DUSTEX - The Australian Experience

DUSTEX AUSTRALIA

For more than 25 years, Dustex Australia has been a national distributor of Dustex, a superior dust- suppressant for broad application within the mining industry and the municipal and roadmaking sectors.

Dustex is the key element of a road stabilisation system that virtually eliminates dust – and costly watering and maintenance procedures – from haul roads, access roads and similar heavy traffic areas. It also is extremely effective as a stabilising agent for waste and mineral dumps, rural airstrips and other dust-prone surfaces.

Dustex is a proven, economic and environment-friendly solution for the control of dust. As a road stabiliser, it binds soil particles to provide a firm, hard-wearing surface.

Dustex is a product of Borregaard Lignotech. The Borregaard Group has 1080 employees across 16 countries and is committed to the continued development and market penetration of Dustex, a non-toxic, lignin-based extract from the wood pulping process.

A LIGNIN DERIVATIVE

Dustex is derived from lignin. It is a calcium lignosulphonate, a product of paper manufacture, easy to handle and satisfying all environmental regulations and expectations. Lignin, a natural polymer, is a major component of wood. It imparts rigidity to the cell walls and acts as a binder between the wood cells, creating a composite material that is outstandingly resistant to impact, compression and bending. Lignosulphonate is produced as part of a pulping process where the cellulose and lignin are separated.

Binding Properties of Lignin

An important property of lignosulphonates is their ability to act as binders. The binding action is both chemical and physical in nature and results from the intermolecular forces between the sulphonated lignin molecules and the molecules on the surface of the particles being bonded. The size of the adhesive molecule is important for the formation of the cohesive bond and is also partly responsible for the strength of the cohesion.

Lignosulphonates are effective binders for different types of soil and road aggregates. As a binder it glues the particles in the surface together. The bond is strong enough to resist the abrasion of tyres. The treated surface layer consolidates, preventing individual particle movement and the subsequent generation of nuisance dust.

Dustex and the Environment

Dustex carries no environmental "baggage". It is derived from a renewable and sustainable resource – plantation timber – and has absolutely no effect on flora or fauna when applied to roads and other dusty surfaces. Rather, Dustex is an environmental plus factor, cutting dust exposure for humans and animals and eliminating dust coverage of roadside foliage.

INSTANT DUST SUPPRESSION

The simplest form of dust control is a direct application of Dustex solution onto an unprepared surface. This "instant" or spray-on method of dust suppression is used to treat:

- mineral dumps
- construction sites
- race tracks
- roads
- quarries

and virtually any area where the incidence of health-threatening dust inhibits safe and efficient operations.

Dustex is readily water-soluble and when sprayed directly onto an unprepared surface will consolidate the soil to form a tightly bound layer. It is the easiest and most cost-effective way to achieve a dust-free environment and is far more effective than multiple applications of water.

Dustex is best applied as an aqueous solution under pressure through spray nozzles, although it may also be applied under gravity with equipment as simple as a hose. A water cart equipped with a pump and spray bar is ideal.
The durability of the treatment is determined by the strength of the Dustex mixture, the evenness of application, depth of penetration into the soil and the properties of the material being treated.

For protection against wind erosion the minimum recommended thickness of the treated surface layer is 3-5mm and for protection against wind erosion and moderate dynamic loads, 10-15mm. Dustex applications of 70 to 210 ml per square metre will keep dry sand surfaces stable against wind velocities up to 140 kilometres per hour.

The application method is simple. Water the surface of the target area and spray/apply the Dustex solution at the recommended rate of 1-1.5 litres per square metre. There are many variables which may influence this procedure and the rate of application and strength of the Dustex mixture should be adjusted to suit.

ROAD STABILISATION

The Dustex “mix-in” method is used to bind and stabilise surface layers to a thickness of between 50 and 100mm. The lignosulphonate binds the particles to produce a durable crust that eliminates the individual particle movement which results in dust.

A Dustex treatment will:

- Reduce current road-water usage by 90 per cent
- Eliminate the need for complementary aggregates
- Provide a hard, smooth, dust-free running surface with excellent traction in wet or dry conditions
- Increase the bearing capacity of existing road material
- Significantly reduce maintenance time and expenditure.

Dustex is an excellent binder for a broad range of road materials in many and varied climatic conditions. Optimum results will be achieved if the aggregates in the surface layer have load-bearing capacity when wet, binding capacity when dry and fall in the upper limit of the “ideal gravel zone” when screened.

The product is incorporated into the road material during the water binding process using conventional road making equipment or a high-capacity cultivator. The road is tyned to the required depth, the windrows sprayed with the Dustex solution and thoroughly blade-mixed to ensure even distribution. The material is then laid out and compacted. A slurry coat of diluted Dustex solution may be applied as a surface seal.

Down to Basics

- During the mixing and compaction procedures it is important to maintain optimum moisture content.
- The road should be formed with a 2-3 per cent crown to facilitate adequate/rapid drainage.
- If the treated surface requires grading, first wet the area. Do not grade dry material.
- Avoid saturating the road as excessive water could leach the product from the surface.
- If necessary, a diluted Dustex solution (15 ml per square metre) may be applied to restore the integrity of a treated surface after heavy rain, when the surface starts to dust again or to control fugitive dust.
- The road material should contain a minimum of 6 to 8 per cent of fines with the maximum aggregate size of 10 per cent to the stabilisation depth

The utilisation of Dustex is an essential part of many organisations’ asset management strategy. It is a gilt-edged investment in safe, efficient operation of plant, people and equipment in a dust-free environment.