Low Impact Dust Control

Using less water and power

Low_Impact_Dust

Gareth McDonald

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Introductions

Gareth McDonald – Material Handling SME

35 years of experience in bulk handling, product handling, palletizing, pallet handling, product packaging and warehousing.

Sat on the UK Health and Safety Executive panel on Combustible Dusts from 2008 to 2012.

Worley group has around 40 material handling engineers with a wide range of skills.

We have worked with seeds and grains, fertilizers including urea, potash and sulphur, woodchips and pellets and with many other bulk materials from salt to coal to metal concentrates.

Safety Moment

SUMMARY

On February 7, 2008, a huge explosion and fire occurred at the Imperial Sugar refinery northwest of Savannah, Georgia.

14 people died and 38 others where injured, including 14 life threatening burns. 3 more died of their injuries.

The explosion was caused by an electrical fault in a ‘non-hazardous’ rated piece of equipment in a dusty area.

Investigations showed that internal company memorandums by managers as early as 1967 expressed their concern about the potential of explosions from sugar dust.

INSIGHTS & LEARNING

- The risk of dust explosions cannot be underestimated!
- Management have a responsibility both legal and moral to act on known information and ensure a safe facility for workers
- Emergency training for all staff is vital
- As equipment and facility designers we are responsible to ensure that workplaces are safe

REFERENCES

- 2008 Georgia sugar refinery explosion - Wikipedia

CSI: Miami

Blood Sugar

Season	9
Number	9
Writer	Gregory Bassenian
Director	Rod Holcomb
Original Airdate	December 12, 2010

1

Materials

A surprising number of everyday materials can be explosive when dusty

2

Progression

The first event is usually minor, but the pressure wave and ignition energy makes the following events devastating

3

Risks

Equipment and infrastructure damage to multiple fatalities

4

Outcomes

- Corporate costs
- Business interruption and closure
- Fines and Imprisonment

Benefits of Dust Control

1. *Reduced risk of fire and explosion*
2. *Reduced cost of housekeeping*
3. *Improved operator conditions*
4. *Lower operating costs:*
   1. *Lower power demands*
   2. *Reduced maintenance*
   3. *Increased uptime*
5. *More sellable product*
6. *Less waste*

Hierarchy of Dust Control

1. *Use a less dusty product*
2. *Reduce the amount of dust generated by the processes*
3. *Reduce the amount of dust liberated during transfers*
4. *Capture dust and blend it back into the flow*
5. *Capture dust and re-use elsewhere*
6. *Capture dust and dispose*

But why does dust impact the Carbon intensity?

Farming / Production

Is energy intensive – fuels, labour

Uses other high CI products . . . fuels, chemicals, fertilizers

Transport

Has a fuel and carbon cost for every lb of material moved

Dust spillage can require more clean up

But why does dust impact the Carbon intensity?

