Comparison of Wind and Ice Criteria 50 vs. 100 Year MRI

PJM DEDSTF
Lines Subcommittee
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ASCE MOP 74 – 1991
Ice Map from Bennett Study
Basis for Extreme Ice Map

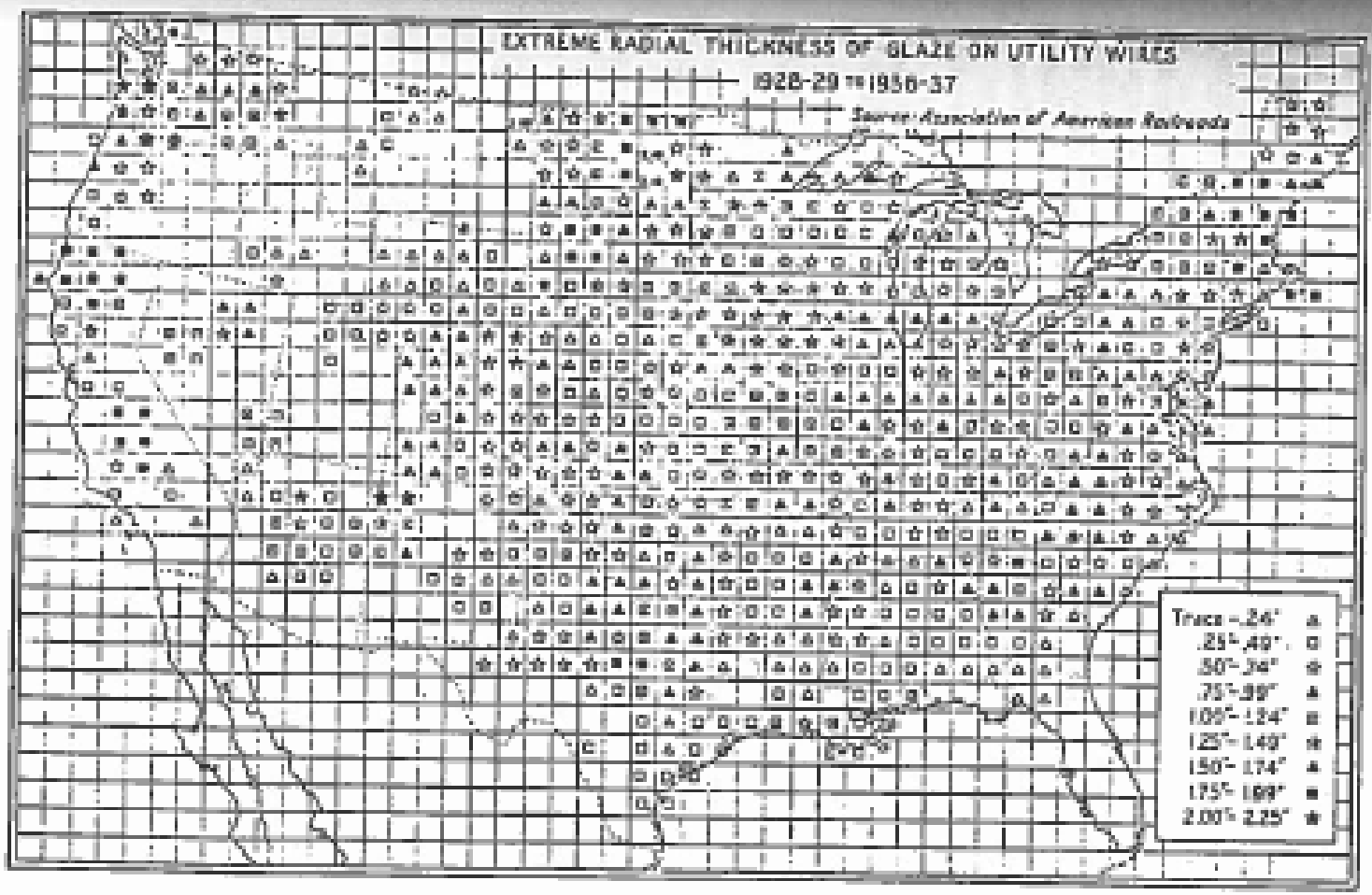

FIG. 1.3-1—Ice Map from Bennett Study

