SENSOR PLACEMENT FOR SNOW & ICE MELT APPLICATIONS

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A great number of service calls come in with the common problem of the heaters not coming on even though it is snowing outside or there is ice buildup. After trouble-shooting the system it is discovered that the equipment is fine but there is no snow or ice on the sensor.

The proper placement of sensors is critical for the snowmelt system to operate. This is especially true if only one sensor is used, multiple sensors can be a little more forgiving for incorrect placement but to get the most out of the system it would be advisable to locate as many sensors in the "sweet spot" as possible.

The best person to determine the sweet spots for the sensors is the installer but to do so the installer needs to consider several parameters when considering the site and the final location of the sensor or sensors. These include but are not limited to:

1. Prevailing winds
2. Obstructions
3. Orientation of buildings and their affects on snow and drift patterns

Let's start with Prevailing winds

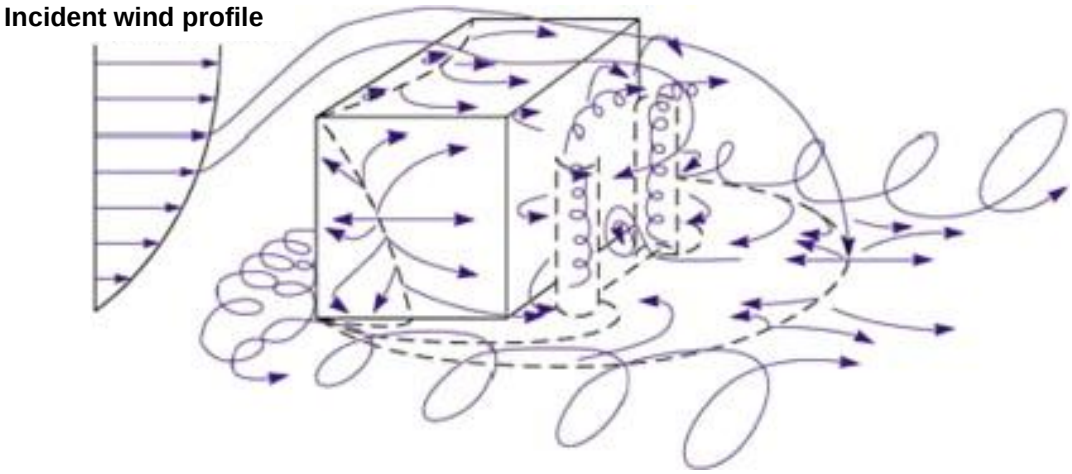
Simply put this tells us the general direction that the wind comes from at any given place. For instance, in South Bend, Indiana where ETI is headquartered the prevailing wind is from the West and varies from the North West or South West. It does not mean that the wind never comes from the East, just that most of the time it comes from the West.

Obstructions

Obviously, trees, bushes, walls, vehicles and buildings can block precipitation from coming in contact with the sensor. What may not be obvious is that this blocking effect could be several feet away depending on the velocity and direction of the wind.

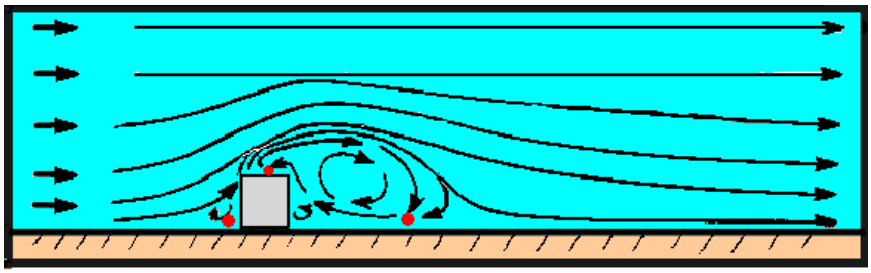
How Buildings affect the snow.

Below is an example of how air flows around an object such as a building and creates vortices that allow snow to accumulate in drifts. These drift zones are the correct location for positioning snow sensors.

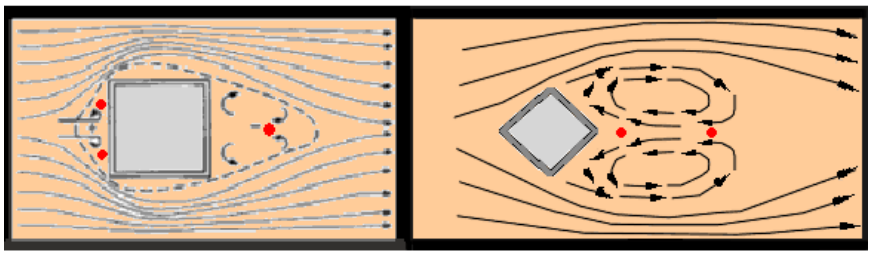


Sensor placement

Below and on the following page are some representations of air flow around buildings. The red dots represent areas where the air turbulence tends to deposit snow. Air turbulence will cause the snow to swirl in many different directions including up it also allows gravity to pull it to a resting place.



