



cpp

CERMAK  
PETERKA  
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OVERVIEW OF SERVICES

WIND ENGINEERING AND AIR QUALITY CONSULTANTS



## About Wind Engineering

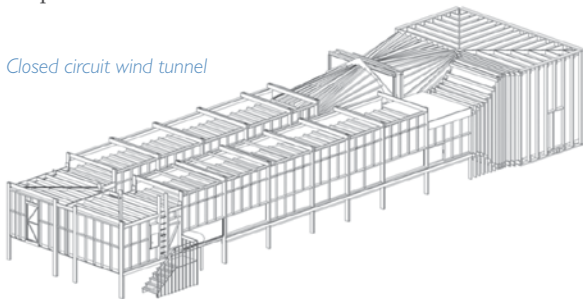
Moving air interacts with buildings and structures in many complex ways. The field of wind engineering works to understand those interactions and to use that knowledge to improve the quality of the built environment.

Wind engineers enhance the value of a project by working with architects, engineers, and owners to identify and address wind- and airflow-related issues. The result is a more efficient design that ensures a reliable and comfortable building.

Wind engineering services can be grouped into several categories. Some of those categories are:

- Building and air quality services
- Wind loading services
- Wind energy services
- Special services

*Closed circuit wind tunnel*



## CPP's Facilities

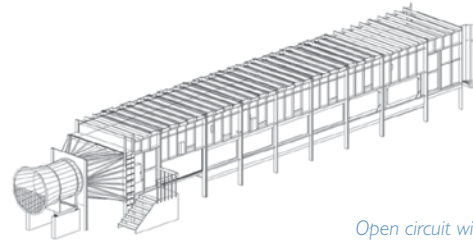
### International Resources

To better serve our growing number of international clients and projects, CPP has added a location in Sydney, Australia. With technical and business leaders in Fort Collins and Sydney, CPP provides responsive wind engineering expertise to owners, developers, and design professionals around the world.

### CPP's Facilities Include:

- Locations in Fort Collins, Colorado and Sydney, Australia
- Three recirculating boundary-layer wind tunnels
- A multiple-CPU computing cluster for CFD simulations
- A full-scale field testing site
- A central model design and fabrication centre

*Open circuit wind tunnel*



*Dr. David Banks showing airflow around a building*



*Urban surroundings on a turntable model*



*Detail of a wind tunnel test model*





## Wind Loading Services

To increase the value of a building project, owners, engineers, and architects consult wind engineers to enhance the reliability and efficiency of their design.

By understanding how wind interacts with buildings and structures, wind engineers help design professionals control costs by using materials more efficiently while ensuring safety and reliability.

### Standard Services Include:

- Wind-induced structural loads and responses
- Wind pressures on cladding
- Wind conditions in pedestrian and recreational areas

### Standards or Testing?

As the wind loading standards themselves state:

1. The standards do not account for unique or unusual structural shapes
2. The standards do not accurately address crosswind effects for even simple shapes
3. The standards represent wind climate and the effects of buildings and terrain in a simplified manner
4. The standards cannot account for interference from surrounding buildings

Wind tunnel testing can account for all of these variables and their complex interactions in ways that standards cannot.

*Wind tunnel model of Circle on Cavill*



*Wind tunnel model of Marina Bay Sands, Singapore*



*Topographic model of Hong Kong*





## Building and Air Quality Services

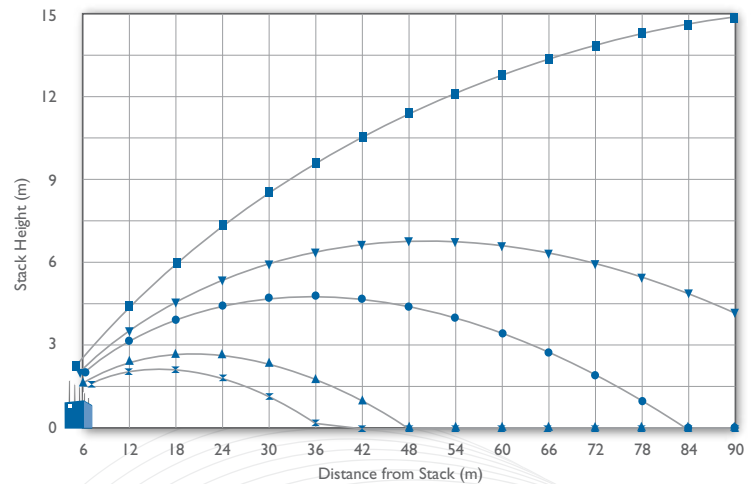
To create safe, comfortable, sustainable buildings, owners and designers must address potential issues of building exhaust and indoor airflow.

CPP provides services that support healthy, comfortable indoor and outdoor environments.

### Standard Services Include:

- Exhaust dispersion analysis
- Exhaust system optimization
- Pollutant concentrations in public areas
- Indoor airflow
- Natural ventilation
- Atrium fire and smoke behaviour

Laboratories and research facilities, academic buildings, hospitals and healthcare facilities, sports arenas and stadiums, hotels, industrial facilities, office and residential buildings all benefit from building and air quality services.

