A Little Wind A Dangerous Thing
To Some Modern Architecture

By ARTHUR HILL
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It's an ill wind that's blowing modern architecture no good.

As a matter of fact, data being collected by the engineering mechanics department at Virginia Tech suggests that a good strong breeze just might cause the disintegration of some of these sweeping, graceful creations of contemporary design.

Wind tunnel tests of a model utilizing a design favored by modernists show areas of negative pressure which produces a suction strong enough to tear off an outer covering, such as wood wind direction caused the model to go into low frequency vibration.

Because of the tests, architects went back to the drawing board to strengthen what appeared to be weak points in the design.

Prof. Bernard Etkin, who assisted in the Canadian wind tunnel tests, makes many of the same points as Prof. Maher:

“Aerodynamic testing should be carried out as a routine step in any building projects of unusual shape,” Etkin said. “Building codes simply are not adequate to cope with such projects. This applies not only to structural strengths, but also to heating, ventilating and smoke dispersal.”

“Most people don’t have the money to test, however,” says Maher. “Unless it’s so unusual a shape that the architect or engineer can convince his client that it should be tested.”

If it reaches that stage, the client usually tells the engineer to forget it and calls for a more conservative—and safer—design, Maher said.

“The problem of oddly shaped structures isn’t as bad in North America as it is in South America, where lax building codes have contributed to the destruction of more than one building, the VPI professor said.”

In this country, the curving lines of modern architecture are

Tests on This Model of Toronto City Hall Brought Redesign

(Toronto Globe and Mail Photo)
A hyperbolic paraboloid, also tends to channel the wind in such a way that the roof tends to lift from the structure, Maher said. This tendency was so strong that the wind at one point was being maintained at a speed of 60 and 65 miles per hour.

At one point on the structure a negative pressure (suction) of 50 pounds per square inch was recorded. Most building codes for this area of the United States require that structures be able to withstand 25 pounds per square inch of pressure.

Nor is it just buildings that structural engineers are warned about. Ignorance of wind effect on materials has been blamed for the collapse of bridges and other structures.

Even a simple arch like ones that support signs at some shopping centers are suspect. "We'll have to see what happens to these signs when a wind comes along," Maher said. "Most of those things aren't anchored too well."

To a reporter who examined one arch, it appeared to be made of molded iron plate which gave a hollow sound when struck with a fist. It also shook when struck. The sign is bolted to the asphalt.

This same wind pressure phenomenon that Virginia Tech scientists are studying caused design changes in the proposed Toronto city hall building after engineers tested a 1/8-inch high scale mahogany model in a wind tunnel at the University of Toronto.

The building, described by engineers as the world's largest airfoil, has two towers that act like turbine blades in a high wind. Depending on the speed and direction of the wind, a high pressure is built up behind the building's two curved sections while low pressure is created on the out-

Tests on This Model of Toronto City Hall Brought Redesign

Tests on this model of the Toronto city hall brought redesign. The model was used in VPI wind tunnel tests to determine the effects of wind on the building.

This Model Is Being Used in VPI Wind Tunnel Tests

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