Shipping

Dust slows shiploading (and unloading) down

Difficult to manage – neighbourhood nuisance

Everyone has different reasons

Grain People

Adding water increases the risk of premature germination

Salts People

Soluble products dissolve

Mining People

Water is an expensive (and scarce) commodity

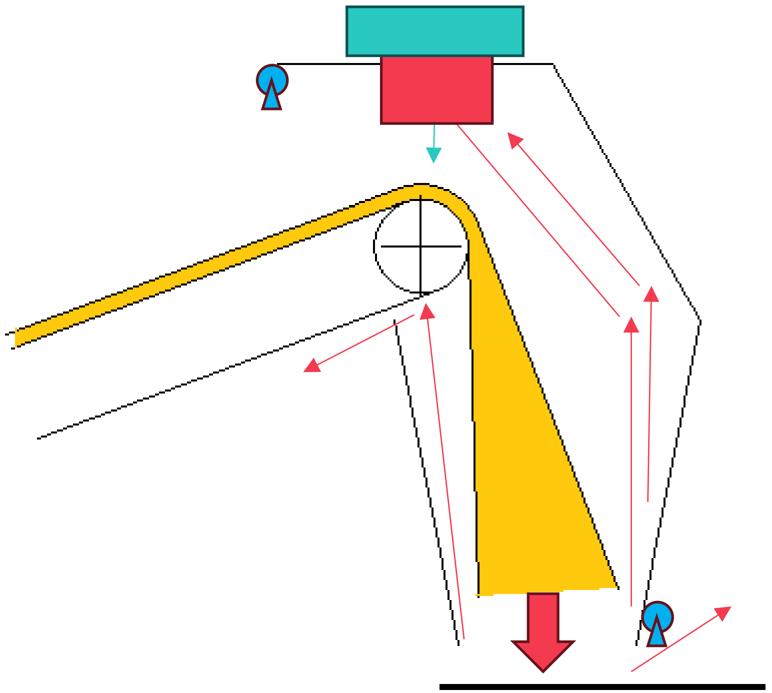
Wood Pellet People

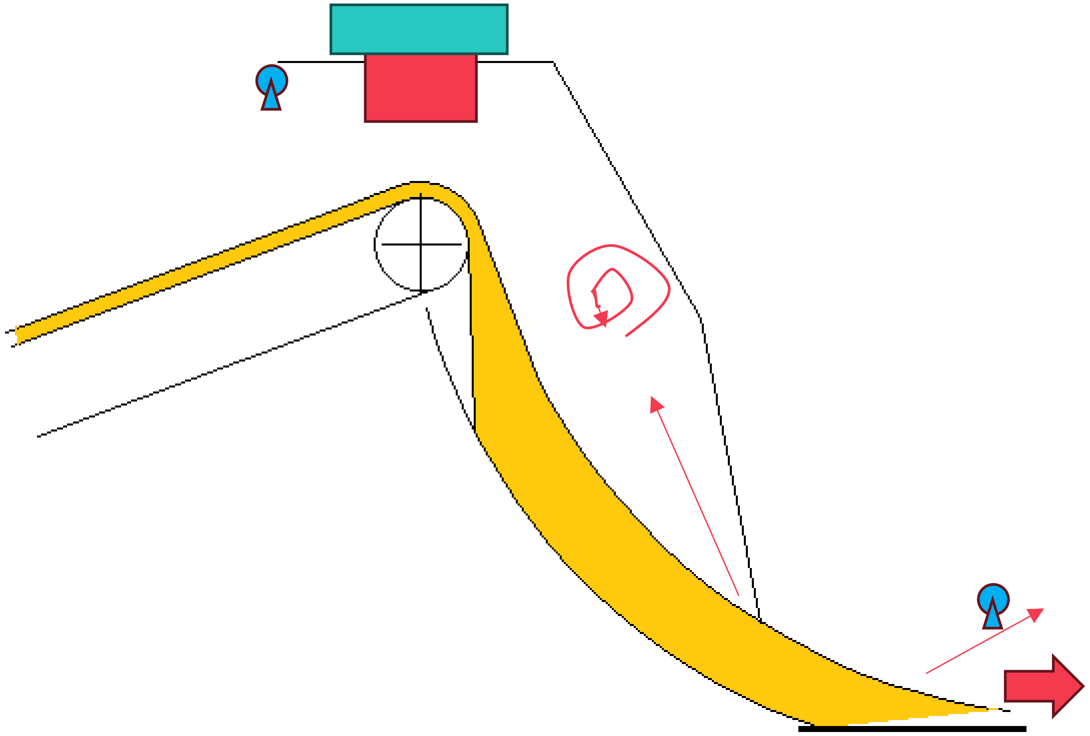
Water increases the likelihood of hotspots and smoulder

(It also sets harder than 5 day old Fruity Pebbles….)

So what can we do?

