



# NEXT GENERATION HAUL ROAD PERFORMANCE

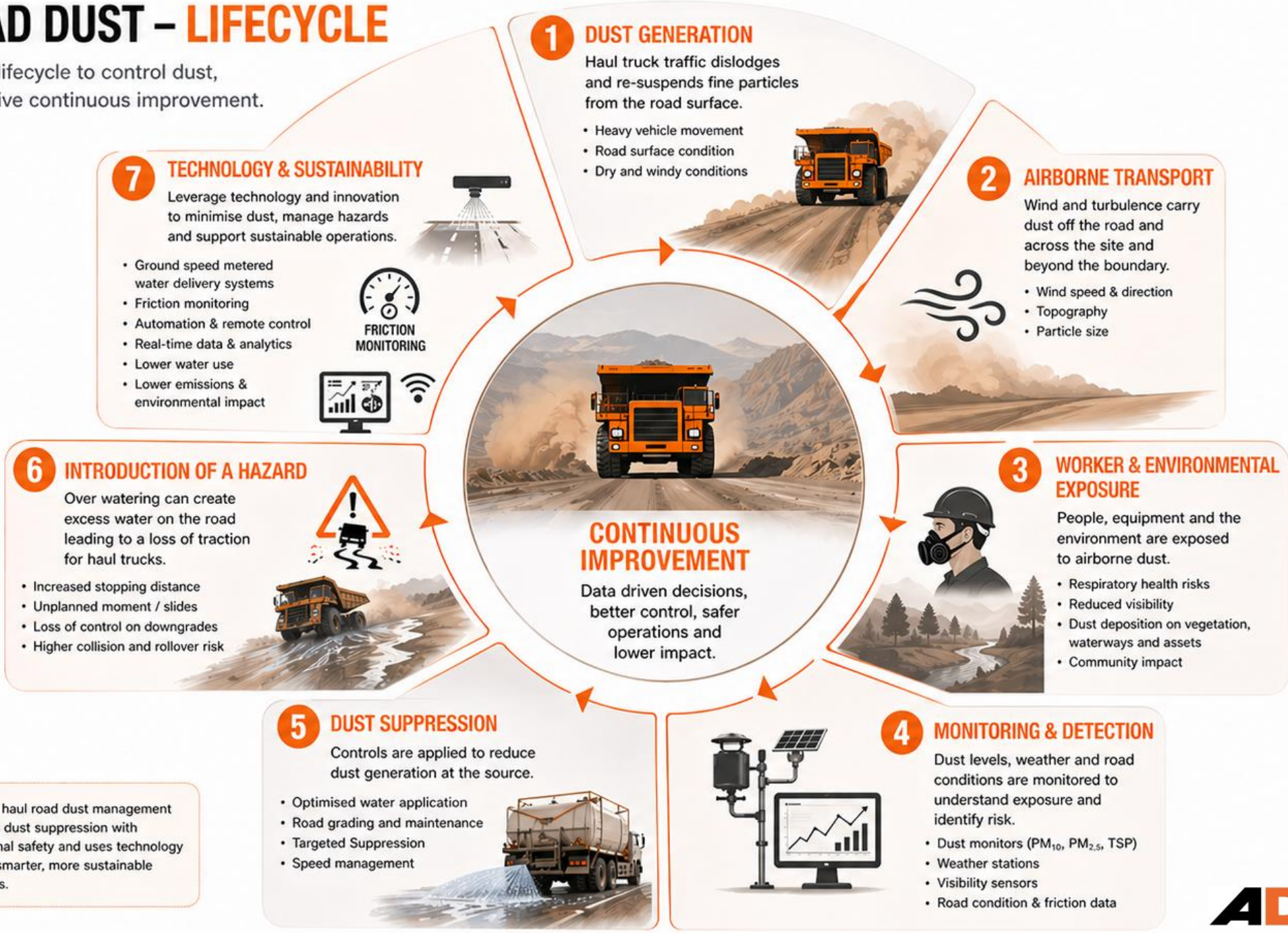
SAFETY, OPERATIONAL & ENVIRONMENTAL GAINS


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Australian Diversified Engineering



# HAUL ROAD DUST – LIFECYCLE

Understanding the lifecycle to control dust, manage risk and drive continuous improvement.



 Effective haul road dust management balances dust suppression with operational safety and uses technology to drive smarter, more sustainable outcomes.