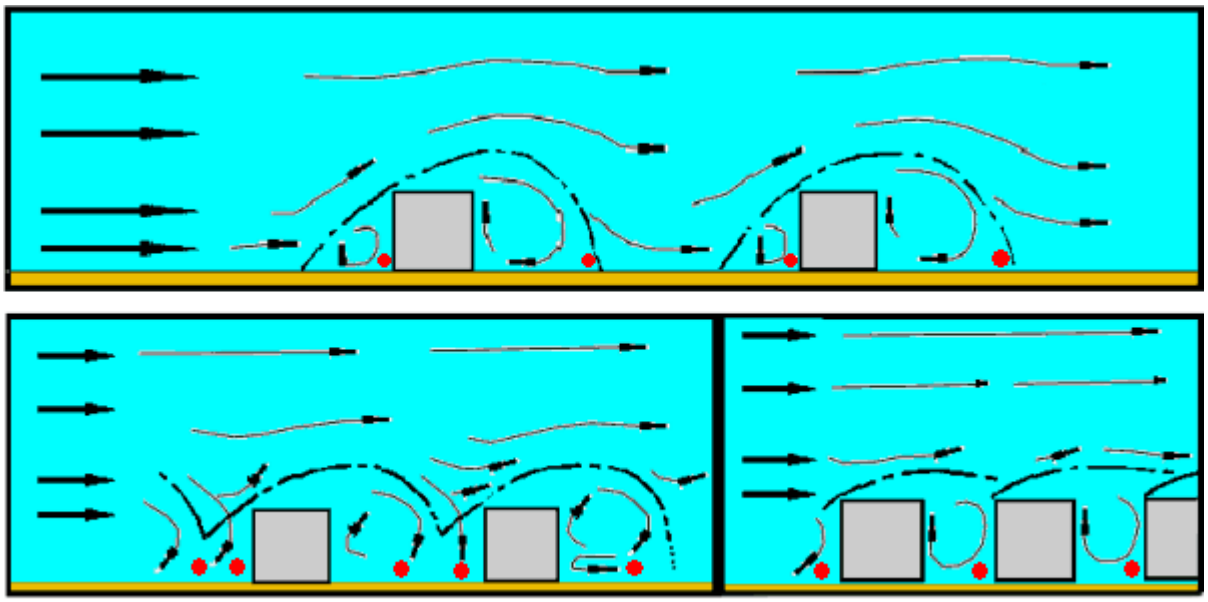
Flow Pattern: Side View Wind Against Face



Flow Pattern: Top View
Wind Against Face

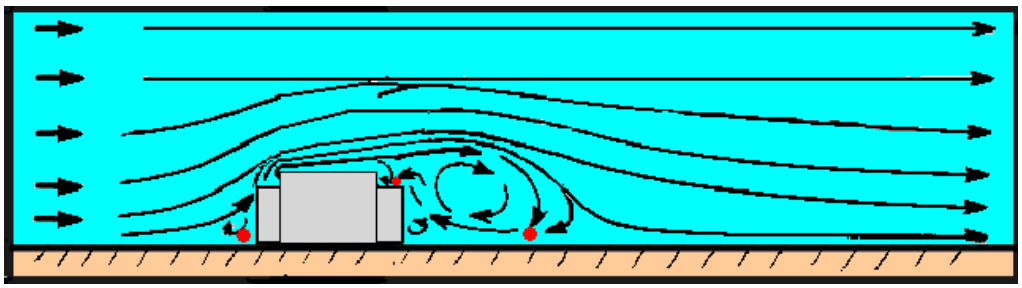
Flow Pattern: Top View
Wind Against Edge

These points should be considered for sensor location.



Urban Wind Flow Patterns With Various Simple Building Shapes and Spacings

This last drawing illustrates a multilevel peaked roof and how the snow will accumulate along the lower roof on the leeward side of the elevated peak.



Conclusion

As you can now see selecting the correct location for a single sensor depends on a great number of variables and needs to be carefully considered, even then the activation of the sensor may be affected by unexpected wind patterns. For this reason, it is advantageous to place several sensors in locations that not only account for the "normal" wind patterns but also for that occasional "Nor Easter" that comes along.

Regardless of the number of sensors each snow sensor should be installed so that it will be higher than the maximum depth of anticipated drifts so the sensor will not be buried. Burying a sensor can cause it to be non-responsive due to the igloo effect. This is caused when the moisture grid heaters melt snow above it causing a cave above the buried sensor. At this point no further moisture can reach the grid to be detected.

While this paper cannot give you exact locations to place your snow sensors it is the authors hope that by providing the informational tools you will have a better understanding and will be able through observation to select the best location possible.