

WIND EFFECTS ON STRUCTURAL SYSTEMS

Helping designers achieve safe, optimized and innovative structures



When wind interacts with a structure, it can affect its safety, cost and habitability.

We help you understand exactly how the wind affects various aspects of your design, from loading on structural components to the comfort of building occupants. This knowledge, delivered at the right time, allows you to truly optimize the design. Instead of chasing last-minute fixes, you're free to focus on ambitious and innovative ideas.

Our Service

We study a broad range of structures, from simple to extremely complex. Some are dynamically sensitive, such as high-rise towers, long-span roofs and rooftop spires. Other projects come in all shapes and sizes, including residential and commercial developments, airports, stadia, convention centers, sculptures and solar installations.

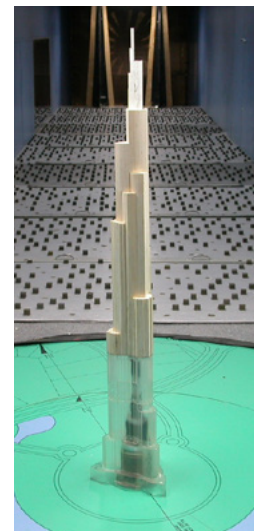
How we work with you will vary depending on the stage of your project. For early design decisions, we leverage our knowledge: Our experienced practitioners can anticipate many wind-related issues. As the design evolves, we refine the strategy with specific investigations. Depending on your needs, we may do wind-tunnel testing of physical models, analysis of computational models, or desk-based assessments. In testing, we may collect hundreds of force, pressure or velocity



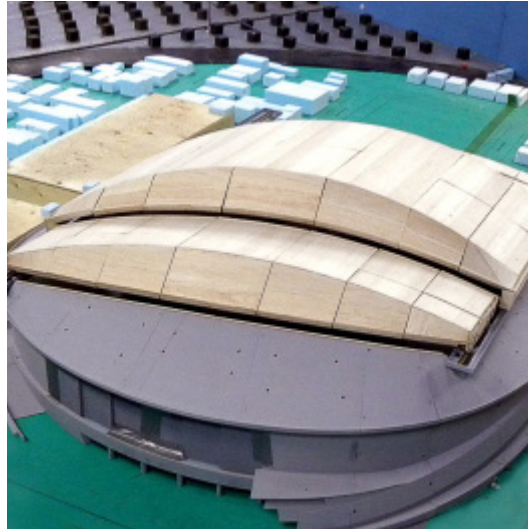
measurements, as needed. We combine these data with meteorological data on the local wind climate to predict wind-induced responses.

Whatever the approach, our work is informed by decades of consulting on projects around the world. With our global presence, we respond quickly and sensitively to regional differences in culture, design, climate and risk.

We put our conclusions into context for you and your clients. Results are delivered in design-ready, visual, easy-to-share formats. We excel at presenting complicated wind-related issues simply. And if the data show problems, we don't just report them; we'll collaborate with you to solve them creatively. When needed, we call on the whole range of our company's exceptional expertise in areas beyond wind engineering. Always, our goal is to choose the right tools and methods to answer your questions.



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RWDI is a
valuable
partner
to clients
seeking to...

Explore Innovations

- Achieve higher heights, longer spans and the most ambitious architectural forms
- Shape structures for optimal wind performance, alongside other functional and aesthetic considerations
- Enhance performance-based design by going beyond code compliance to a true understanding of code intent

Create Opportunities

- Focus design efforts for most effect through parametric studies
- Save money by spending structural capital where it's most effective

- Effectively use structural changes, shape changes and damping systems for optimization, by assessing wind issues early

Meet Challenges

- Solve post-construction and retrofitting issues creatively and cost-effectively

Fulfill Expectations

- Meet or exceed building code requirements with trusted recommendations
- Inform the entire project team with easy-to-understand presentation of the issues impacting your project

How we work

Consulting Roles

We collaborate with you to answer your questions about the impacts of wind. Depending on the context we may, for example:

- Inform the design at the conceptual stage. Our assessments may guide changes to form or structure and/or identify concepts and requirements for damping solutions.
- Provide detailed, project-specific wind loading information to bring existing buildings “up to code.” We target performance-based design criteria, rather than applying code-based assumptions.
- Recommend protocols for operation of structural systems. For example, we can recommend how the retractable roof of a stadium can be managed during storms to balance safety and comfort.

Determining wind forces

We operate various boundary-layer wind tunnels, including some that can accommodate very large models. Our investigations usually focus on determining the wind forces acting on a structure’s main wind-force resisting system (MWFRS) and secondary structural systems. When codes are conservative—which they are designed to be most of the time—we identify initial cost savings. Otherwise, we expose limitations that would show up in the future if not addressed.

Redefining possible.



Planning early for motion and vibration

Through early involvement in the design process, we equip architects with options to shape their buildings for better wind performance, alongside other functional and aesthetic considerations. Structural engineers benefit from early feedback to choose the most efficient structural schemes. For example, damping systems can be an effective optimization tool when integrated in a design at an early stage, rather than as an afterthought when problems arise.

Collaboration and communication

Wind engineering involves extensive collaboration. Within RWDI, we consult with a wide cross-section of experts in model construction (physical and virtual), instrumentation, meteorology, reliability, structural dynamics, and design and aerodynamics. We consult beyond our firm with architects and structural engineers as needed. Our results are delivered in design-ready format for analysis and in visual formats for ease of communication with the rest of your design team.