Snow Drifting and Accumulation

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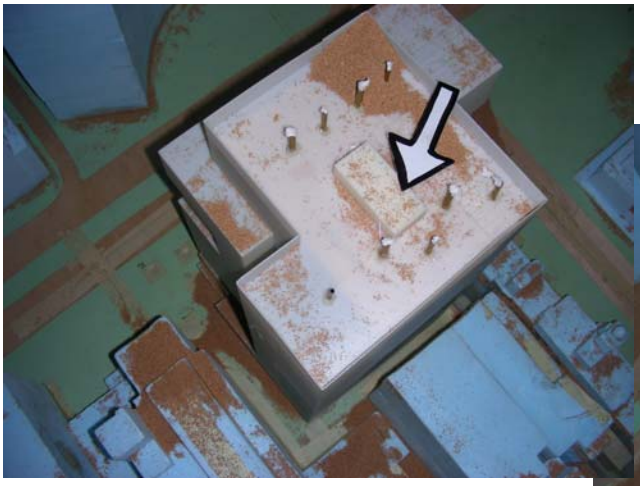
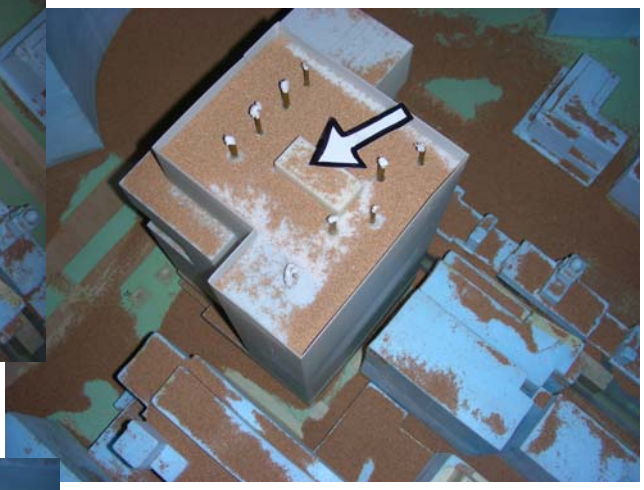
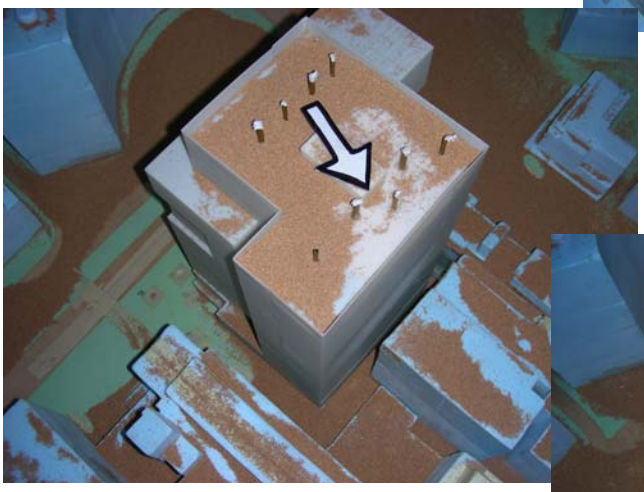
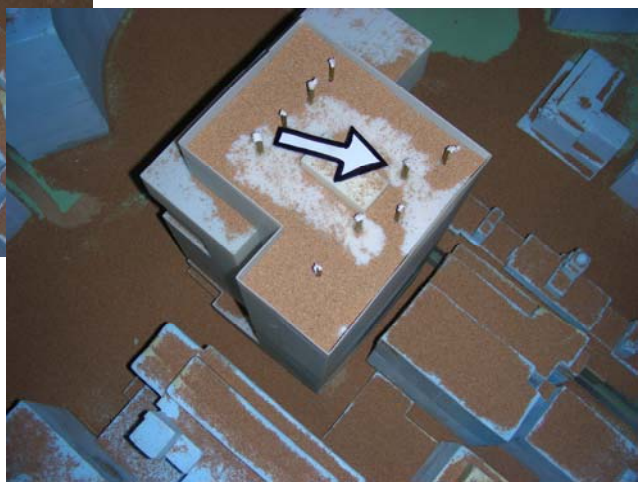
The task of predicting snow depths at a specific outdoor location is an exercise in predicting some of the most complicated processes in nature. Snow itself, without the influence of wind, is a complex material that undergoes various morphology and phase changes in response to numerous environmental effects. In a global sense, the main processes affecting snow deposition and aging on a surface include: snowfall amount, snow drifting due to wind, melting due to heat loss at the roof surface, melting due to solar radiation and melting due to rain, in addition to sublimation and compaction. As well, there is an important distinction between snow weight and snow depth. Snow loads acting over a surface are related to snow depth by the density, which varies with location, depth through the snow pack, and time.