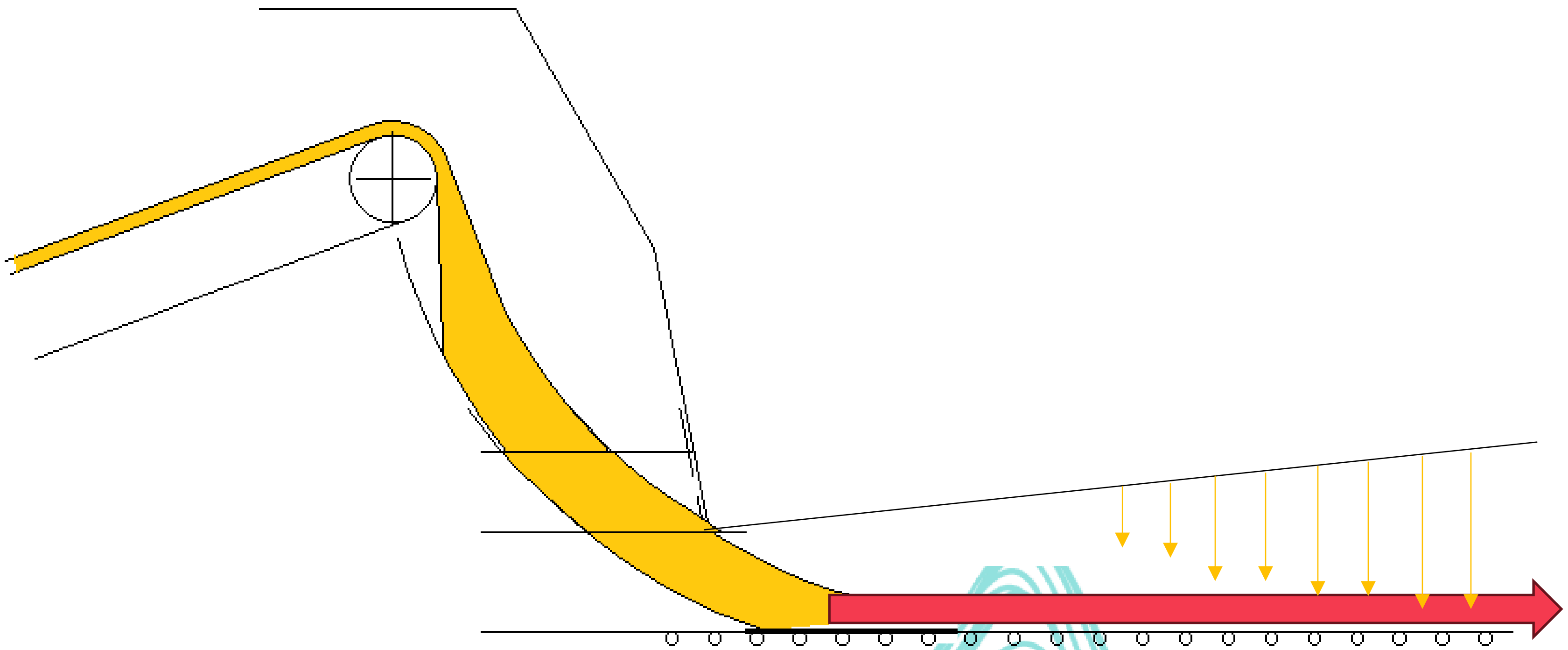
Conveyors





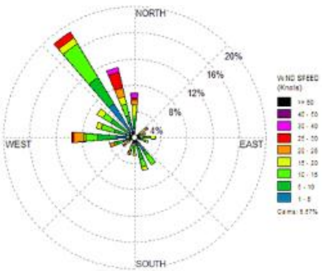
So what can we do?

