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Vortex Generating Sand and Snow Fence

Researchers at University of South Florida have developed a new technology that addresses problems with currently used sand and snow fence designs. In particular, this fence addresses problems with sand and snow scouring created when the wind direction does not align at the optimum angle with fence made with rectangular slats. Current designs of sand and snow fencing are installed to work at an optimum angle with the prevailing wind direction, which is not always consistent when windy storm conditions move through an area.

This new fence design developed at the University of South Florida, creates asymmetrical vortices in the air as it passes through the fence slats from any wind direction, not just the prevailing wind. This causes airborne particles to fall out of transport and deposit on the downwind side of the fence no matter which direction the wind is blowing relative to the fence.

This fence design employs triangular slats versus rectangular slats used in prior art. By arranging these triangular slats correctly, one can eliminate parallel surfaces through which air moves. Moving air through nonparallel surfaces causes vortices that allow airborne particles (sand or snow) to be trapped in the vortex and fall out of transport.

Lack of consistent vortex generation is a common problem with current designs because the maximum efficiency of rectangular slats occurs only when the wind direction aligns in an optimum angle relative to the fence slats. This new design uses an asymmetrical slat shape to create nonparallel paths that disrupt flowing air and create vortices from wind moving in any direction. The variable nature of wind direction and speed as air moves through the fence panels alter and create new vortices. As each vortex traps airborne particles, when that vortex breaks down or alters, trapped particles drop out of transport and deposit on the downwind-side of the fence slats regardless of the wind direction. Thus, the new design is equally efficient in all wind directions.

Advantage:

- Increases the amount of snow/sand accumulation downwind of the fence by creating vortices in all wind directions

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The above image is a photograph of the mockup of the snow / sand fence created by our researchers. Note the shape of each slat is triangular. This shape helps create vortices that increase the amount of snow / sand accretion downwind of the fence

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