TORNADO HAZARD ASSESSMENT AND EFFECT OF STRUCTURE SIZE

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Abstract: United States experiences a number of tornadoes every year. However, quantitative tornado hazard assessment for site- and structure-specific wind probabilities is not available for United States. The effect of structure size on tornado risk assessment is very important, the neglect of target size leads to a huge underestimation in tornado strike probability for high wind speed. Using the developed tornado statics and wind filed model, Hazard maps in United States for EF0-EF5 wind speeds have been developed for several different target structure sizes, and the target include point target, 0.08 mi², 0.03 mi², and 0.5 mi² circular target, respectively. Relationship between tornado striking probability and target size have been investigated, and tornado hazard for a specific structure in United States can be interpolated from given location and size using the hazard maps. This quantitative hazard estimation can be further applied to guide the engineer in determine design wind speed in tornado zone and help to facilitate the disaster mitigation planning.