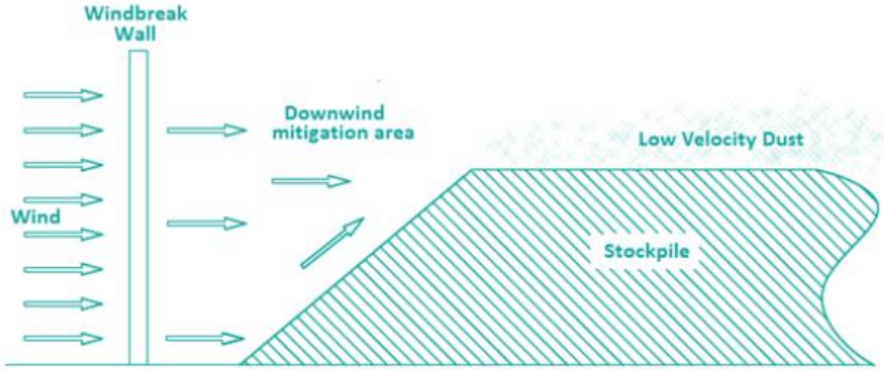
Conveyors



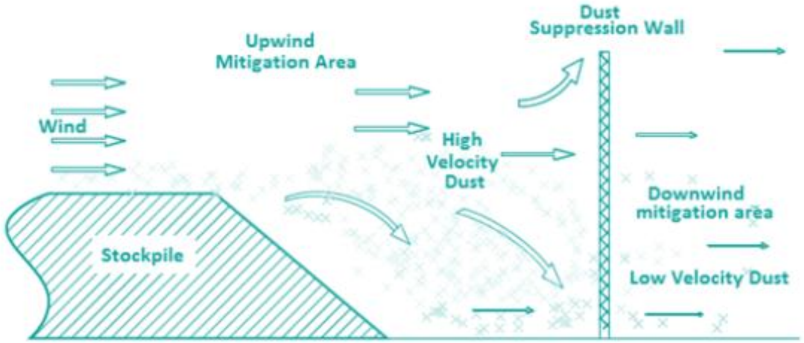
So what can we do?

