRECTIONAL SHEARS ASSOCIATED.
ALL JETSTREAMS ARE “NOT” CREATED EQUAL

** TURBULENCE IS A FUNCTION OF THE SHEARS WITHIN THE JET
NOT THE STRENGTH OF THE JET **
ATMOSPHERIC SOUNDING VCNTY GRR
INDICATING RATHER UNIFORM WINDS
FL420 DOWN TO FL200 – LITTLE TURB
WITH GENERALLY SMOOTH ALTITUDES
HERE IS A SLIGHTLY WEAKER JET BUT WITH MUCH STRONGER SHEARS.
1) What percent of aircraft accidents are weather related?
   a) 10%
   b) 20%
   c) 60%
   d) 80%

2) What phase of flight do most aircraft accidents or injuries occur?
   a) Takeoff-climb
   b) Cruise
   c) Final approach-landing

3) What is the most important impact to aircraft travel?
   a) Surface winds
   b) Aircraft Icing
   c) Thunderstorms
   d) All the above

4) What causes aircraft turbulence?
   a) Jet stream
   b) Contrails
   c) Mountains
   d) I don’t know

5) What causes aircraft icing?
   a) Thunderstorms
   b) Snow accumulation on aircraft
   c) Super-cooled liquid freezing on aircraft
1) **What percent of aircraft accidents are weather related?**
   a) 10%
   b) 20%
   c) 60%
   d) 80%
   **b) 20%**

2) **What phase of flight do most aircraft accidents or injuries occur?**
   a) Takeoff-climb
   b) Cruise
   c) Final approach-landing

3) **What is the most important Impact to aircraft travel?**
   a) Surface winds
   b) Aircraft Icing
   c) Thunderstorms
   d) All the above

4) **What causes aircraft turbulence?**
   a) Jet stream
   b) Contrails
   c) Mountains
   d) I don’t know

5) **What causes aircraft icing?**
   a) Thunderstorms
   b) Snow accumulation on aircraft
   c) Super-cooled liquid freezing on aircraft
1) What percent of aircraft accidents are weather related?
   a) 10%
   b) 20%
   c) 60%
   d) 80%

2) What phase of flight do most aircraft accidents or injuries occur?
   a) Takeoff-climb
   b) Cruise
   c) Final approach-landing

3) What is the most important impact to aircraft travel?
   a) Surface winds
   b) Aircraft icing
   c) Thunderstorms
   d) All the above

4) What causes aircraft turbulence?
   a) Jet stream
   b) Contrails
   c) Mountains
   d) I don’t know

5) What causes aircraft icing?
   a) Thunderstorms
   b) Snow accumulation on aircraft
   c) Super-cooled liquid freezing on aircraft
1) What percent of aircraft accidents are weather related?
   a) 10%
   b) 20%
   c) 60%
   d) 80%

2) What phase of flight do most aircraft accidents or injuries occur?
   a) Takeoff-climb
   b) Cruise
   c) Final approach-landing

3) What is the most important Impact to aircraft travel?
   a) Surface winds
   b) Aircraft Icing
   c) Thunderstorms
   d) All the above

4) What causes aircraft turbulence?
   a) Jet stream
   b) Contrails
   c) Mountains
   d) I don’t know

5) What causes aircraft icing?
   a) Thunderstorms
   b) Snow accumulation on aircraft
   c) Super-cooled liquid freezing on aircraft
1) What percent of aircraft accidents are weather related?
   a) 10%
   b) 20%
   c) 60%
   d) 80%
   [Circle: b]

2) What phase of flight do most aircraft accidents or injuries occur?
   a) Takeoff-climb
   b) Cruise
   c) Final approach-landing
   [Circle: c]

3) What is the most important Impact to aircraft travel?
   a) Surface winds
   b) Aircraft Icing
   c) Thunderstorms
   d) All the above
   [Circle: d]

4) What causes aircraft turbulence?
   a) Jet stream
   b) Contrails
   c) Mountains
   d) I don’t know
   [Circle: c]

5) What causes aircraft icing?
   a) Thunderstorms
   b) Snow accumulation on aircraft
   c) Super-cooled liquid freezing on aircraft
1) What percent of aircraft accidents are weather related?
   a) 10%
   b) 20%
   c) 60%
   d) 80%

2) What phase of flight do most aircraft accidents or injuries occur?
   a) Takeoff-climb
   b) Cruise
   c) Final approach-landing

3) What is the most important Impact to aircraft travel?
   a) Surface winds
   b) Aircraft icing
   c) Thunderstorms
   d) All the above

4) What causes aircraft turbulence?
   a) Jet stream
   b) Contrails
   c) Mountains
   d) I don’t know

5) What causes aircraft icing?
   a) Thunderstorms
   b) Snow accumulation on aircraft
   c) Super-cooled liquid freezing on aircraft
Figure 22. Icing Citations by Phase of Flight 2003–2007

Not mutually exclusive. Total number of icing citations = 64.

Source: NTSB Aviation Accident and Incident Database