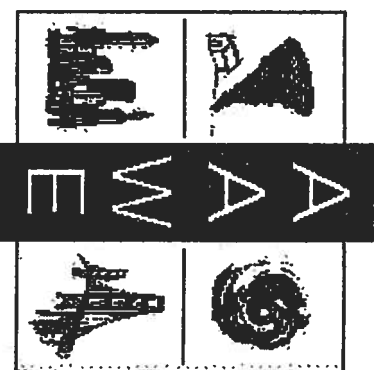


**WIND ENGINEERING RESEARCH AND
OUTREACH PLAN TO REDUCE LOSSES
DUE TO WIND HAZARDS**



**American Association
for Wind Engineering**
www.aawe.org

in collaboration with



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4. UNDERSTANDING OF WIND HAZARDS (COMPONENT A)

The first step towards protecting society from losses due to wind hazards is a significant improvement in our understanding of wind hazards in the United States. Areas identified to be critical for accomplishing this goal are listed in Tables 4.1 and 4.2. They are divided into two groups: Research Tasks (Table 4.1) and Outreach Tasks (Table 4.2). The research tasks delineate areas broadly defined for Component A in Table 3.1, while the tasks in Table 4.2 refer to the related outreach effort of this component and cross-component/area outreach listed in Table 3.1 under the Component D heading.

4.1. Research Tasks

The tasks listed in Table 4.1 address research that would improve our understanding of severe winds (including hurricanes, tornadoes, thunderstorms, and other strong winds phenomena) and wind-induced loading on buildings and structures. They are designed to take advantage from rapid advances in sensors, data acquisition, processing and sharing, as well as simulation and visualization.

Table 4.1. Research Tasks of Component A – Understanding of Wind Hazards

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| <p>AR1. Enhanced Knowledge and Data on Severe Winds</p> <ul style="list-style-type: none">a. Improve characterization and archival of properties of severe winds (hurricanes, thunderstorms, tornadoes, downslope winds).b. Enhance/develop instrumentation and data transfer/processing infrastructure for acquisition of severe wind/wind loading data and data archival.c. Develop simulation techniques (analytical, physical, numerical) for modeling severe winds, for studies of wind hazards impact.d. Gain knowledge on wind-borne debris and impact on structures.e. Synthesize/improve knowledge on other natural phenomena contributing to wind hazards impact (water surge, flooding). <p>AR2. Understanding and Quantification of Wind Loading</p> <ul style="list-style-type: none">a. Develop field/laboratory database and knowledge-based system/model for wind loading on buildings and structures exposed to different types of wind.b. Develop infrastructure/simulation techniques (analytical, physical, numerical) for modeling of loading on buildings and structures induced by severe winds.c. Develop demonstration/benchmark studies employing the developed tools. <p>AR3. Mapping of Wind Hazards</p> <ul style="list-style-type: none">a. Develop techniques for modeling orographic, topographic and urban effects on wind hazards.b. Develop mapping of wind hazards in critical regions. |
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Tasks AR1 and AR2 reflect the progression from the development of the necessary field and laboratory infrastructure, acquisition of knowledge through field and laboratory experimentation, through the development and application of simulation techniques, and synthesis of the developed knowledge on severe winds and wind-induced loading. This effort also includes development and application of techniques for mapping of wind hazards, Task AR3.

4.2. Outreach Tasks

The outreach tasks listed in Table 4.2 are geared towards rapid application and dissemination of findings of the research tasks discussed above. As can be seen, they include transfer of the developed knowledge and tools into codes, standards and guidelines and dissemination of these innovations to practicing professionals. These efforts cover all the areas addressed by the research tasks: the severe winds and wind-induced loading, (Task AO1), and mapping of wind hazards, Task AO2.

Table 4.2. Outreach Tasks of Component A – Understanding of Wind Hazards

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| <p>AO1. Enhanced Knowledge and Data on Severe Winds and Wind Loading</p> <ul style="list-style-type: none">a. Incorporate the developed knowledge/techniques/models into codes & guidelines.b. Disseminate the developed codes & guidelines and knowledge/techniques & models to practicing professionals. <p>AO2. Mapping of Wind Hazards</p> <ul style="list-style-type: none">a. Disseminate wind hazards characterization/zonation of urban (suburban) regions.b. Develop/improve surge/flood mapping and warning. |
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