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Extreme Ice Map
50 Year MRI

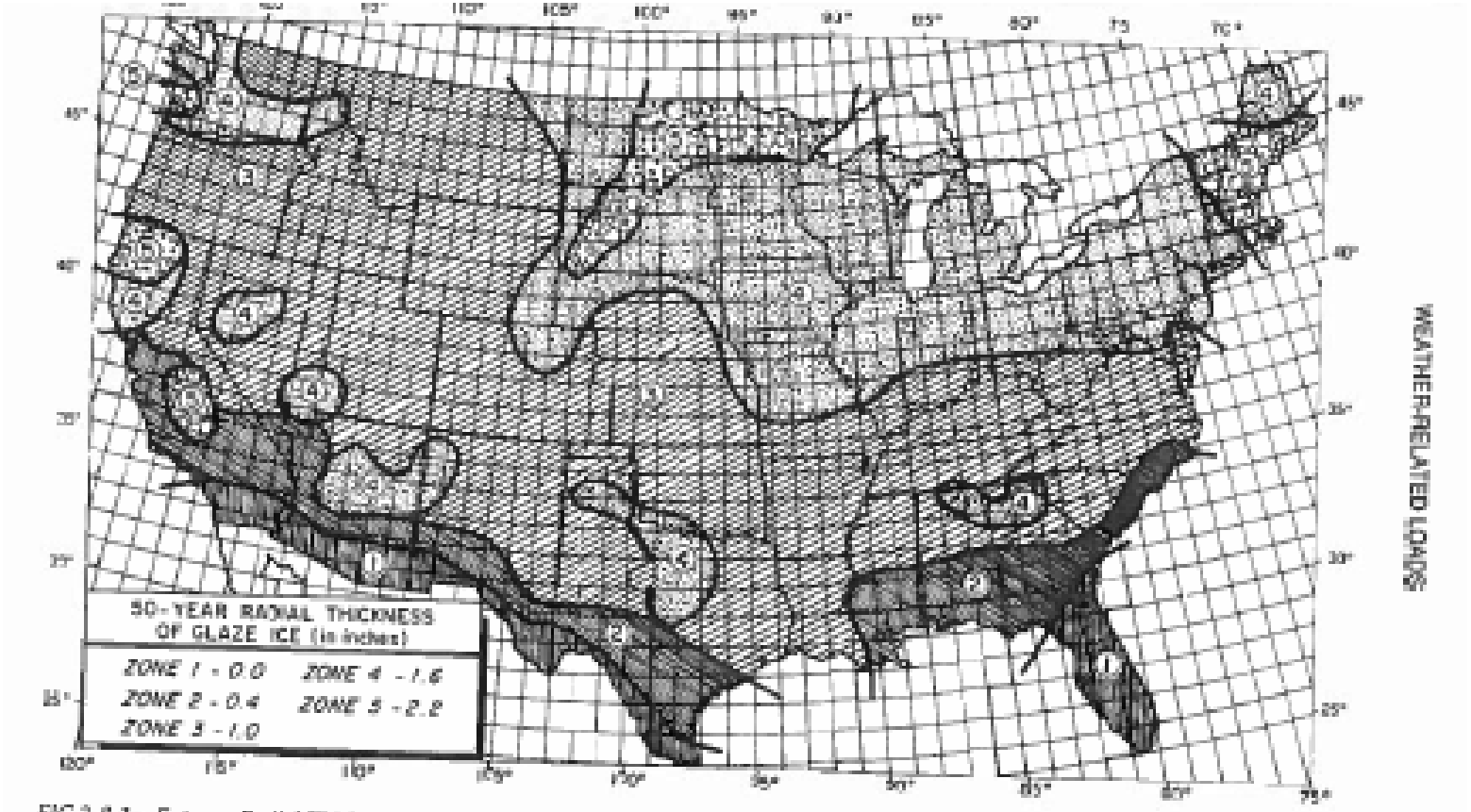

FIG 2-8-1—Extreme Radial Thickness of Glaze Ice Having a 50-Year Return Period

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Extreme Wind w/ Concurrent Ice Map
50 Year MRI