# DUST GENERATION & IMPACT & CONSEQUENCE

- EPA Website Case Studies - *Bust the Dust NSW & EPA initiatives*
- Financial Impact - *Heavy fines & lost revenue*
- Community & Environmental impacts
- Operational Impacts – *Mine Shutdowns, equipment breakdowns*
- Personnel Impact – *OH&S, respiratory diseases & injury*

# HAUL ROAD DUST – RISK IMPACT



# DUST SUPPRESSION- HISTORICAL METHODOLOGY

- Water Cart Operation
- Traditional spray methodology
- Pitfalls – negative outcomes





# INTRODUCTION OF A HAZARD – POSSIBLE OUTCOMES

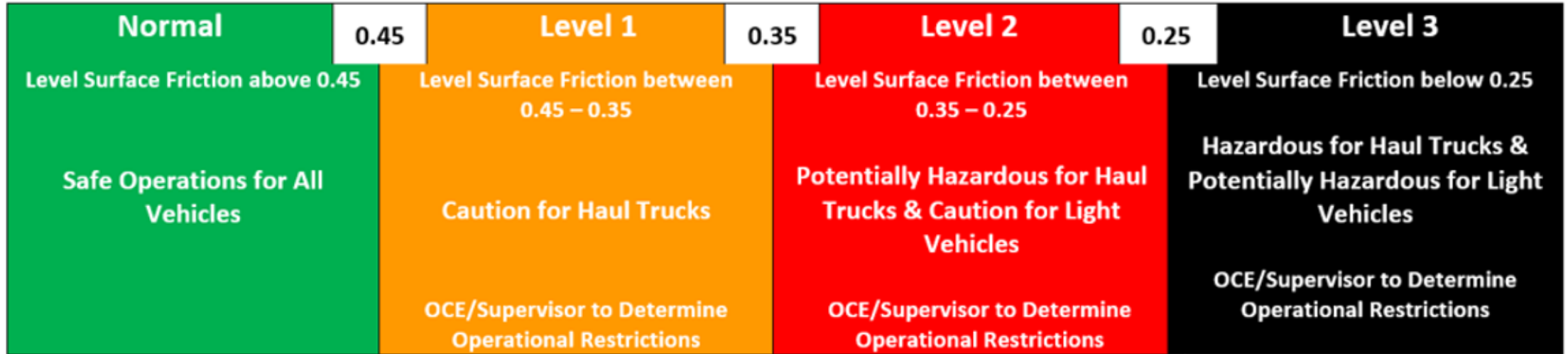
- Over watering
- Unplanned movement / slides
- Increased safety issues
- Shutdowns / Incident investigations
- Regulatory fines
- Operational impact
  - *Water usage*
  - *Increased equipment maintenance*
  - *Reduced productivity*

# HAUL ROAD FRICTION – WHY MEASURING IS IMPORTANT

- Soil substrates
- Ramps / Inclines
- Weather & Climate
- Road maintenance
- Calibrating road surface
- Making informed decisions



