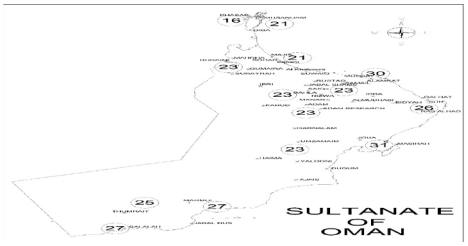
conferenceseries.com

Alnuaimi Ali, J Steel Struct Constr 2017, 3:2 (Suppl)
DOI: 10.4172/2472-0437-C1-002

4th International Conference on
ADVANCED STEEL STRUCTURES
November 09-10, 2017 Singapore

Basic wind speed map for Oman

Alnuaimi Ali
Sultan Qaboos University, Oman



Oman is not considered a potential earthquake zone, and therefore, the effect of wind loads on structures are considered the dominant factor when determining lateral loads on edifices such as buildings, chimneys, and power or satellite communication transmission towers. The aim of this research was to develop the first basic wind speed map for Oman. Hourly-mean wind speed records from 40 metrological stations were used in the calculation. The period of continuous records ranged from 4-37 years. The maximum monthly hourly-mean and the maxima annual hourly-mean wind speed data were analyzed using Gumbel and Gringorten methods. Both methods gave close results in determining basic wind speeds, with the Gumbel method giving slightly higher values. The maximum and minimum differences between the two method values were 2.97 and 0.31%, respectively in the case of monthly maximum hourly-mean and 7.58 and 1.85%, respectively in the case of annual maxima. Due to lack of long-term records in some regions of Oman, basic wind speeds were extrapolated for some stations with short-term records, which were defined as those with only 4-8 years of continuous records; in these cases, monthly maxima were used to predict the long-term basic wind speeds. Accordingly, a basic wind speed map was developed for a 50-year return period. This map was based on basic wind speeds calculated from actual annual maxima records of 29 stations with at least 9 continuous years of records as well as predicted annual maxima wind speeds for 11 short-term record stations. The basic wind speed values ranged from 16 m/s to 31 m/s. The basic wind speed map developed in this research is recommended for use as a guide for the structural design in Oman.

References

1.Abohemda M B and Al Shebani M M (2010) Wind load characteristics in Libya. *World Academy of Science, Engineering and Technology*; 63: 240-243.

2. Al Maawli S S, Majid T A and Yahya A S (2008) Determination of Basic Wind Speed for Building Structures in Oman. *Proceedings of International Conference on Construction and Building Technology, ICCBT'08*; F(22): 235-244.

3. An Y and Pandy M (2005) A comparison of methods of extreme wind speed estimation. *Journal Wind Engineering and Industrial Aerodynamics, Elsevier*; 93: 535–545.

4. Choi E and Tanurdjaja A (2002) Extreme wind studies in Singapore, an area with mixed weather system. *Journal Wind Engineering and Industrial Aerodynamics, Elsevier*; 90: 1611-1630.

Biography

Alnuaimi Ali is an Associate Professor in Civil and Architecture Engineering Department, Sultan Qaboos University, Oman. His research expertise focuses on structural design and analysis, estimating construction cost and administration of contracts. He has published more than 42 refereed journal papers and 33 conference papers. He has carried out tens of consultancy works for different agents in the field of civil engineering.

alnuaimi@squ.edu.om
alnuaimiasm@gmail.com