Why Reverse Rankings are Used

Table 23 in the document, *Aviation_Climatology_Assessment_Report*, and table 19 in the *Aviation Climatology Assessment Report_Supplement_TRACON_summary_table*" use reverse rankings to help calculate the frequencies that are weighted by air traffic and impact.

Because of large differences in frequencies of various weather elements (as great as one to two orders of magnitude), a method must be employed to keep from generating numbers that are not realistically indicative of workload that may be associated with a particular weather element.   The purpose of the reverse rankings is to "cushion" the effect of having large standard deviations and large variations in the averages for different weather elements.

Consider the following example: LAX has a significant visibility frequency of 32.13 percent. DFW has a frequency of 6.51 percent. When multiplied by the impact factor of 1.62, the difference would be 41.5 "points." LAX has a station thunderstorm frequency of 0.06 percent, while DFW has a station thunderstorm frequency of 1.05 percent. This difference, when multiplied by the thunderstorm impact factor of 2.38, yields a "point" difference of only 2.36. Yet, while thunderstorms rarely impact the LAX airport, they have a relatively high frequency and create substantial workload at DFW.

The reverse ranking of the significant wind factor (significant wind frequency times air traffic factor) for LAX is 54, while at DFW it is 37. When multiplied by the wind impact factor of 1.62, the difference becomes 27.54. Thus the difference in the weighted wind impact factor between the two airports is 27.54.

LAX has a reverse ranking for thunderstorms of 17, while DFW has a reverse ranking of 67. When multiplied by the impact factor of 2.38, the difference is 119.

The same method (reverse rankings) was used for all weather elements.

The following table shows the average frequency (for all airports used in the study), and the standard deviations.

Weather Element	Average Frequency (%)	Standard Deviation
Significant Wind	10.05	9.99
Thunderstorms (at station)	0.67	0.62
Thunderstorms (50 nm)	1.14	0.81
Significant Ceiling	11.44	10.39
Significant Visibility	6.64	7.95
Snow	1.78	2.23
Freezing Precipitation	0.23	0.21
Turbulence	36.67	15.59
Icing	16.84	11.53