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Project 3

Development of Building Code and Design Guidelines Related to Severe-Wind Hazard

Project Goals

The development, adoption and enforcement of codes play an important role in mitigating the loss of life and property damage produced by severe wind events. The actual provisions adopted vary widely from country to country.

The goal of this project is to review the wind load provisions in the U.S.-Asia region and propose a uniform code structure suitable for analysis and design throughout the region. Five specific tasks are proposed to accomplish this objective as follows:

(a) Identification of the various code parameters used in the assessments of wind loads on a region-by-region basis;

(b) Development of an inter-code parametric conversion translator that will permit the provisions of one code to be applied to another;

(c) Sensitivity analyses of the various code parameters as related to the assessment of wind loads for typical buildings and structures;

(d) Development of a "regional" U.S.-Asia uniform building code; and

(e) Development of a simplified code applicable for the design/ construction of housing and simple low-rise buildings.

Benefits

The end results of this project will be a rational design methodology based on the current state of knowledge that will encourage the adoption and enforcement of appropriate wind code provisions for mitigating the effects of severe wind.

Time Requirement

It is anticipated that the above five tasks will require a minimum of three years for completion. This time frame will permit proper communication among those responsible for the promulgation of code provisions for each country, practicing engineers and researchers; a review of the results of the parametric analyses; and incorporation of the end results of tasks (a) - (c) into the development of a uniform regional code.

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Project 4

Improved Definition of Wind Characteristics in Severe Storms

Project Goals

The goals of this project are:

(a) To improve the diagnostic model of low-level windfield in tropical cyclones before and after landfall;

(b) To improve understanding of the boundary layer wind characteristics in various types of severe storms; and

(c) To improve understanding of wind distribution in vertical plane over water and over land.

Implementation

(a) SURFACE INSTRUMENTATION - A large number of appropriately instrumented measurement towers (30 m to 100 m). System of stations chosen based on a high frequency of hits from Storms/Tornadoes/Tropical Cyclones.

(b) WIND PROFILERS (wind data in the vertical) [also a few Doppler Radars] - These sensors should be sited on islands, or near a coastline; we also require wind-measuring stations along the coastline and in critical areas of the Continental USA subject to severe thunderstorm phenomena.

(c) Requires adequate spacial and temporally-resolved surface and upper level data (reconnaissance aircraft, and profilers, or extra radiosounde sites).

(d) Data analysis, synthesis and interpretation-develop refined diagnostic and conceptual models of windfield in severe storms.

Benefits

(a) Improved input to diagnostic and prediction models.

(b) Improved understanding of severe storm structure and behavior.

(c) Improved basis for assessment of windloads.

(d) For model verification and validation and subsequent model improvements.

Time Requirement

3-5 years

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