CHIMNEYS AND COOLING TOWERS

Achieving safe, optimized and innovative structures while mitigating risk

When wind interacts with a chimney or cooling tower, it can affect safety, cost and functionality.

At RWDI, we help you understand exactly how the wind affects various aspects of your chimney or cooling tower design. Wind issues are often complex in origin but, with the right expertise, can be simple in resolution. We find creative yet pragmatic solutions by combining exceptional expertise in three areas: interpreting large meteorological data sets, modeling the physics of air flow, and implementing sustainable engineered solutions in real structures.

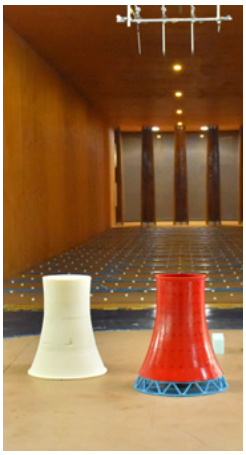
How we work with you will vary depending on the stage of your project. Depending upon your needs, we may do wind-tunnel testing of physical models, analysis of computational models, or desk-based assessments.

Wind Loading - Desktop Assessments

Desktop assessments give early direction on wind-related design issues on chimneys. Such advice may include positioning of chimneys with respect to wind direction, aerodynamic solutions, structural dynamic alterations and supplementary damping solutions. While there is no substitute for a project-specific model investigation, such feedback can identify critical design issues at the time when they are most readily addressed.

Wind Loading - Wind Tunnel Testing

Wind tunnel testing is the most accurate means of predicting project-specific wind pressures. We operate various boundary-layer wind tunnels, across our offices around the world. A scale model replica of the project and the immediate surroundings will be tested in a wind tunnel that simulates wind speeds and turbulence levels appropriate for the site.



The two main phenomena critical for the design of chimneys are buffeting and vortex shedding. For measurements, RWDI considers either a rigid model to find the wind loading along and across the structure, or an aeroelastic model test to find out bending moments and shears both along and across the structure. For cooling towers, we can provide the net pressure distribution on the shell, as well as meridional and hoop stress across the shell at various levels. Further, the wake interference between adjacent chimneys and cooling towers can be captured and reported for design.

Dispersion Modeling

Knowing how emissions will behave helps to mitigate and manage associated risks.

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REEFS/Plume-RT is a unique software solution from RWDI that helps decision-makers, field operators and regulators respond effectively to planned and accidental release events, as well as weather-driven incidents (fumigation, inversion, fog). It's the only 3D tool of its kind informed by on-site meteorology, air quality data and site-specific weather forecasts combined with advanced dispersion models. The result is real-time, accurate plume-path predictions, presented in a format that supports timely, informed decisions – including during emergencies.

Exhaust/Fog Modeling

Fog and icing resulting from cooling towers are tackled with a suite of modeling approaches, from CFD modeling for short-range detailed impact around the facility, to seasonal risk and mitigation studies with SACTI, to 24/7 weather and CALPUFF modeling and testing.

How we work

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.

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

Explore Innovations

- Understand and design for unanticipated aerodynamic behavior in slender structures
- Enhance performance-based design by going beyond code compliance to a true understanding of code intent
- Safely undertake lighter, material-efficient and more flexible designs
- Evaluate alternate emissions scenarios and cumulative effects of operations
- Benefit from custom solutions to complicated data challenges

Create Opportunities

- Effectively use structural changes, shape changes and damping systems for optimization, by assessing wind issues early
- Save money by spending structural capital where it's most effective
- Optimize production while managing emissions

Meet Challenges

- Ensure resiliency for strong wind events, reducing the risk of costly cascading failures that may result in environmental spills and possibly lengthy downtime of production.
- Remediate and upgrade existing structures effectively at the least cost
- Minimize weather-related operational risks
- Respond effectively to air-quality emergencies through access to real-time data
- Respond to emission concerns with sound, easy-to-present evidence

Fulfill Expectations

- Meet or exceed code requirements with trusted recommendations
- Make decisions with increased precision and confidence