

# WIND EFFECTS ON FAÇADE SYSTEMS



Identifying and reducing the risk of façade failure



Wind-induced façade failures are costly—to budgets, to reputations, sometimes to lives. We help you reduce the risks (or cope with problems) creatively and cost effectively.

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## Our Service

We show how the skin of your structure—its cladding & components (C&C) and secondary cladding systems—is affected by the wind climate at your site.

We investigate residential and commercial developments of all shapes and sizes, including high-rise towers, stadia, airports, convention centers, sculptures, solar

installations and many other special or complex structures.

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.

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

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## Explore Innovations

- Foster stakeholder buy-in for daring façades by anticipating and addressing issues
- Construct successful green buildings by exploiting new sustainable systems while ensuring safety
- Design new surface treatments that are safe and effective

## Create Opportunities

- Safely introduce new features during a retrofit (e.g., green building systems)

## Meet Challenges

- Plan for strong wind events, reducing the risk of costly breaches and cascading failures
- Remediate existing construction effectively at the least cost
- Prepare data for litigation or insurance claims

## Fulfill Expectations

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



## Determining wind forces

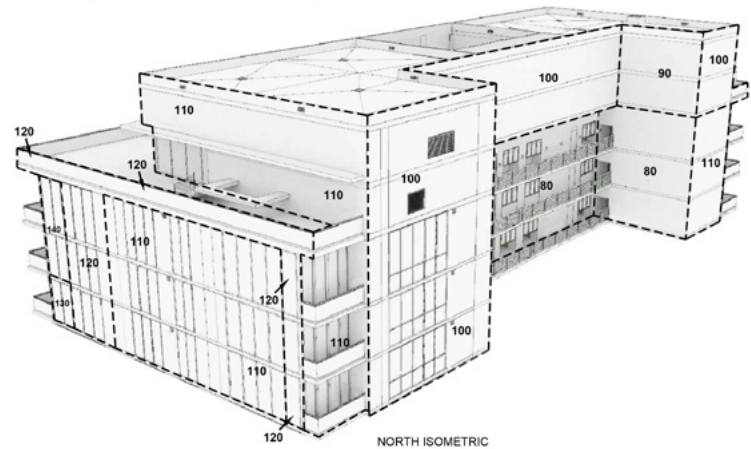
Our investigations are primarily focused on determining the wind forces acting on the building's skin. In early stages of conceptual design, we may rely on desk-based analytical approaches and/or our extensive aerodynamic knowledge base. This knowledge base captures experience developed over decades of practice. With these tools we can inform key decisions about height and form. As design progresses into schematic and detailed stages, we do wind tunnel investigations with rigid models. In these studies, we measure wind behavior at hundreds of discrete locations.

## Savings through specifics

Building codes must, of necessity, be broad enough to include most expected design situations. As a result, they sacrifice precision in the interests of safety. By studying your design in your location, we help you optimize it—strengthening where needed, saving materials and cost elsewhere. From decades of experience, we know where to focus our analysis to find cost-effective solutions and demonstrate their safety. This approach can be especially useful in bringing existing buildings up to code at less cost.

## Planning for internal pressures in strong wind events

In strong wind events, such as hurricanes or typhoons, an initial breach of the façade can trigger other wind-related failures—and subsequent insurance claims. The interaction of storm winds with the breached façade can cause excessive internal pressures. These pressures can propagate damage to other cladding elements that share the same interior volume. We provide a unique probabilistic assessment of internal pressures.



## 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, curtain wall consultants, 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.

