where T is the return period in years and V_T is the T-year return period wind speed. In the nonhurricane-prone regions of the United States, the strength design wind load, W_T, occurs when

$$W_T = C_F V_T^2 = C_F V_{50}^2 W_{LF} \qquad \text{(C26.5-3)}$$

Thus,

$$V_T / V_{50} = [0.36 + 0.1 \ln(12T)] = \sqrt{W_{LF}} \qquad \text{(C26.5-4)}$$

and from Eq. C26.5-4, the return period T associated with the strength design wind speed in the nonhurricane-prone portion of the United States is

$$T = 0.00228 \exp\left(10\sqrt{W_{LF}}\right) \qquad \text{(C26.5-5)}$$

Using the wind load factor of 1.6 as specified in ASCE 7-05, from Eq. C26.5-5 we get $T = 709$ years, and therefore $V_{\text{design}} = V_{709} / \sqrt{W_{LF}} \approx V_{700} / \sqrt{W_{LF}}$. Thus for Risk Category II structures, the basic wind speed is associated with a return period of 700 years, or an annual exceedance probability of 0.0014.

The importance factor used in ASCE 7-05 and earlier for the computation of wind loads for the design of Risk Category III and IV structures is defined so that the nominal 50-year return period nonhurricane wind speed is increased to be representative of a 100-year return period value. Following the approach used above to estimate the resulting effective strength design return period associated with a 50-year basic design speed, in the case of the 100-year return period basic wind speed in the nonhurricane-prone regions, we find that

$$T = 0.00228 \exp\left(10\left(V_{100} / V_{50}\right)\sqrt{W_{LF}}\right) \qquad \text{(C26.5-6)}$$

where for V_{100} / V_{50} computed from Eq. C26.5-4 with $W_{LF} = 1.6$, we find $T = 1{,}697$ years. In the development of Eq. C26.5-6, the term $\left(V_{100} / V_{50}\right)\sqrt{W_{LF}}$ replaces the $\sqrt{W_{LF}}$ used in Eq. C26.5-5, effectively resulting in a higher load factor for Risk Category III and IV structures equal to $W_{LF}\left(V_{100} / V_{50}\right)^2$. Thus for Risk Category III and IV structures, the basic wind speed is associated with a return period of 1,700 years, or an annual exceedance probability of 0.000588. Similarly, the 25-year return period wind speed associated with Risk Category I buildings equates to a 300-year return period wind speed with a wind load factor of 1.0.

Wind Speeds. The wind speed maps of Fig. 26.5-1 present basic wind speeds for the contiguous United States, Alaska, and other selected locations. The wind speeds correspond to 3-sec gust speeds at 33 ft (10 m) above ground for exposure category C. Because the wind speeds of Fig. 26.5-1 reflect conditions at airports and similar open-country exposures, they do not account for the effects of significant topographic features such as those described in Section 26.8. Except for wind contours along the hurricane prone coastline, wind speeds have been rounded to the nearest 5 mph. The original maps, without rounding, are given in Vickery et al. (2008a).

Non-hurricane Wind Speeds. The non-hurricane wind speeds of Fig. 26.5-1 were prepared from peak gust data collected at 485 weather stations where at least 5 years of data were available (Peterka 1992 and Peterka and Shahid 1993 and 1998). For non-hurricane regions, measured gust data were assembled from a number of stations in state-sized areas to decrease sampling error, and the assembled data were fit using a Fisher-Tippett Type I extreme value distribution. This procedure gives the same speed as does area-averaging the return period speeds from the set of stations. There was insufficient variation in return period over the eastern three-quarters of the lower 48 states to justify contours. The division between the 115 and 110 mph (51 and 48 m/s) regions on the map for Risk Category II buildings, which follows state lines, was sufficiently close to the 110 mph (48 m/s) contour that there was no statistical basis for placing the division off political boundaries. These data are expected to follow the gust factor curve of Fig. C26.5-1 (Durst 1960).

Limited data were available on the Washington and Oregon coast. In this region, a special wind region was defined to permit local jurisdictions to select speeds based on local knowledge and analysis. Speeds in the Aleutian Islands and in the interior of Alaska were established from gust data. Contours in Alaska were modified slightly from ASCE 7-88 based on measured data, but insufficient data were available for a detailed coverage of the mountainous regions. Gust data in Alaska were not corrected for potential terrain influence. It is possible that wind speeds in parts of Alaska would reduce if a study were made to determine the topographic wind speed-up effect on recorded wind speeds. In some cases, the innermost and outermost contours for Alaska have been rounded to the nearest 5 mph.

Hurricane Wind Speeds. The hurricane wind speeds are based on the results of a Monte Carlo simulation model described in Applied Research Associates (2001), Vickery and Wadhera (2008a and 2008b), and Vickery et al. (2008a, 2008b, and 2009). The hurricane simulation model replaces the model used to develop the wind speeds used in ASCE 7-98 through ASCE 7-05. Since the development of the model used for the ASCE 7-98 wind speeds,