

Algorithm for Calculation of the Sum of Weighted Impact Factors For All Weather Elements

Refer to the Aviation_Weather_Factor_Summary.xls file that can be downloaded from the web site.

The sum of weighted impact factors for all weather elements (AX), is the sum of I (weighted wind impact factor), P (weighted thunderstorm impact factor), U (weighted ceiling impact factor), Z (weighted visibility impact factor), AE (weighted snow impact factor), AT (weighted freezing precipitation impact factor), AO (weighted turbulence impact factor), and AT (weighted icing impact factor).

$$\mathbf{AX = I + P + U + Z + AE + AJ + AO + AT} \text{ where,}$$

I = Wind impact factor * Reverse Ranking of significant wind factor

Wind impact factor = sum of the rankings of the 8 weather element impacts/ sum of rankings for wind. See table 1 of the Aviation_Climatology_Assessment_Report.pdf.

Significant wind factor = significant wind frequency * air traffic factor

Air traffic factor = Specific airport traffic/ Average traffic at the 68 airports

P= Thunderstorm impact factor * Reverse Ranking of the thunderstorm factor

Thunderstorm impact factor = sum of rankings of the 8 weather element impacts/ sum of rankings for thunderstorms.

Thunderstorm factor = Station thunderstorm frequency * air traffic factor

Air traffic factor = Specific airport traffic/ Average traffic at the 68 airports

U = Ceiling impact factor * Reverse Ranking of the significant ceiling factor

Ceiling impact factor = sum of rankings of the 8 weather element impacts/ sum of rankings for ceilings.

Significant ceiling factor = significant ceiling frequency * air traffic factor

Air traffic factor = Specific airport traffic/ Average traffic at the 68 airports

Z = Visibility impact factor * Reverse Ranking of the significant visibility factor

Visibility impact factor = sum of rankings of the 8 weather element impacts/ sum of rankings for visibility.

Significant visibility factor = significant visibility frequency * air traffic factor

Air traffic factor = Specific airport traffic/ Average traffic at the 68 airports

AE = Snow impact factor * Reverse Ranking of snow event factor

Snow impact factor = sum of rankings of the 8 weather element impacts/ sum of rankings for snow.

Snow event factor = Snow event frequency * air traffic factor

Air traffic factor = Specific airport traffic/ Average traffic at the 68 airports

AJ = Freezing Precipitation impact factor * Reverse Ranking of freezing precipitation event factor

Freezing precipitation impact factor = sum of rankings of the 8 weather element impacts/ sum of rankings for freezing precipitation.

Freezing precipitation event factor = Freezing precipitation event frequency * air traffic factor.

Air traffic factor = Specific airport traffic/ Average traffic at the 68 airports

AO = Turbulence impact factor * Reverse Ranking of turbulence factor

Turbulence impact factor = sum of the rankings of the 8 weather element impacts/ sum of rankings for turbulence.

Turbulence factor = turbulence score * air traffic factor

Turbulence score = Low + High level frequencies of turbulence (AWC climatology)

Air traffic factor = Specific airport traffic/ Average traffic at the 68 airports

AT = Icing impact factor * Reverse Ranking of the icing factor

Icing Impact Factor = sum of the rankings of the 8 weather element impacts/ sum of the rankings for icing.

Icing Factor = Composite Icing factor * air traffic factor

Composite Icing Factor = score derived by sum of categories based on airmet issuances and sounding icing potential (AWC and NCAR studies).

Air traffic factor = Specific airport traffic/ Average traffic at the 68 airports