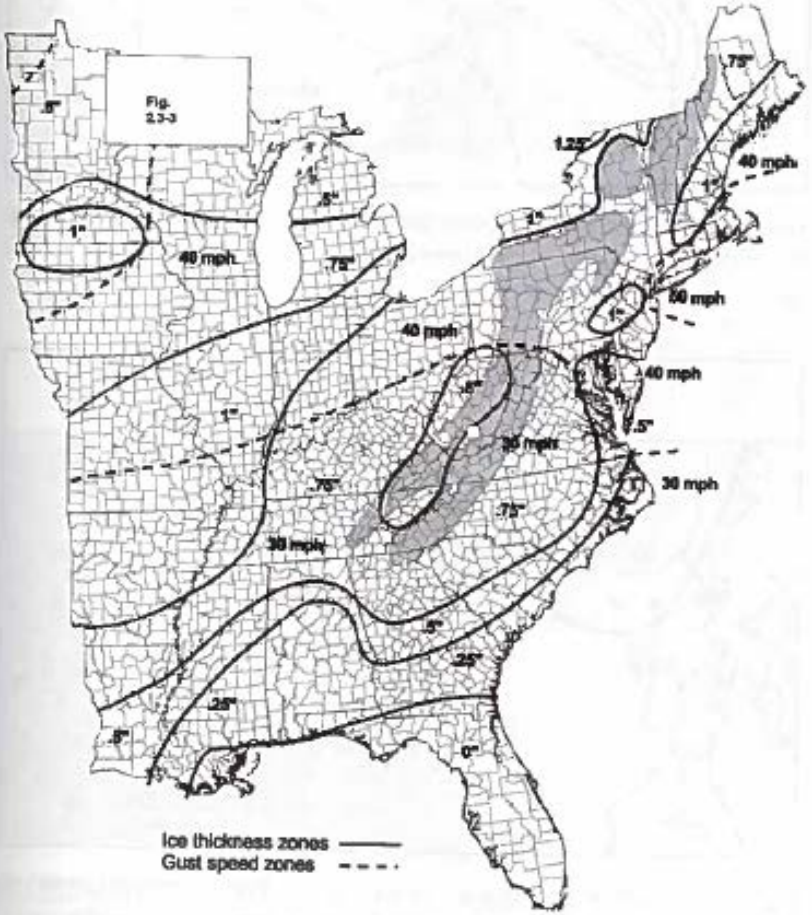

Figure 2-14. Extreme radial glaze ice thickness (in.), eastern United States; 50-year return period with concurrent 3-sec wind speed. Source: ASCE (2005).

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MRI Adjustment Factors

Table 1-1. Load Factors, γ_w, to Adjust Relative Reliability from 50-Year RP Extreme Wind Load Design

Relative Reliability Factor (RRF)	Load Return Period, RP (years)	Probability that the Load Is Exceeded in 50 Years = $1 - (1 - 1/RP)^{50}$	Wind Load Factor, γ_w
0.5	25	0.87	0.85
1	50	0.64	1.00
2	100	0.39	1.15
4	200	0.22	1.30
8	400	0.12	1.45

Table 1-2. Factors γ_i and Corresponding γ_w to Adjust Relative Reliability from 50-Year Extreme Uniform Ice Thickness and Concurrent Wind Load Design

Relative Reliability Factor (RRF)	Load Return Period, RP (years)	Ice Thickness Factor, γ_i	Concurrent Wind Load Factor, γ_w
0.5	25	0.80	1.0
1	50	1.00	1.0
2	100	1.25	1.0
4	200	1.50	1.0
8	400	1.85	1.0

If local ice and wind data are not available for a long period of record, then the 50-year return period values shown on the wind map, Fig. 1-1, and the ice and concurrent wind maps of Figs. 2-13 through 2-18 in Chapter 2, should be used. The loads derived from these maps can be adjusted to other return periods using the factors γ_w or γ_i of Tables 1-1 and 1-2. The selection of the relative reliability factor should be based on the importance of the line. The factors in Table 1-1, which are applied to the wind load, were derived from the Gumbel distribution based on wind data with a dispersion of 18%, in the mid-range of typical annual extreme

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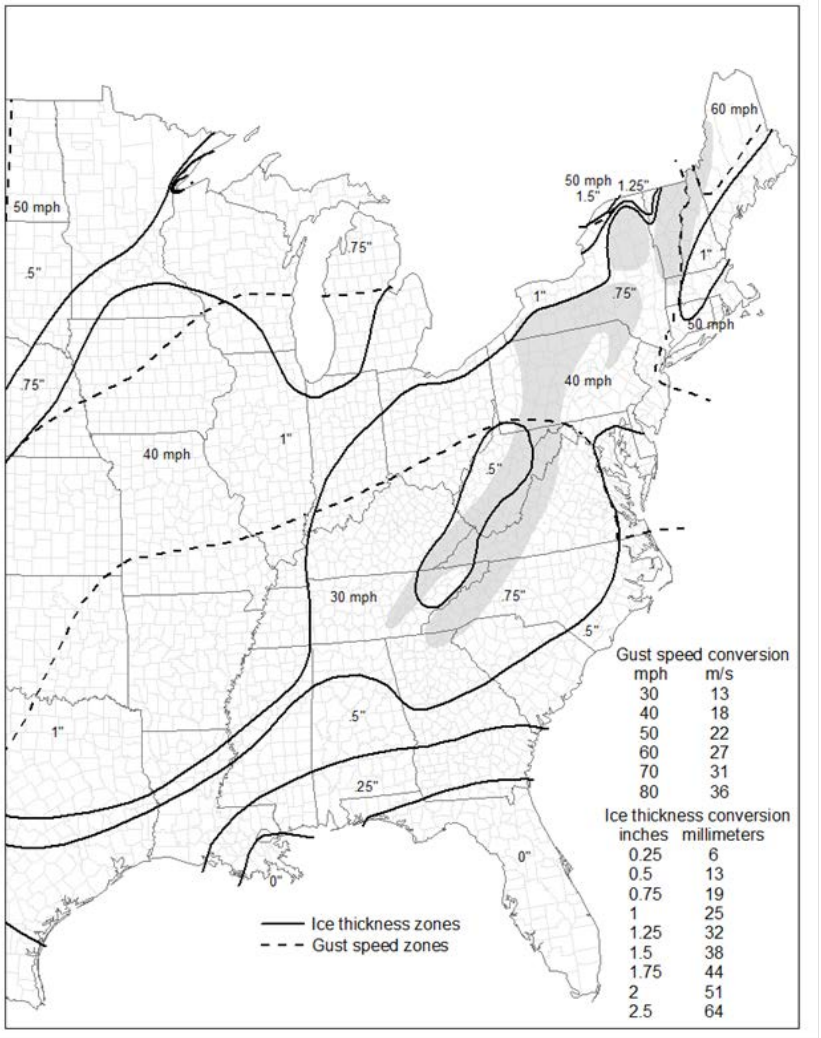
Extreme Wind w/ Concurrent Ice Map
100 Year MRI