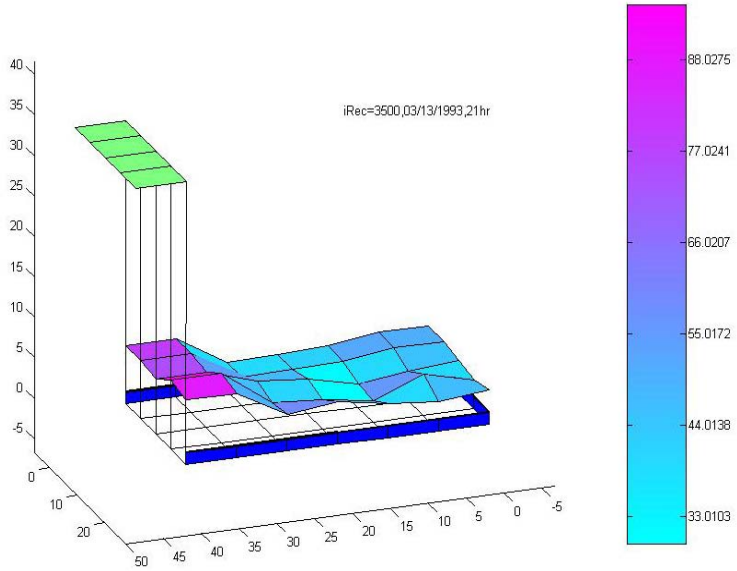


Snow drift visualization is used to determine where drifts are likely to occur for different wind directions and how to mitigate their effects.

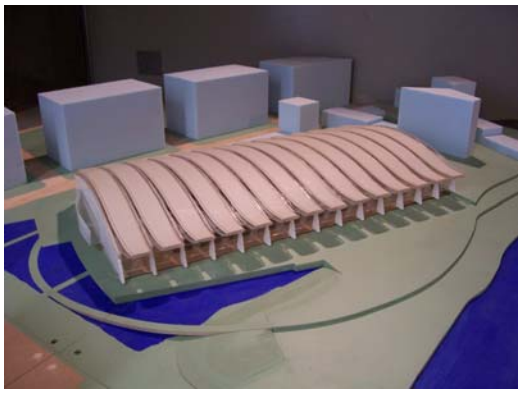
Snow Drifting and Accumulation

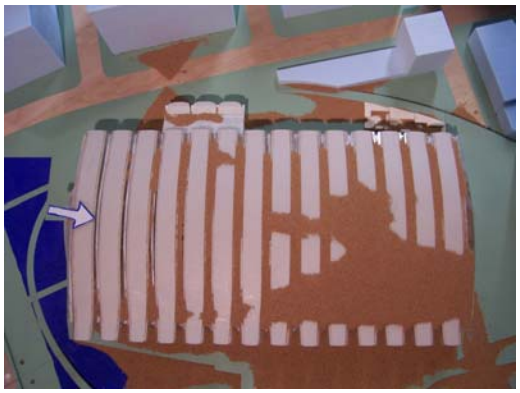
Snow Accumulation Modelling (SAM)

To obtain estimates of snow depths over the roofs of buildings, studies use a combination of wind tunnel modelling and historical meteorological simulations, embodied in a computerized procedure called Snow Accumulation Modelling (SAM). The overall objective of the procedure is to re-create the actual snowfall depths that would have occurred over the study building had the building existed during the recorded meteorological history of the site. The results, based on the number of years of meteorological data, are then used to predict in a statistical sense what is likely to happen in the future.



SAM has been developed by *GmE* to calculate and animate the accumulation of snow on a roof or over ground surfaces over an entire winter season. The user has the option to choose a year and specify the number of rooftop/grade level elements for animation. An on-screen colour bar dynamically shows the relation between the patched colour of the rooftop elements and the instantaneous accumulated depth in centimeters. The height of the colour patched snow surface is proportional to the snow accumulation depth.





Snow Loading and Snow Drifting on Long Span Roofs