

The Cost of Water in Trucked Manganese

Why chemical dust control saves more than it costs along the Hotazel-to-port corridor

An industry cost analysis prepared by Benmarc Environmental

29 years in SA mining · 200+ installations · 35M tonnes treated annually

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SECTION 1

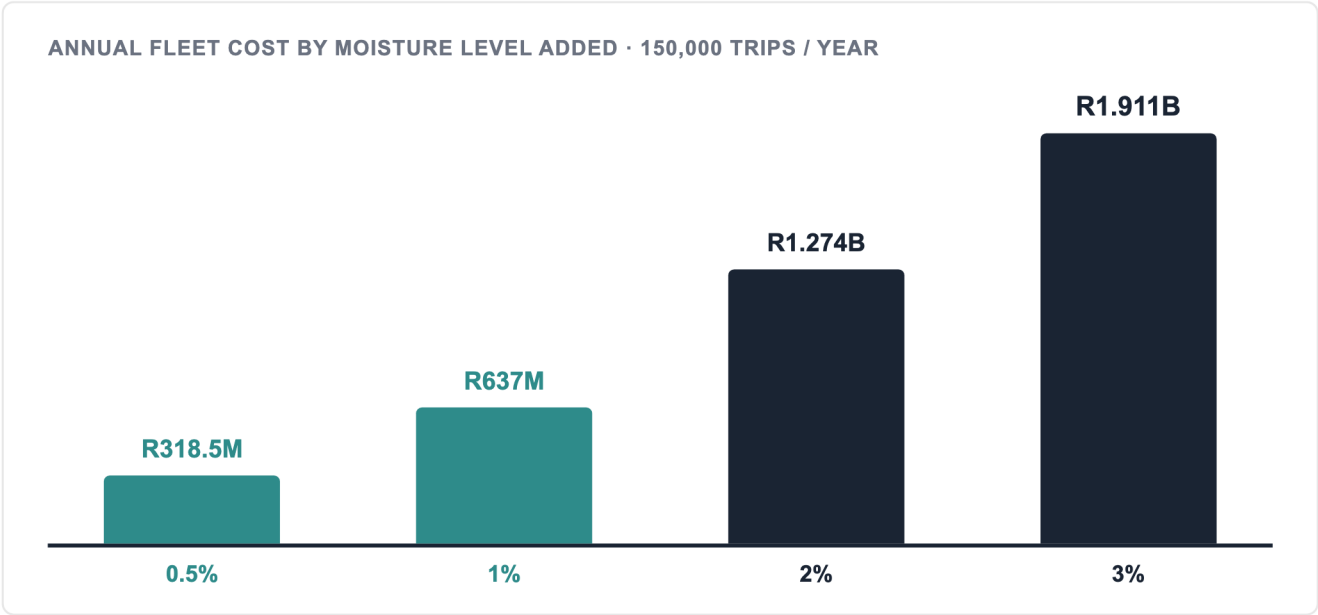
The Problem

Approximately 10 million tonnes of manganese ore move from the Kalahari Manganese Belt to export terminals each year by road. The dominant corridor, Hotazel to Ngqura, covers roughly 1,100 km. Water is the most commonly used dust suppressant, but not the most cost-effective. Every litre added at the mine must then be hauled, handled, and ultimately paid for as dead weight on the invoice.

SECTION 2

What Moisture Costs

On a 34-tonne truck, every 1% of moisture equals 0.34 tonnes of water. That water displaces saleable ore and is deducted from the invoice before the mine is paid. The cost scales directly with moisture: the chart shows the annual bill to a 500-truck fleet at each level; the table breaks it down per trip.



Moisture level	Water per truck	Trucking wasted / trip	Product value lost / trip	Total / trip	Annual (fleet)
0.5%	0.17 t	R262	R1,862	R2,124	R318.5 million
1%	0.34 t	R524	R3,723	R4,247	R637 million
2%	0.68 t	R1,048	R7,446	R8,494	R1.274 billion
3%	1.02 t	R1,571	R11,169	R12,740	R1.911 billion

Water-only dust suppression typically adds 3%+ moisture. BM515E achieves better dust control at 0.5 to 1%. **The gap between those two rows is the opportunity.**

Basis: trucking rate R1.40/tkm over 1,100 km (R1,540/tonne, of which ~R118 is diesel at R30.64/litre); manganese priced per dry metric tonne unit (dmu), so all moisture is deducted before payment. Fleet: 500 trucks, 34-tonne payload, 150,000 trips per year.

