As a major supplier of dust control systems for the coal handling industry, Dust Solutions Incorporated (D.S.I.) has seen a significant increase of customer inquiries from port facilities. This may be in part due to the shifting focus of anti-coal organizations which are targeting coal import/export facilities as part of their efforts to reduce use of carbon based fuels.

Government regulators are responding to increasing pressure from these groups to write ordinances to reduce the environmental impacts of material handling and storage. At this writing a major city in the United States has proposed strict requirements for controlling dust from stockpiles as well as specific control measures that must be in place. One of these control measures is to require the use of wind fences to prevent wind from carrying dust off site.

**WHAT IS A WIND FENCE?**

A wind fence is typically defined as a porous structure (usually a porous fabric mounted to column supports) that is placed on the upwind side of the area that one is trying to protect from the wind. To be effective, the fence must allow a certain percentage of wind to bleed through the fence to equalize the pressure differential on both sides. The definition of wind is the movement of air from a high-pressure zone to a low-pressure zone. Equalization of air pressure reduces the air velocities. By allowing some air to bleed through, the higher speed winds are deflected away from the downwind storage area as the wind then ‘sees’ medium air pressure already present at the stockpile location. The end result can be wind reductions of over 50%.

Trees are natural way of creating these same phenomena and have been used for centuries in the agriculture industry to protect farm fields from damaging winds that cause soil erosion. However, trees take years to grow and require site conditions where they can live (most coal yards are not plant friendly).

**NOT ALL FABRICS ARE CREATED EQUAL**

Dust Solutions DustTamer™ Wind Fence System uses a specially engineered fabric that is knitted from industrial grade woven polyester, resistant to UV rays, inclement weather and temperature extremes. It comes in two porosities to best meet site specific requirements of fence height and coverage area. Its unique ability to be tensioned prevents ‘flagging’ of the material and consequential damage due to abrasion that lesser fabrics are subject to. Real world applications over the last 30 years have shown that DustTamer can withstand winds in excess of 100 mile per hour with no damage.

Another important feature of DustTamer™ fabric besides its strength and durability is its ability to not plug with dust, debris, snow and ice. This self-cleaning feature is due to its ribbed and slotted design. Horizontal ‘ribs’ provide the structure and vertical filaments joining each rib provide the porosity. DustTamers vertical filaments stay loose and move around to release materials that can plug a basket weave type of fabric. This ‘self-cleaning’ feature is very important as it prevents the issue associated with using basket weave pattern materials. If the fabric plugs two things can happen: 1) Plugged fabric prevents the bleed through effect that is necessary for wind reduction so the...
benefit is lost. 2) If the material is plugged the fabric and the structure will receive higher wind loads than when clean, possibly resulting in either fabric or structure failure in high winds.

**Wind Screens combined with Dry Fog™ Dust Suppression Systems**

DustTamer can be used for protecting conveyors, dump and grab hoppers from blowing dust as well. D.S.I. uses DustTamer in conjunction with dry fog dust suppression systems to reduce the ambient airflow across dump hoppers and to contain the dust-fog mixture inside the hopper. Typically the screen is mounted to a frame and surrounds the hopper on three or four sides.

Unlike conventional water spray or chemical spray systems, dry fog is not designed to wet the process material; it only wets the airborne dust. This makes it an ideal solution for dust from moisture sensitive materials such as coal, coke for fuel, copper concentrate, clinker and cement. Moisture addition to the material is typically less than 0.05% by weight and many times is undetectable.

Dry fog systems do not require any chemicals to break up surface tension as its unique nozzle design creates 1–10 micron size droplets that are of like size to the airborne dust. Making the droplet the same size as the airborne dust particles overcomes surface tension as well as the slipstream effect that larger droplets from misting or water sprays create which are ineffective in removing particles from the air.

D.S.I. nozzles flow rates are measured in gallons or litres per hour not minute, ranging from 3.5 GPH/13.25 litres per hour up to 13 GPH/ 60 litres per hour. It has been estimated that a DSI nozzle can cover the surface area of ½ a football field with fog with only 1 gallon/3.78 litres of water. This allows for the D.S.I. nozzles to create large volumes of fog in dump pockets or hoppers.

In conclusion, these technologies can help any port facility comply with air quality regulations, increase worker safety, prevent product loss all while improving their public image.

*DustTamer™ containing Dry Fog™ to agglomerate the airborne dust.*