

# Award winners can solve grain's dust problems, says Wypych

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Associate Professor Peter Wypych of the University of Wollongong

The Olds Elevator and Dust Suppression Hopper - two products which have featured prominently at the Australian Bulk Handling Awards - received plaudits recently from Associate Professor Peter Wypych of the University of Wollongong in his address to the Grain Logistics conference.



Click to view a video excerpt from Peter Wypych's presentation.

At the event, held on April 1st and 2nd in Sydney, Wypych presented a session on Developments in Safe and Reliable Conveying and Handling.

In terms of dust control, Wypych discussed the Dust Suppression Hopper, invented by DSH Systems, a family-run New Zealand company. He showed a video in which a Dust Suppression Hopper reduced dust by 98%, and said that the University would do more modeling of the technology in future.

The Dust Suppression Hopper consists of a hopper with a central plug and uses either springs or a Programmable Logic Computer (PLC) to control the clearance between the hopper and the plug.

The material column has a minimized surface area and entrains less free air than material discharged directly from the outlet of a conveying system. This feature makes the hopper less prone to releasing dust into the surrounding environment.

In practice, material is conveyed into the top of the hopper and is contained until the weight forces the hopper to move away from the plug, releasing the material through the cavity between the plug and the hopper at the bottom of the device. The head of material maintained in the hopper squeezes air trapped in the material to disperse and this allows the product to flow as a solid column at a flow rate adjusted by controlling the clearance between the hopper and the plug.

The Dust Suppression Hopper won an award for Innovative Technology at the 2006 Australian Bulk Handling Awards in Melbourne; at the 2007 event, held in Sydney, the company won the award for Dust Control Technology, Application or Practice.

The Olds Elevator, developed by the Olds family of Queensland, is beginning to find favour as an alternative to bucket elevators. The patented technology reverses normal screw conveyor design, with an outer casing rotating around a static inner screw. It reduces dust and the risk of explosions and is gentle on materials being handled.

The device allows users to elevate a broad spectrum of bulk materials at 90 degrees, while simultaneously volumetrically feeding with a high degree of accuracy. It is finding its way into a variety of plants in Australia and is also being manufactured under licence and finding application in the US, Mexico, UK and Singapore.

The Olds Elevator won an award for Innovative Technology at the 2006 Australian Bulk Handling Awards in Melbourne

Elsewhere in his presentation, Wypych described research being conducted by the University of Wollongong with applicability to the grain handling sector. One area of interest is low velocity slugflow pneumatic conveying, in which materials can be carried at one metre per second, compared to speeds of around 20 ms/s in normal pneumatic conveying.

In the field of air entrainment and dust generation, the original theory was published by Hemeon in 1963, with the latest Conveyor Equipment Manufacturers Association (CEMA) publication the bible of conveyor design producing a similar equation.

In 45 years nothing has changed in this area, but were intent on changing that at Wollongong, said Wypych. Using Hemeon or the CEMA guide youll underestimate dramatically the amount of air entrained, and subsequently the amount of dust. Therefore, you can understand why we see such dust clouds out in the field.

In terms of the computer modeling of particulate flows using DEM simulations, the University of Wollongong has developed its own code but is focusing its energies on validation and calibration work a much neglected field internationally.

Longer term, Wypych suggested that dust suppressants, already used in mining, might be applied in the grain industry.

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Dust Suppression Hopper - [www.dshsystems.co.nz](http://www.dshsystems.co.nz)

Olds Elevator [www.oldselevator.com](http://www.oldselevator.com)

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