The Benmarc Solution: Treat at Source, Travel Clean

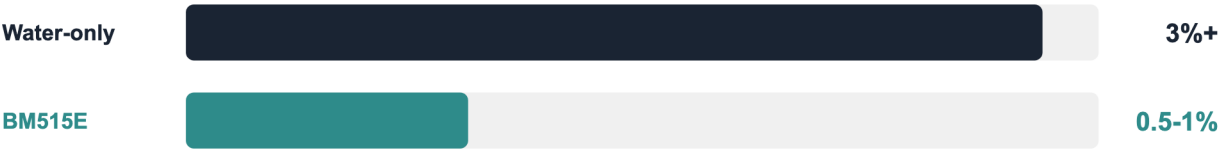
BM515E binds dust fines to larger ore particles with a single application at the loading point. It achieves 90%+ dust reduction at just 0.5 to 1% moisture, against the 3%+ and roughly 80% reduction that water-only methods deliver with constant reapplication. The binding effect persists for up to 14 days and carries through multiple transfer points, so the load travels clean from mine to port without re-wetting.

Benmarc is not a chemical supplier. Through its Total Dust Management model, TDM® (Total Dust Management), it delivers chemistry, engineering, fabrication, installation, and maintenance under one supplier, on one contract. With the National Dust Control Regulations 2026 tightening limits and NEMA Section 24G fines reaching R5 million, treating dust at source is now a compliance position as much as a cost one.

One supplier, one contract: the TDM® model



Moisture added per treated tonne



The gap, roughly 2 percentage points, is ore shipped instead of water on every trip.

Sources: benmarc.co.za (BM515E product page); ScienceDirect (2024); Aerosol and Air Quality Research (2022); Ecolab/Nalco Water; SA Government (NDCR 2026, NEMA).

Beyond the Direct Cost

The per-trip economics capture only the direct payload cost. Excess moisture creates compounding costs downstream:

Port penalties and TML compliance

Manganese ore fines are classified as Group A cargo under the IMSBC Code, and may liquefy if shipped above their Transportable Moisture Limit. Cargo exceeding TML cannot be loaded, causing demurrage of US\$15,000 to 50,000 per day. Every drop of water added at the mine reduces the available moisture budget for safe shipping.

Material handling and conveyor life

Wet manganese sticks to truck bodies, chutes, and conveyor belts. Belt carry-back accounts for up to 3% of throughput as waste. Chute blockages from wet fines can shut down processing for hours.

The Markman crisis

In June 2026, the Daily Maverick reported that the Markman airshed in Gqeberha has reached a state of saturation, with dust deposition far exceeding the NDCR non-residential limit of 1,200 mg/m²/day. This crisis is about ore treatment: material arriving at port with excessive fines and inadequate dust control generates emissions at every handling step.

Sources and Methodology

Cost model. Publicly available benchmarks: R1.40/tkm trucking rate (Discovery Alert); manganese priced per dry metric tonne unit (Fastmarkets); SA diesel R30.64/litre (SA Government, July 2026). Fleet parameters (500 trucks, 34t payload, 150,000 trips/year) reflect a large Northern Cape loading operation on the Hotazel-to-Ngqura corridor. Cost at each moisture level scales linearly from R4,247 per trip per 1% (R637 million/year fleet-wide).

BM515E performance. The 0.5 to 1% moisture addition and 90%+ dust reduction figures are published on benmarc.co.za (BM515E product page). Water reduction is calculated by comparing BM515E moisture addition against the 3%+ required by water-only methods.

Third-party research. Discovery Alert, African Mining Market, Reuters/Zawya, Fastmarkets, ScienceDirect (2024), Aerosol and Air Quality Research (2022), Ecolab/Nalco Water, Daily Maverick (June 2026), IMO/IMSBC Code, SA Government (NDCR 2026, NEMA, Mine Health and Safety Act), Tega Industries, Flexco, Razor Labs.

Disclaimer: This brief is prepared by Deep Water Advisor for Benmarc Environmental. Cost figures are modelled from publicly available data and should be validated against actual operational parameters for any specific site. Benmarc does not guarantee specific savings without a site assessment.

Water is the expensive option

THE PROBLEM

R1.911_{bn}

The annual cost of 3% unnecessary moisture across a 500-truck fleet: hauled water and displaced ore, paid for at every trip.

THE SOLUTION

0.5-1%

BM515E moisture addition, from a single application that binds dust at source.

90%+

dust suppression

14 days

residual effect

THE DIFFERENCE

R1.274_{bn}

Annual recoverable value from a 2% moisture reduction: ore shipped instead of water, on the same fleet, over the same road.