Discussion of “Ultimate Wind Load Design

Gust Wind Speeds in the United States for

Use in ASCE-7” by Peter J. Vickery, Dhiraj

Wadhera, Jon Galsworthy, Jon A. Peterka,

Peter A. Irwin, and Lawrence A. Griffis

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1. Given that large synthetic hurricane wind speed data sets were

produced for the development of the ASCE 7–10 Standard

maps, the authors could help elucidate the question of whether

hurricane winds in the United States are best fitted by the

Gumbel or the reverse Weibull distribution (see, e.g., Heckert

et al. 1998; Simiu and Miyata 2006, p. 34), at least for a few

mileposts. This contribution would be particularly valuable

in that it would enable improved structural reliability assessments.

The credibility of the results would be enhanced if a

long hurricane data set for at least one hurricane milepost were

posted by the authors on the internet.

2. Probability distributions of extreme nonhurricane wind speeds

are commonly assumed to have a Type I Extreme Value (Gumbel)

distribution tail. However, even if this assumption were

accepted, the parameters of the distribution can vary as a function

of location. This observation is illustrated in Fig. 1, which

shows the variability of the ratios VT∕V50 among 118 stations.

For example, the ratio V1700∕V50 is 1.4 at Greenville, SC, and

1.2 at El Paso, TX; and ASCE uses a value of 1.35. If, in addition,

reverse Weibull distributions are used, as is the case in

“Wind Actions” (AS/NZ 2002) (see also Holmes and Moriarty

1999), and consideration is given to the mixed character of the

extreme value distributions in zones with both thunderstorms

and synoptic storms (Lombardo et al. 2009), the differences

can become even larger (Lombardo 2012).

3. The authors present the wind maps for nonhurricane regions

without comment or qualifications. As was pointed out in

Simiu et al. (2003) (see also Peterka and Esterday 2005 and

Simiu et al. 2005), the ASCE 7 Standard 50-year wind maps

were developed by assuming that it is legitimate to employ the

data for any one station in two, three, or even four superstations.

The use of this assumption for the development of the

ASCE 7 Standard map is clearly documented in Peterka (2001)

and renders the wind map artificially uniform by suppressing

actual differences such as those illustrated in Fig. 1. The geographical

nonuniformity of the extreme wind speeds can be

considerably stronger for speeds with 700- and 1,700-year

mean recurrence intervals than for the 50-year speeds. The

authors’ opinions on this issue would be helpful, since efforts

being undertaken at NIST and elsewhere to update the U.S.

wind map would benefit from their views.

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1

1.1

1.2

1.3

1.4

1.5

VT/V50

5 50 100 300 700 1700

0.7

0.8

0.9

T (yr)

Fig. 1. Ratios of VT∕V50 for 118 stations in nonhurricane regions

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