# HAUL ROAD FRICTION – PROFILING

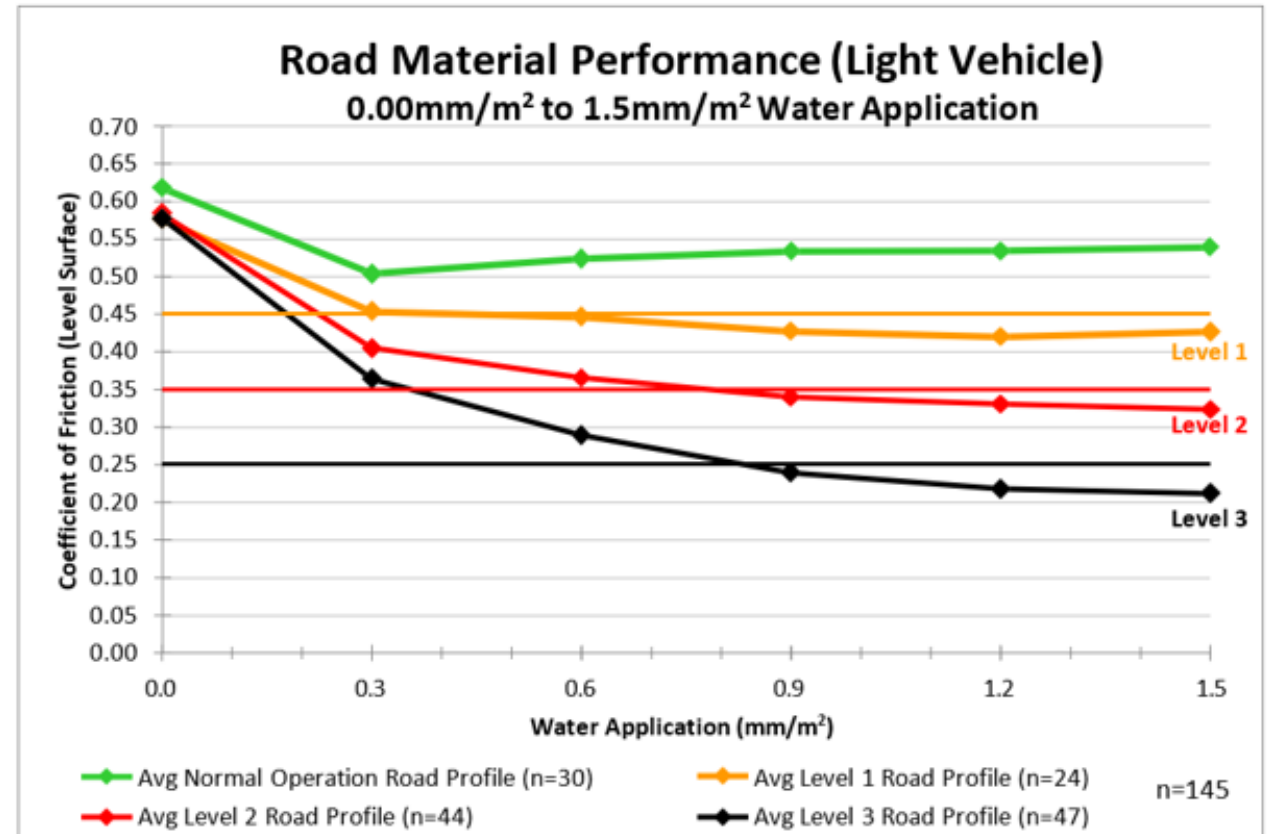


The coefficient of friction is a dimensionless number representing the ratio of the force of friction between two bodies to the normal force pressing them together. It quantifies the "grip" or resistance between surfaces, with higher values indicating more resistance and lower values indicating easier sliding.

Effectively measuring the maximum braking or accelerating force between tires and the road without slipping

# COEFFICIENT OF FRICTION - ANALYSING THE DATA

- **> 0.45:** Safe operations for all vehicles.
- **0.35 – 0.45:** Caution required for haul trucks.
- **0.25 – 0.35:** Significant safety risk; operational restrictions needed.
- **< 0.25:** Extremely hazardous.



Friction Safety Levels (Tulloch/QMIHSC)



**VERICOM**

Precision Instrument  
for Haul Road Design /  
Haul Road Friction /  
Rolling Resistance



**SCAN ME**

## AVAILABLE MEASURING TOOLS

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# NEW GENERATION WATER CART OPERATIONS – ADVANCEMENTS IN SPRAY METHODOLOGY

- New thinking Spray Methodology
- Results driven data – *Friction testing, data logging & operator metrics*
- Intuitive control systems & Operator Ergonomics
- Automation – *Metered GPS ground speed-controlled water delivery systems*
- Compatibility & retrofittable solution
- Environmental sustainability - *Reduction in water and emissions*



# TECHNICAL SPECIFICATIONS - ADE SPRAY

<b>Operator selectable coverage</b>	<b>0.1mm to 1.5mm</b>
<b>Operator selectable Operating speed range</b> <i>(water coverage rate dependent)</i>	<b>5 km/h to 55 km/h</b>
<b>Water per spray head group</b> <i>(Based on Komatsu HD785 hydraulic system, tank &amp; pipework design &amp; hydraulic circuit conditions)</i>	<b>144 LPM - 3,800 LPM</b>
<b>Spray width per spray head group</b>	<b>6 – 8 meter standard</b>
<b>Water pump max flow rate</b> <i>(Based on Komatsu HD785 hydraulic system, tank &amp; pipework design &amp; hydraulic circuit conditions)</i>	<b>7,320 LPM (maximum)</b>

# Spray Head Configurations

Based on 0.5 (L/m<sup>2</sup>) water coverage rate of speeds up to 55kph. This is for illustration purposes only.

