

Thiess Smart Water Trucks



Queensland Mining Industry Health & Safety Industry Awards 2007



Innovative Thinking

- **This is not just another water truck**
it's an example of identifying root causes
- **This has not been a quick fix**
it's been a a 2 year commitment to
implement the required change
- **This has been a significant investment of
time and money**
to address a long term mining industry
problem



Thiess Smart Water Truck – creating a step change



The Problem

- Inconsistent application of water onto unsealed roads, resulting in serious incidents involving equipment losing traction
- Qld Dept of Mines reported:
 - 15 incidents in 2005
 - 18 incidents in 2006
 - 6 incidents in 2007 (4 months of data)at least one vehicle is sliding out of control on over-watered roads every 2-3 weeks



Thies Smart Water Truck – creating a step change



The Problem *Typical Examples*



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The Problem *Typical Examples*



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Problem Identification

- Historically, the Water Truck Operator determined the volume and location of water to be applied to the road surface
- Water Truck Operators were often the last to be allocated in the pre-start process
- Other road users were required to adjust their driving to compensate for over-watered roads
- Water Truck configurations have remained largely unchanged for 15-20 years
- Spot watering was used to control loss of traction situations



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Problem Solving

Mindset Change

- **Traditional approaches don't work**
we needed to do more than run a training session or a Toolbox talk.
- **Change required on a number of fronts**
a combination of hard and soft controls were required
- **Not just 'tweaking' one element**
2 year 'journey' to reduce the over-watered road hazard



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The Solution

Creating a Step Change

▪ **Hard Controls**

- Lowered Spray bar with increased number of spray heads
- Smaller spray heads which can be adjusted horizontally
- Electronic controller incorporated to sense ground speed and then regulate water flow and spray head activation
- Modified control box
- Solenoid controlled valve box to regulate water flow
- No water delivered below 5 kph
- Water pump output also linked to ground speed
 - Low – 5 -19 kph
 - Med – 20 - 35 kph
 - High – +35 kph



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The Solution

Creating a Step Change

▪ **Control Box**

The control box is broken up into 5 main functions:

- 1) Spray head selection (High and Low speed sprays)*
- 2) Water Pump activation*
- 3) Water Pump output selection (L,M,H)*
- 4) Water cannon activation*
- 5) Misc lighting and Tail light washing options*



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The Solution

Creating a Step Change

▪ **Soft Controls**

- *Upgraded BCC competency framework to emphasise the responsibility of a Water Truck Operator*
- *Created a Positively Safety Imperative (i.e. Golden Rule) to improve focus on preventing over-watered roads*
- *Minimised the Operator's requirement to constantly 'flick' switches in the cab of the water truck*
- *Provided training and assessment tools to improve awareness and compliance*



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The Solution *Creating a Step Change*

- **PSI #2 addressed following issues:**
 1. Operator Responsibility
 2. Supervisor Responsibility
 3. Water Truck configuration
 4. Management of the Watering Process
 5. General requirements



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The Solution

Creating a Step Change



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The Solution *Video Demo*



The Solution *Video Demo*



Implementation ... *Successful Trial*

- **Commenced with a trial at Collinsville Coal Mine**

A number of field trials were conducted and Operator feedback was obtained

Calibration of the various output settings were also addressed

- **After significant trial period, it was decided to extend the roll-out to our other project sites (9 water trucks)**



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Benefits *Optimal Water Delivery*

- **Water delivery is linked to water truck speed**
The road surface is dampened not flooded
The watering application is constant;
no wet and dry sections
- **Water Truck Operators are expected to be accountable for the amount of water on the road surface**
Dedicated Operators are assigned to the water truck each roster rotation



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Cost Summary

- **Approx \$20K (ea) to modify the existing units**

While the units were being modified we took the opportunity to update and standardise water pumps/piping, hydraulic drives and controllers to allow for interchangeable componentry across the fleet (\$60K ea) – Not essential

- **The cost to set-up a new unit would be approximately \$8-10K**
- **Minimal ongoing maintenance costs**



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Transferability

Across Industry

- **The componentry used are all off-the-shelf items**

Remote Control Technologies designed and configured the controller units

The key to the set-up is being able to 'talk' to the speed sensor

The water trucks were required for 24 - 36 hours to modify



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- **We are still refining some of the settings and configurations to cater for the following:**
 - Different road material types
 - Road construction requirements
 - Variances between day and night conditions (evaporation etc)
 - Seasonal adjustments



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Questions?



