WINDS OF CHANGE

I'm sure I'm not the only one who has sat in front of the television news, horrified by the scale of damage suffered by many parts of the world following hurricanes and severe storms. We gaze at the pictures of devastation and cling on to the hope that our own homes must be better built. After all, we live in a relatively affluent country and there are building regulations, standards and many years of experience to make sure that our buildings can withstand anything.

Well it may surprise you to learn that there has never been any full-scale wind-load testing of roof structures, either in the UK or in North America. Certainly people have tried to learn from previous mistakes, gradually finding which structures and build methods seem the most resistant to high wind loads. All of this has been backed up by sophisticated computer simulations and wind tunnel testing on scale models, but it doesn't change the fact that no-one has tried to test real roof structures, made from timber and held together with nails…until now.

One of the organisations at the heart of the testing that has been carried out to date is the University of Western Ontario in Canada. They have decided to correct this lack of real data by building a facility (termed the 'Three Little Pigs' facility in London, Ontario) capable of subjecting full-sized buildings (two- and three-storey) to the types of loads seen during a hurricane. Housed in a hangar-style building, a fully-adjustable frame, carrying over 100 individual and interconnected wind simulators, will apply positive and negative wind forces over a +5 to –20 kilopascals range (5 kilopascals equates to a weight of around 500kg for every square metre of roof). The simulators also use a fast-acting valve system that enables wind pressure to reverse direction up to 7 times per second. This means the facility can reproduce the rapidly changing sucking and blowing wind loads that are so destructive to roof structures (particularly at the corners), providing a very realistic simulation.

The University's deep understanding of wind patterns will allow it to create and apply realistic wind profiles to various buildings and roof types. The information gathered will be fed back into the industry, where building codes can be modified and the next generation of building materials and processes can be developed. We have been engaged to develop the wind simulators to be used in the facility, which will open in Autumn 2006, giving researchers the flexibility to apply multiple wind profiles to many different types of construction until failure.

This project will have a great impact across the world, as the analysis and research carried out by the University will lead to saving lives and reducing the financial burden of natural disasters. After all, the research that has been ploughed into constructing buildings to withstand earthquakes has had a profound effect in countries susceptible to regular tremors. **Eric.Wilkinson@CambridgeConsultants.com**