## 1 (2x) 8m Spray Banks

a Total: 7,320Lpm\*

b Mode: Zig zag  
Total: 3,600Lpm\*

## 2 (2x) 4m + 15m Spray Banks

a Mode: (2x) 4m  
Total: 3,300Lpm\*

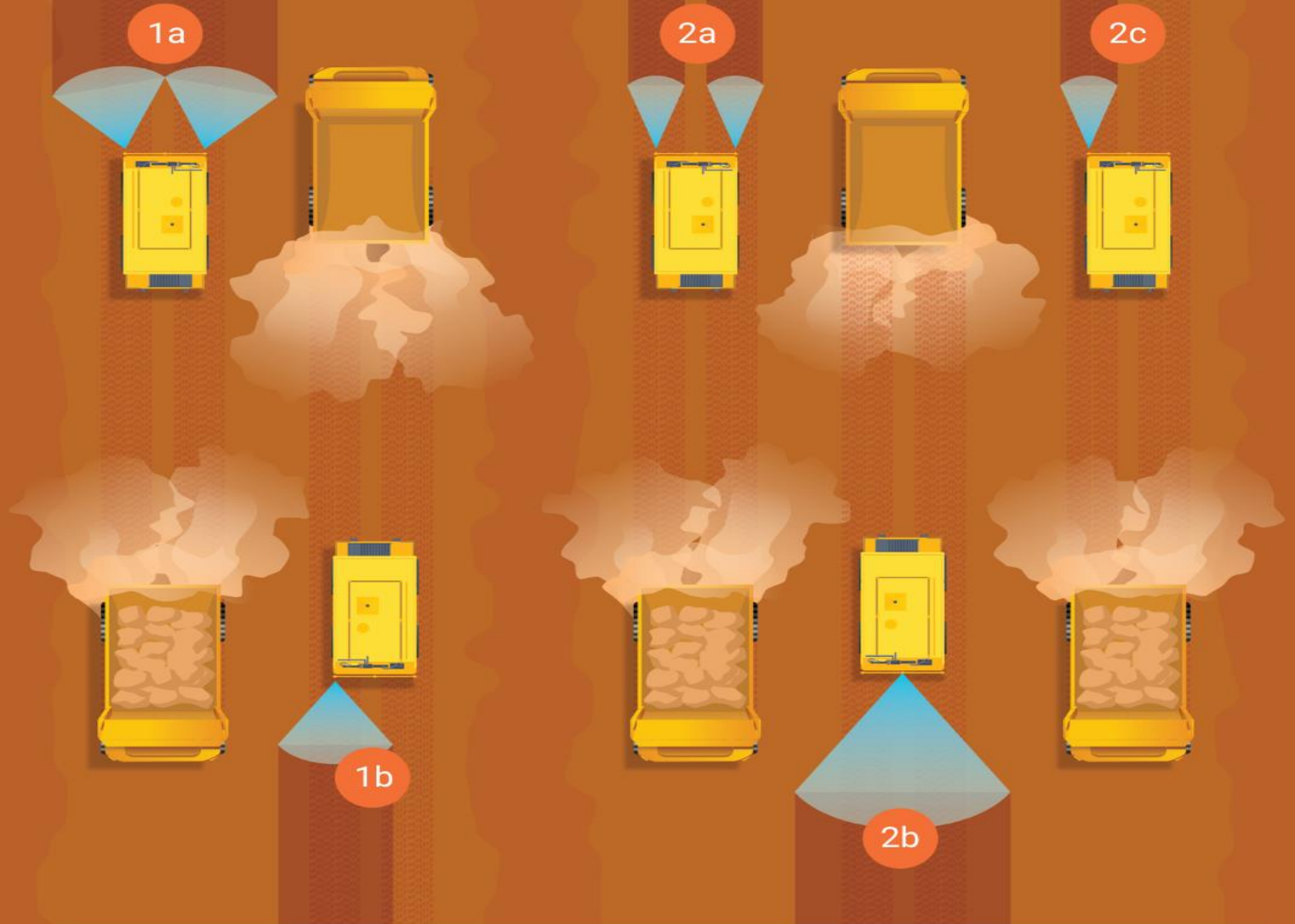
Top speed of 45kph in this mode

b Mode: 15m Centre spray  
Total: 6,300Lpm\*

Top speed of 50kph in this mode

c Mode: Zig zag  
Total: 1,800Lpm\*

\*Water flow rates are based on a Komatsu HD785 hydraulic system and also subject to tank design, pipework configuration & hydraulic circuit condition.



DID YOU KNOW?

