Alan G. Davenport

AISC Special Achievement Award Winner

By Lena Singer

Wind engineering expert Davenport has lent his expertise to some of the world's most well-known structures. His advice to young engineers? Keep it simple!

Even as a young boy, Alan G. Davenport, Ph.D. was familiar with the effects of turbulent wind on structures.

Davenport was born in southern India, where his British parents were tea planters, inland from a region where pre- and post- monsoon season cyclones have conjured gusts as powerful as 100 mph. The roof of his family's bungalow home was secured with sandbags for protection against the wind.

Decades later, Davenport designed the Boundary Layer Wind Tunnel Laboratory at the University of Western Ontario—among the world's first for simulating turbulent wind environments. Since its completion in 1965, he has served as the laboratory's director and has overseen ground-breaking research on the behavior of structures under wind loads—including some of the 20th century's most celebrated structures.

For these contributions to the structural engineering community, Davenport was presented with an AISC Special Achievement Award at the 2005 North American Steel Construction Conference in Montreal, Quebec. He was honored "for his contributions to the development and application of wind engineering and design."

As a child During World War II, Davenport developed an enthusiasm for building model airplanes. At 18, he entered Cambridge University where he studied mechanical science, with a focus on mathematics and structures. He discovered a passion for flying real airplanes after joining the university air squadron. He earned a B.A. in Mechanical Sciences from Cambridge in 1954, and an M.A. in Mechanical Sciences in 1958.

After earning his M.A.Sc. in Civil Engineering from the University of Toronto in 1957, Davenport joined the Royal Canadian Navy where he earned his pilot wings.

"I was always keen on flying," he said. "If I could've got a job as a pilot, I would have been interested at one time."

Davenport joined Canada's National Research Council after leaving the navy, where he worked to update the National Building Code of Canada (NBC).

"They were looking for someone who would update the building code and because I had a little experience with aerodynamics and wind flow, they picked me to take on this study," he said.

In 1961, Davenport earned his Ph.D. from the University of Bristol, England. The findings of his doctoral research were published in the thesis, "The treatment of wind loads on tall towers and long span bridges in turbulent wind."

"Most of my thesis [research] had not been done before," Davenport said. "The response was very encouraging from the structural engineering community."

That same year, Davenport joined the faculty of the Department of Civil and Environmental Engineering at the University of Western Ontario in London, Ontario. He taught statistics and reliability, but the focus of his research continued to be wind loads on major structures.

In the early 1960s, Davenport began work with Leslie E. Robertson on wind studies for the development of the World Trade Center Towers. Davenport studied projected wind loads for the 1,368′ and 1,362′ towers—a height at which wind load analyses had not been done before.

"The particular feature that was important was fluctuating dynamic winds," Davenport said of the towers. "[They were] extremely tall, and the wind characteristics for that height were not known with great precision at that time."

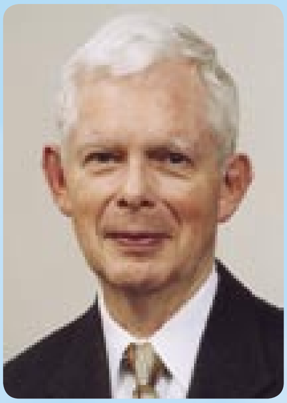
Wind engineering studies for the towers were conducted at Colorado State University, which Davenport credits as having the "other pioneering wind tunnel."

Soon after, in 1965, the Boundary Layer Wind Tunnel was constructed at the University of Western Ontario. The tunnel, with wind speeds of 34 mph (55 km/h), was designed for the study of aeroelastic behavior and pressure on structures, primarily buildings and bridges.

"It was the first of its kind," Davenport said. "The aeronautical wind tunnels [before it] were usually very short, so that the wind flow was kept very smooth—not like the real atmosphere, which is turbulent."

In 1984, a second wind tunnel was constructed at the laboratory that is capable of wind speeds up to 62 mph (100 km/h) and features three testing sections.

As director of the laboratory, Davenport has overseen wind engineering for such notable structures as the Sears Tower in Chicago and the CN Tower in Toronto. His work on bridges includes wind engineering for the world's longest suspension bridge, Tsing Ma bridge in Hong Kong, and wind performance



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rehabilitation of the Bronx-Whitestone Bridge in New York.

Davenport has been recognized by his engineering peers on numerous occasions. He is a Fellow of the Canadian Society for Civil Engineering, a former president of the Canadian Academy of Engineering, and a recipient of the Sir John Kennedy Medal, the Engineering Institute of Canada's most distinguished honor. In 1987, he was elected as a foreign associate to the United States National Academy of Engineering. In 2001, he was awarded the French Association of Civil Engineering's esteemed Caquot Medal, which was followed in 2002 with a wind engineering symposium held in his honor at the University of Western Ontario. In 2002, he was also inducted into the Order of Canada.

As the author of more than 200 papers, Davenport, now 72, travels often for speaking engagements around the world with his wife of 48 years, Sheila. They have four children and seven grandchildren. Although he is retired from teaching, he continues to have an active role at the laboratory, where he says the effects of wind loads on low-rise buildings are now a major focus of research.

"We know from studies after hurricanes and other fierce storms that the lower buildings really are punished by the wind," he said. "We've discovered that these structures are very fragile in terms of their reaction."

Davenport says this is only one of many "tempting" problems left to be examined in wind and structural engineering. The Indian Ocean earthquake and tsunami disaster that occurred late 2004, for example, raised a new set of questions.

"One of the things we noticed, looking at the damage, was that the trees recovered rather fast, particularly the palm trees," Davenport said. "By studying the palm trees, we could find some use for that knowledge in improving the design of structures. Of course, we have to realize its water we're dealing with—not just wind, but waves."

As younger generations of engineers approach these new problems, Davenport offers this advice:

"Keep it simple," he said. "You don't have to re-invent it every time. You can make mistakes if things are complicated." ★

Lena Singer is Assistant Editor of Modern Steel Construction.