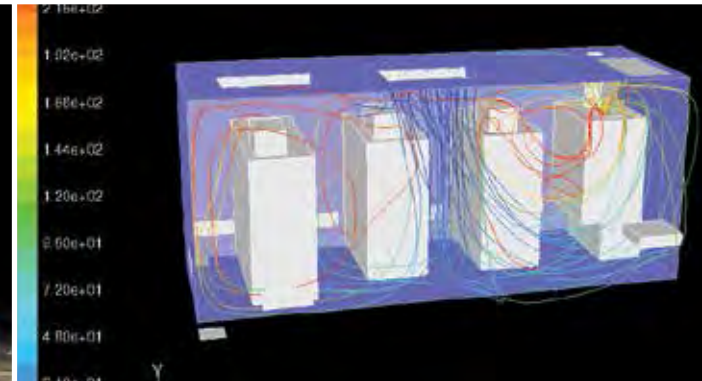


Volume flow rate as measured against stack height

Exhaust being drawn upwind

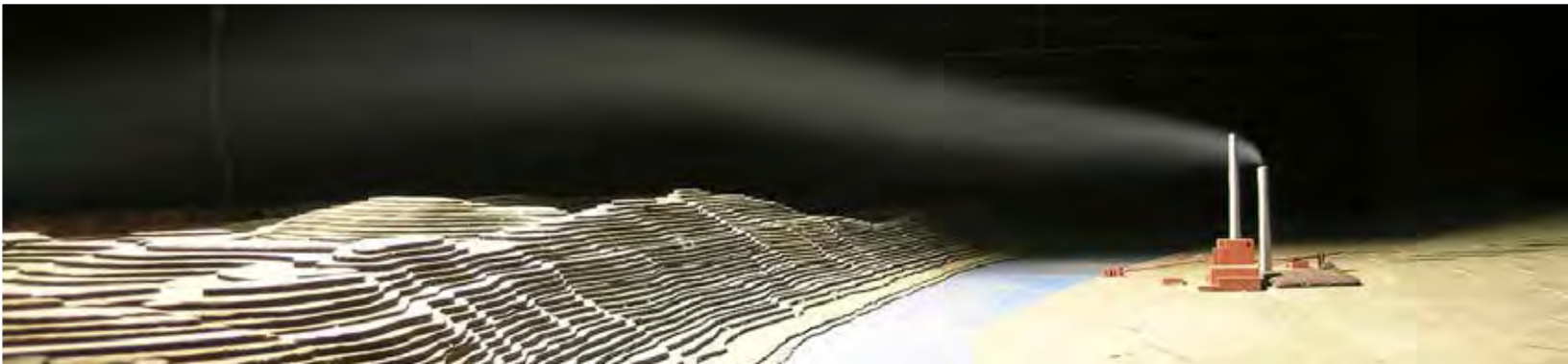


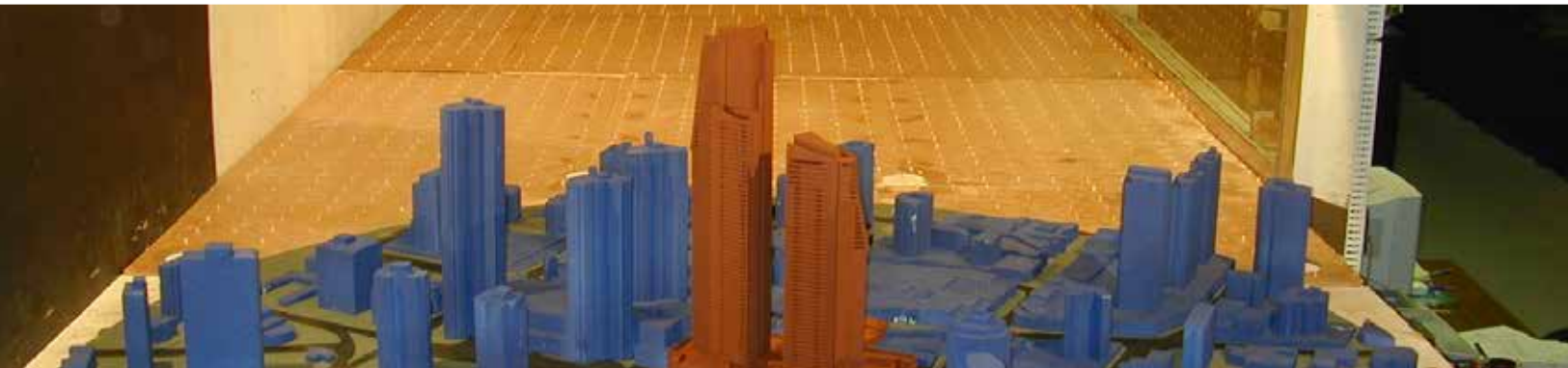
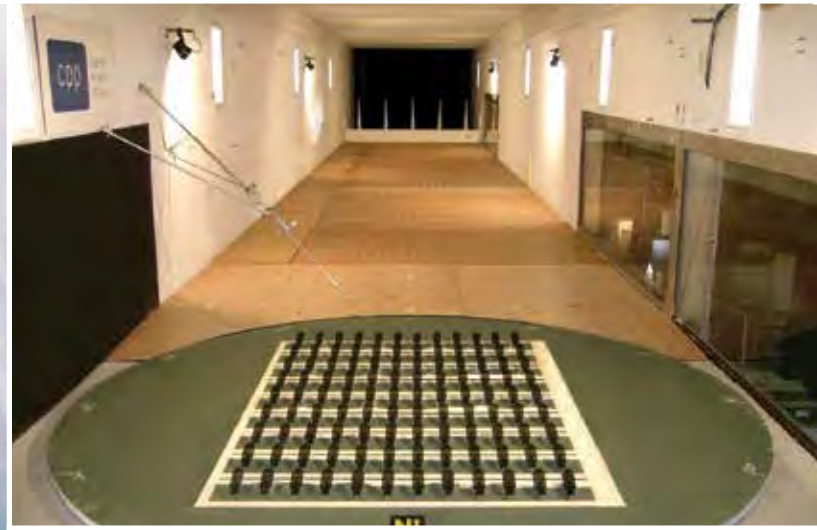
CFD simulation of airflow within a room