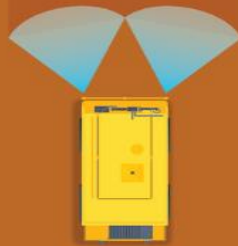
**The primary source of dust on haul roads, is trucks themselves.**



The majority of fugitive dust generated on haul roads comes directly from the tyres of haul trucks as they move across the surface. Every pass stirs up fine particles, especially when the road is dry or poorly treated.

## Spray System Functions

ADE Spray offers a full suite of intelligent spray functions designed to suit any condition. From targeted spot spraying or full-coverage flood mode, operators can easily adapt spray output to optimise dust suppression, reduce water use and boost safety on-site.



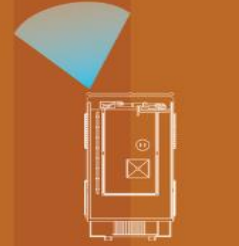
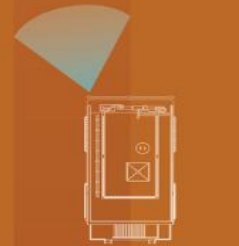
### METERED MODE

Metered mode is a controlled water output mode. The system adjusts water output to achieve the selected water coverage rate based on vehicle speed.



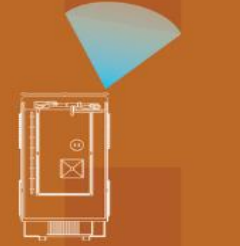
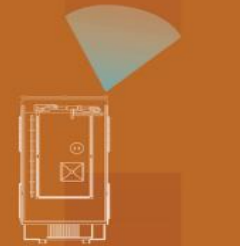
### ZIG ZAG

Zig Zag mode is a controlled water output mode that alternates between two or more spray heads, leaving a constant alternating dry line.



### STRIP SPRAY

Left or right spraybank only, leaving a constant dry line.



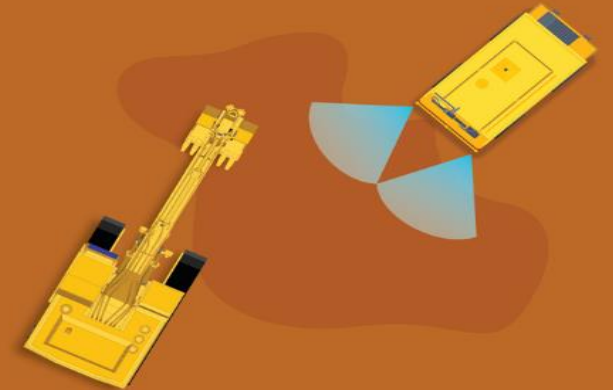
### SPOT SPRAY

On/off distance controlled (adjustable) pulsing of selected spray bank.



### PUMP OVERRIDE

Allows for ancillary water control function such as front water pressure outlet(s). Settable maximum water pressure for control.



### FLOOD MODE

Fully Open spray banks controlled by engine RPM with a settable target water pressure.

# HAUL ROAD DUST – TECHNOLOGY & SUSTAINABILITY

Smart technology for efficient dust management, safer operations and a more sustainable future.

## SMART WATER DELIVERY PRECISION & EFFICIENCY

- ✓ Ground speed metered water delivery systems adjust application rates in real time.
- ✓ Ensures the right amount of water is applied – not too little, not too much.
- ✓ Reduces water usage by up to 30%.
- ✓ ADE Spray 4.0 is Smart Drop certified.



## ADE FRICTION SAFETY & TRACTION

- ✓ Friction testing & training
- ✓ Measure coefficient of drag
- ✓ Realtime data to make better decisions.



## FUTURE READY

- ✓ ADE Autonomous water trucks & systems already in use in Australia.
- ✓ Fully Electric water systems under development.



## OPTIMISED TRUCK PERFORMANCE

- ✓ Ergonomic driver controls
- ✓ Lower hydraulic pressures
- ✓ Lower maintenance and running costs.



## SUSTAINABILITY OUTCOMES



**WATER EFFICIENCY**  
Use less water through precise application and smart controls.



**LOWER EMISSIONS**  
Reduced dust emissions improve air quality and community health.



**ENVIRONMENTAL STEWARDSHIP**  
Minimise impact on vegetation, waterways and ecosystems through effective dust management.



**FUEL & ENERGY SAVINGS**  
Optimised routes and automation reduce fuel use and greenhouse gas emissions.



**SAFER OPERATIONS**  
Better traction, visibility and less rework create a safer and more productive site.



**STRONGER COMMUNITIES**  
Reduced dust leaving site boundaries builds trust and supports social licence to operate.