Stockpiles

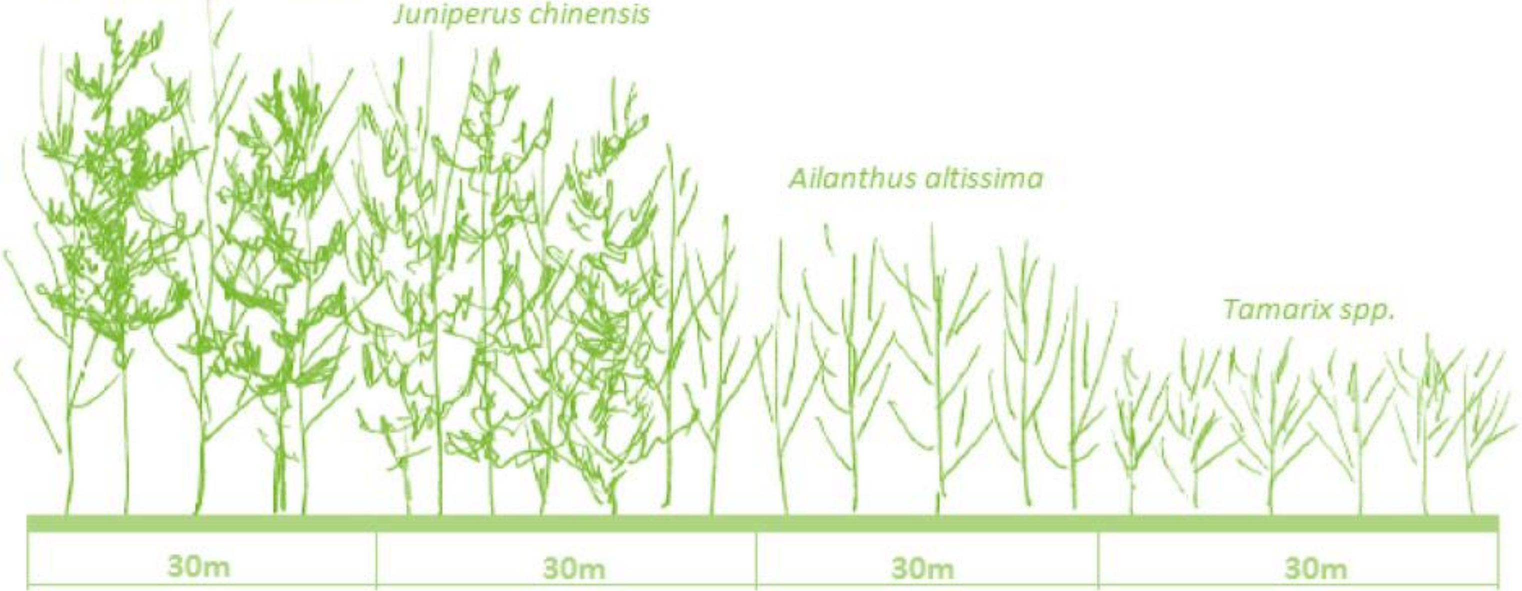




Windbreak Wall

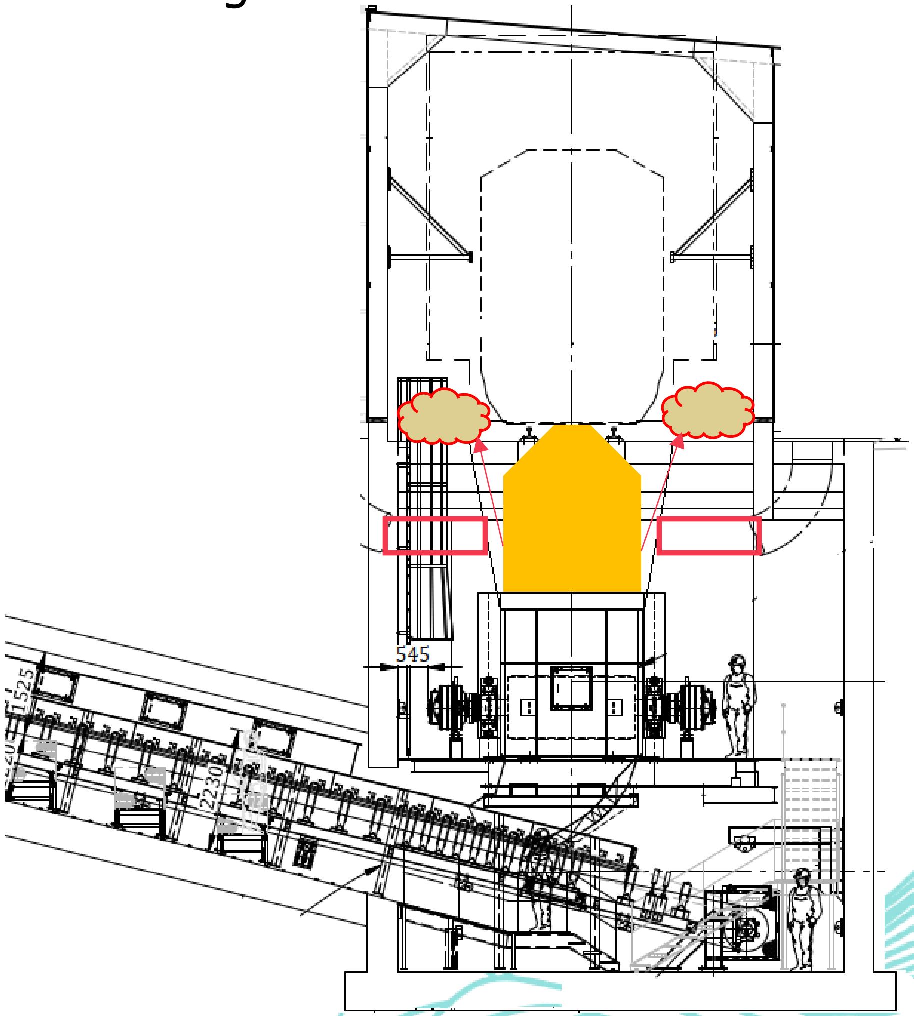


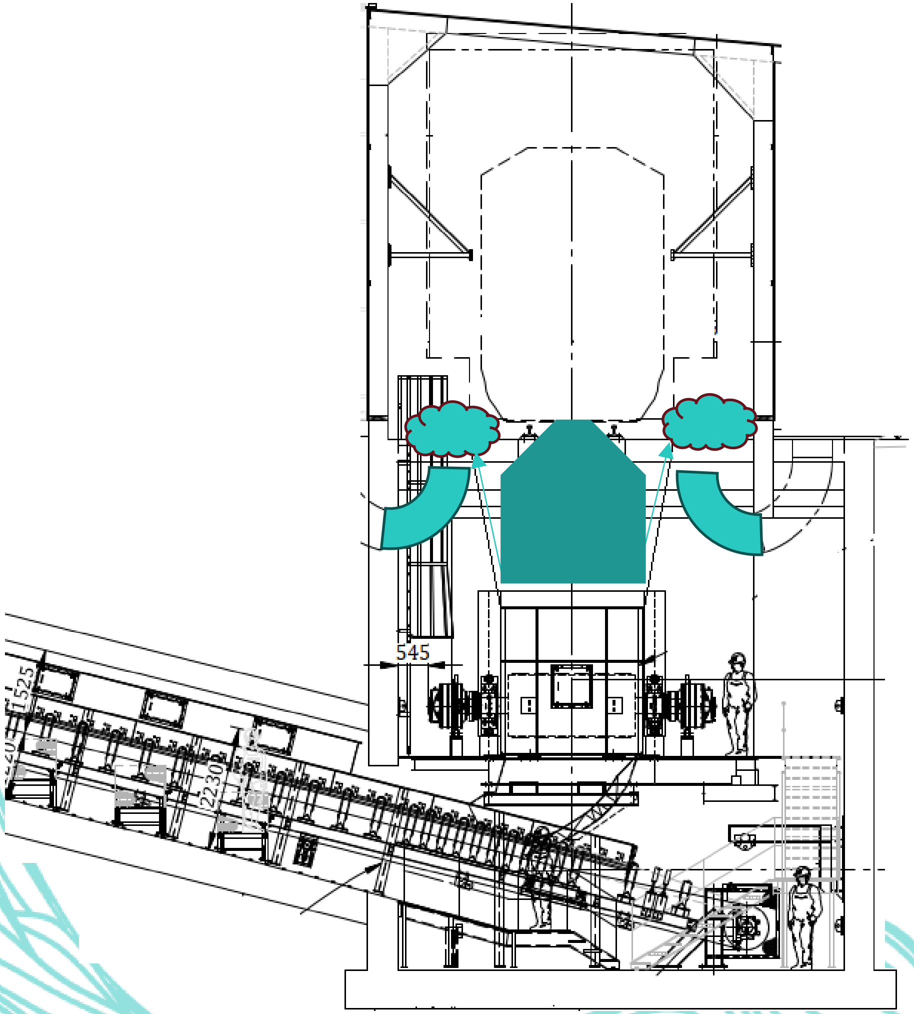
Dust Suppression Wall



So what can we do?

Unloading





What Else Can We Do?

Traditional grain export routing

- FARM – Harvester
- FARM – Trailer
- FARM – Silo
- FARM – Truck
- ELEVATOR – Unloading
- ELEVATOR – Silo
- ELEVATOR – Railcar
- TERMINAL – Unloading
- TERMINAL – Silo
- TERMINAL – Shiploader
- TERMINAL – Ship
- TERMINAL – Ship
- TERMINAL – Shipunloader
- TERMINAL – Silo
- TERMINAL – Railcar
- DEPOT – Unloading
- DEPOT – Storage
- DEPOT – Parcelling

What Else Can We Do?

Grain by bag

- FARM – Harvester
- FARM – Trailer
- FARM – Silo
- FARM – Parcelling
- FARM – Container
- TERMINAL – Parking
- TERMINAL – Ship
- TERMINAL – Ship
- DEPOT – Parking

Conclusion

Every need is different. . .

For each application we must understand the needs of the whole product route from producers, to shippers to end users.

There's a lot of simple options and technologies around, selecting the right one is the difference between a clean facility and a housekeeping nightmare!

‘It’s a conveyor system – They’re always dusty’

‘Fires and explosions are just one of the hazards of this industry’

Two statements that I never want to hear again!

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Q&A

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