CPP offers exhaust/intake design testing









## Wind Energy Services

CPP's wind energy services ensure good turbine placement and design and protect investments in wind energy.

### Small Turbine Performance Testing

CPP uses customized hybrid methods to evaluate new and unique wind turbine designs. Through computer simulations, scaled physical models, and full-scale field testing, CPP provides quicker, more accurate results for less than the cost of traditional testing methods.

### Wind Farm and Turbine Siting

Surrounding terrain has a large effect on the wind conditions—and therefore the productivity—of a wind farm site. High turbulence and excessive wind shear can impair wind turbine performance. Proper siting of wind farms and turbines protects output levels and provides a quicker return on investment.

To ensure optimal siting, CPP uses physical and computational models to accurately map and predict regional and local wind environments, changes in seasonal, daily, and hourly winds, and the effects of complex terrain on wind conditions.

## Special Projects

Some wind-related issues are not easy to categorize. CPP specializes in unusual wind and airflow challenges that require innovative approaches.

Special projects drive the progress and innovation that improve procedures throughout the industry.

CPP has analysed the effects of wind on...

- ...power line capacity
- ...solar collectors and satellite receivers
- ...amusement park rides
- ...door operability
- ...pre-launched space vehicles and launch pad structures
- ...roof shingles
- ...driving rain and its effects on windows
- ...helipad siting
- ...snow drifting and loading
- ...wind-induced noise and its mitigation

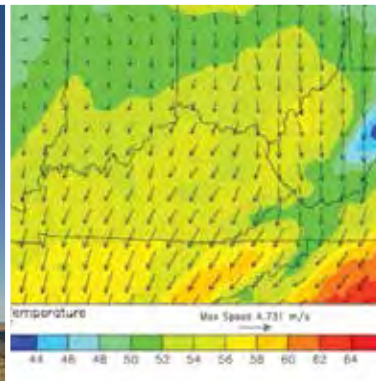
CPP also performs full-scale field testing and monitoring, and forensic services for structural accidents and failures.

*Experimental wind turbine*

*Regional wind map*

*Wind tunnel model of a launch vehicle*

*Solar panel array, similar to those tested by CPP*



# About CPP

Modern wind engineering began in the 1950s with the work of Dr. Jack Cermak, his colleagues, and students. As a professor and researcher at Colorado State University, Dr. Cermak pioneered the now-standard methods of modelling and testing pollutant dispersion and the effects of wind on buildings and structures. In 1964, his laboratory tested the design of the World Trade Center Twin Towers in New York City, bringing wind engineering to the attention of architects and engineers around the world.

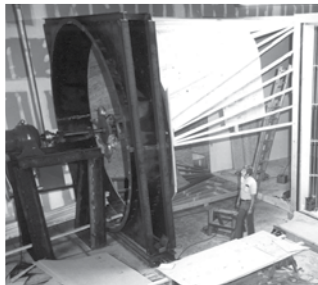
In 1981, Dr. Cermak and Dr. Jon Peterka co-founded Cermak Peterka and Associates, America's first commercial wind engineering company. Three years later, Dr. Ron Petersen joined and the company was renamed Cermak Peterka Petersen (CPP).

In 2007, CPP established full-service operations in Sydney, Australia. With company leaders and technical staff on two continents, CPP provides even better service to developers and design professionals around the world.



Dr. Matt Glanville

Dr. Graeme Wood



With more than 3,500 projects on 7 continents, CPP is one of the world's most experienced wind engineering companies.



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CPP Services Support Sustainable Design

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