UNIVERSITY OF NEWCASTLE AUSTRALIA

TUNRA BULK SOLIDS

Services

Dust (Environmental) Testing

Over the past decade, there has been an increased focus on environmental and health concerns related to dust emissions in mining and mineral processing activities. Understanding the behaviour of dry bulk materials in different handling operations is of utmost importance for the design of 'dust-free' facilities.

TUNRA Bulk Solids offers the following dust testing services:

Dust Extinction Moisture (DEM) Testing

One of the methods used for characterising bulk materials is the Australian Standard AS 4156.6, typically known as the "Dustiness" or "Dust Extinction Moisture (DEM)" test, whose main aim is to determine the relationship between moisture content and dustiness levels.

The critical moisture content for dust suppression according to AS 4156.6-2000 is defined as the Dust Extinction Moisture, and provides a starting point for an effective dust control framework.

Fines (-6.3mm) and Lump

The standard was written specifically for coal in the -6.3 mm size fraction but may also be utilised for other bulk materials and larger particles (lump) by adapting the procedure and altering the quantity of test sample according to the bulk density.

Wind Tunnel Dust Testing

Wind tunnel testing may be performed in a medium scale wind tunnel to investigate the lift-off behaviour of particulates as they travel on uncovered conveyors, in rail wagons or when exposed to wind lift-off during stockpiling.

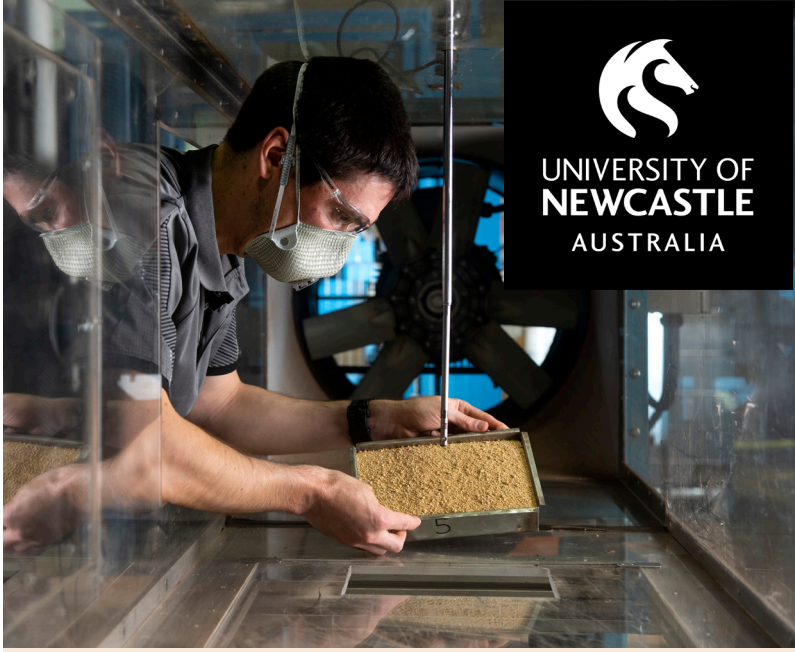
Tests may be carried out at different moisture levels, durations, surface wind velocities and with or without treatment including water only sprays, or sprays containing a solution of water, surfactant and veneers. In addition, DustTrak Monitors can be used to measure aerosol concentrations corresponding to PM1, PM2.5, respirable, or PM10 size fractions.

TUNRA Bulk Solids Wind Tunnel

Wind fences can be used to abate dust emissions in current operations. TUNRA has the expertise and project experience in conducting large wind tunnel scale modelling to assess the stockpile wind fence performance on dust control.

TUNRA Bulk Solids develops custom solutions to suit the individual needs of our clients

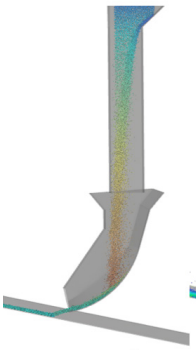
TUNRA Bulk Solids DEM Machine



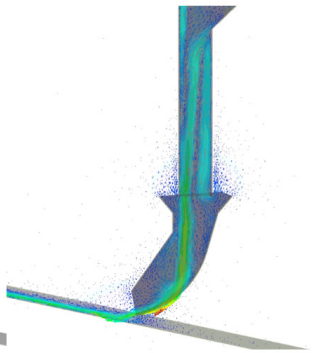
Numerical Modelling

The use of numerical modelling has grown in the field of bulk solids handling, with techniques such as Discrete Element Modelling and Computational Fluid Dynamics being used extensively to simulate the flow of particulates. These modelling techniques allow for great visualisation of material flow and can be used to quantify the effect of design changes of

DEM can be useful for a first evaluation of dust emission to analyse material flow. In general, dust is often generated when there is an abrupt change in particle velocity or direction, which are factors that can be analysed with DEM. CFD can be used with a single-phase approach to simulate air flow only, or a multi-phase approach to model both material and air flow. These numerical modelling techniques are sometimes used by themselves or in combination through either direct coupling or indirect coupling.



DEM Particles



CFD Air Velocity Vectors

Why TUNRA Bulk Solids?

Experience and Expertise

We have provided expert solutions to industry for over 45 years and are the leading organisation for materials handling research and consulting in Australia and internationally

Research and Development

We have a proven track record in research and development through the close association with The University of Newcastle

Quality Service

We have highly qualified, well-trained and specialist staff that are committed to delivering excellence

First Class Facilities

Our laboratory is a state of the art facility located within the Newcastle Institute of Energy and Resources (NIER) at The University of Newcastle

Industry Standards

We are accredited to ISO 9001, ISO 45001 and ISO 14001

Independent

We are independent and not for profit

Further information

- To access our Case Studies **visit www.bulksolids.com.au**
- To discuss your industry and business needs **phone 02 4033 9055**