Wind-Induced Motion & Structural Load Study

A structural wind load study allows designers to examine complex load effects in detail by providing an effective static floor-by-floor loading results in a format that is ready-to-use in most structural design applications. A wind-induced motion and structural load review may be used to provide preliminary estimates of the overall structural wind loads, and building motion for human comfort at the top occupied floor.

Benefits:
- Reduces project cost by eliminating the potential for unnecessary conservatism implied in code calculations.
- Includes assessment of dynamic response not covered in local codes.
- Reduce risk by including the effects of interference and dynamic response.
- Provides assessment on the level of occupant comfort.
- Offers simple and easy-to-use presentations for higher complicated wind effects, such as mode effects and differential loading between linked towers.
- Where required, optimizes the structure and reduces wind response further through aerodynamic or structural dynamic modifications.
- Obtain structural factors that will impact a building’s structural performance early in the design process.
- Increase creative design flexibility.
- Increase structural durability potential.
- Increase tenant space potential.
- Make key design decisions before the detailed design begins, saving time and cost.

Various Approaches Available:
Six approaches available to best meet the project needs, including RWDI’s unique HFFB / Aeroelastic hybrid model.

Accuracy:
Wind tunnel simulations include proximity buildings and farfield terrain effects on a direction-by-direction basis. Interpretation of the site’s wind climate is performed on long-term historical wind speed and direction records on an hour-by-hour basis. A comprehensive wind response analysis uses detailed structural properties (nonlinear mode shapes, dynamic coupling, structural links between buildings, modal crosscorrelations, and more). A parametric analysis further explores the sensitivity of structural properties on wind response. Provide wind induced structural loads and motion perception (acceleration) of the building.

Hurricane / typhoon simulations:
included where appropriate.
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RWDI Helps Through all Stages of Design

Start of Design → Conceptual Design → Schematic Design → Detailed Design → Completion

**Key Features**

- **Extensive Database Improves Estimation:**
  Utilizes RWDI’s wind tunnel database of more than 1000 data sets in order to estimate as closely as possible the structural response of a building to strong winds.

- **Experts with Experience:**
  Provides consultation with RWDI’s dynamic response experts who have worked on many of the world’s tallest buildings and the world’s most complex designs.

- **Interactive Consulting Process:**
  The RWDI interactive consulting process helps to manage and assess design decisions affecting the building’s structure.

The best and most useful time to consider wind energy and the related issues (identified below) is during the early master planning or conceptual design stages. This provides the opportunity to refine the design and address potential problems when corrective action can be easily incorporated. This would have the benefit of minimizing costly remedial work in the future as well as eliminating or refining subsequent detailed studies.

**Related Issues:**

- Pedestrian Comfort
- Wind Energy
- Wind Loading
- Wake Effect
- Structural Motion
- Structural Borne Noise
- Environmental Impacts
- Snow and Ice

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**How RWDI works with your team**

- **Wind-Induced Motion and Structural Loads Review**
  - Assisting the selection of an efficient structural system to achieve performance targets.

- **Fine-tuning of the selected scheme and refinement of wind-induced responses.**

- **Wind Tunnel Testing**
  - Wind tunnel testing based on final design scheme.