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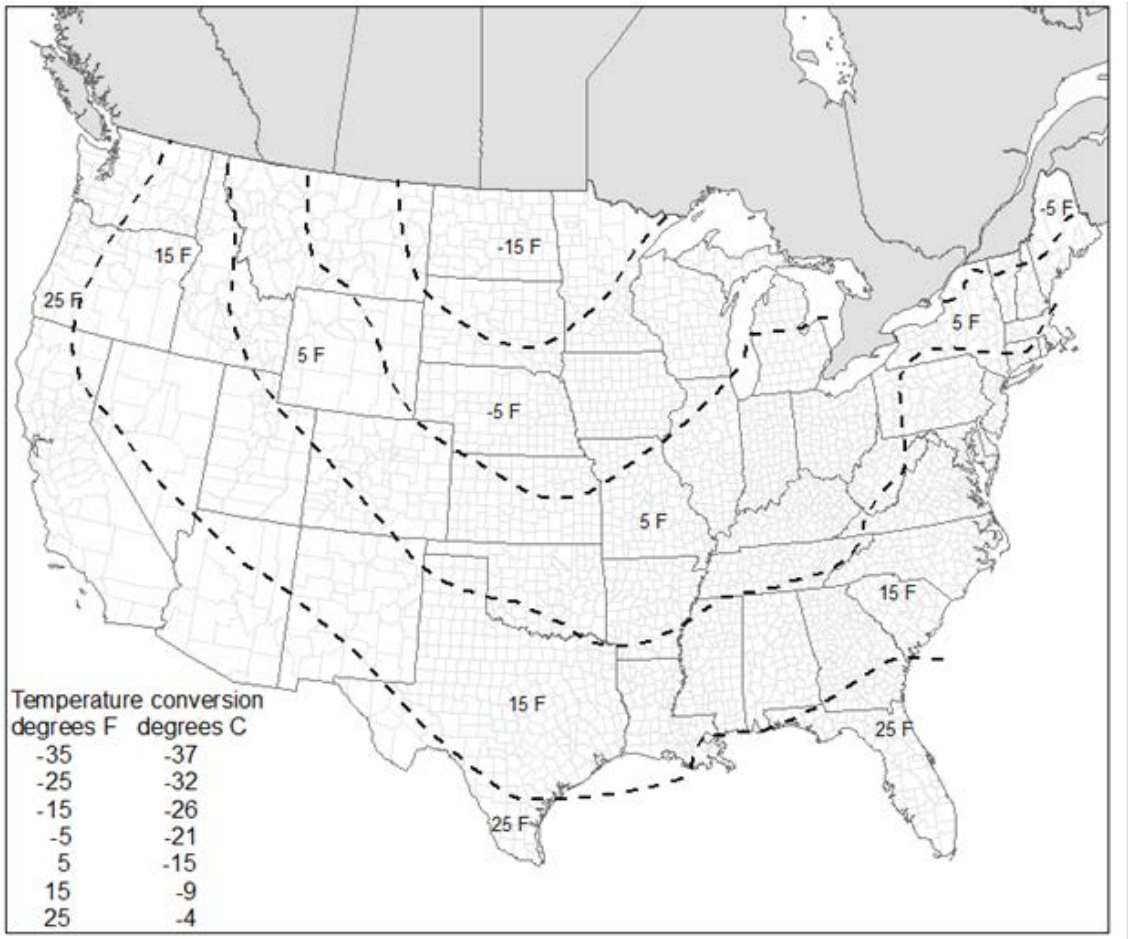
Temperature Map to be used w/ Extreme Wind w/ Concurrent Ice Map
100 Year MRI



ASCE MOP 74 – 3rd Edition
Extreme Wind Map
50 Year MRI