

# THE AUSTRALIAN MINING REVIEW

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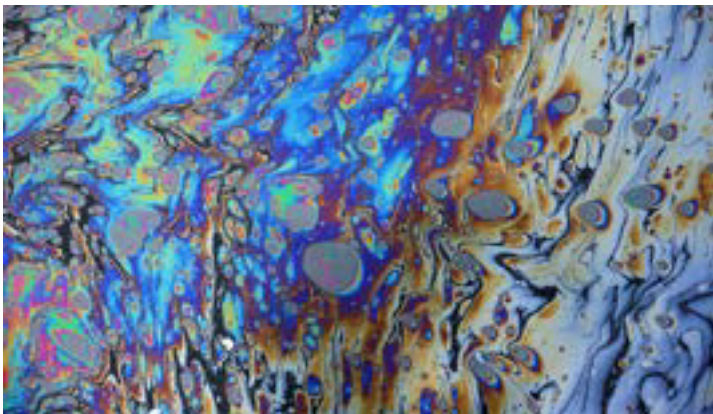




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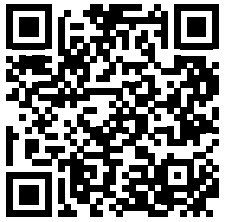
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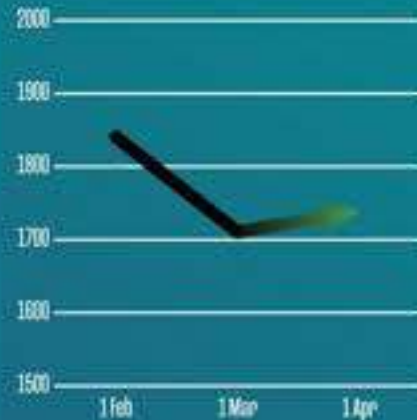
# MAJOR COMMODITIES

## SNAPSHOT

### GOLD

\$US/oz

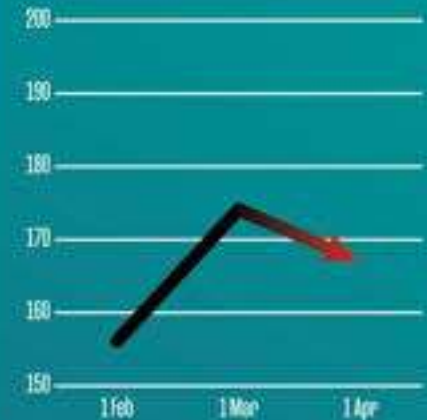
Gold has flatlined around US\$1700/oz and is expected to continue to lose its lustre in 2021 as the COVID-19 vaccines are rolled out, lifting real bond yields and weakening the appeal of the precious metal for investors.



### IRON ORE

\$US/t  
62% Fe CFR China

Iron ore prices remain at near 10-year highs around US\$170/t due to high steel production in China with many analysts now tipping the price to remain strong throughout 2021 before dropping in 2022 as Brazilian supply recovers.



### COPPER

\$US/t  
LME Price

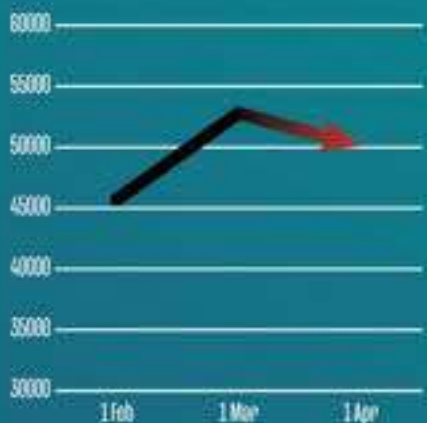
The Department of Industry's latest quarterly report predicts the base metal to be buoyed by the global economic recovery and rising investment in low-emissions technologies.



### COBALT

\$US/t

The key element in lithium-ion batteries has experienced supply challenges during the pandemic as most investors tip the price to continue rising as the electric vehicle sector picks up.



### ALUMINIUM

\$US/t  
LME Price

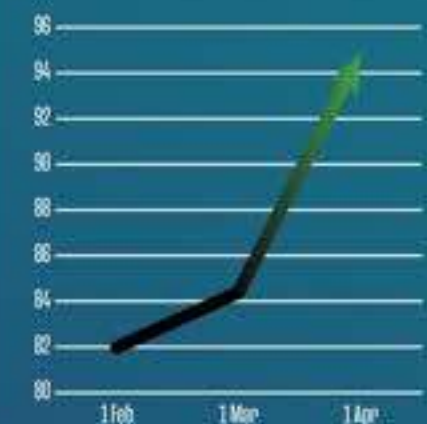
The aluminium price is expected to continue its upward trajectory due to strong demand from China, however could go backwards if new strains of COVID-19 significantly disrupts global economic recovery.



### THERMAL COAL

\$US/t

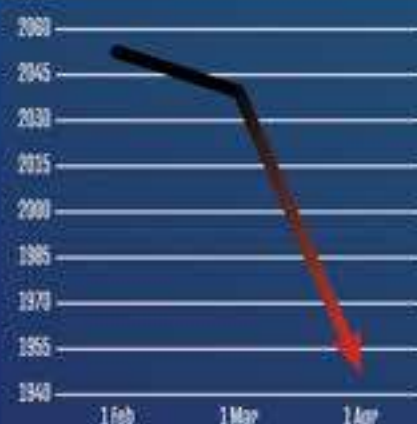
Tighter supply from the Port of Newcastle due to heavy rain as well as cold weather in north Asia has supported the coal price but will likely ease as weather conditions normalise.



### LEAD

\$US/t  
LME Price

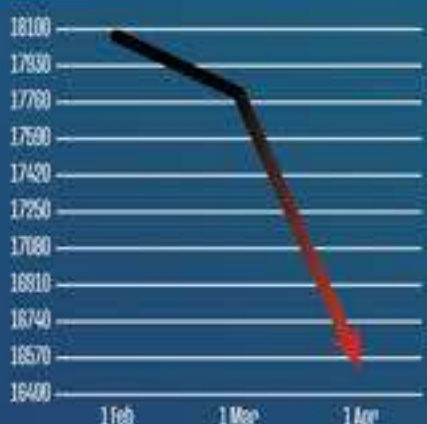
The lead price has dropped since the start of the year but is expected to remain strong amid healthy demand from battery makers.



### NICKEL

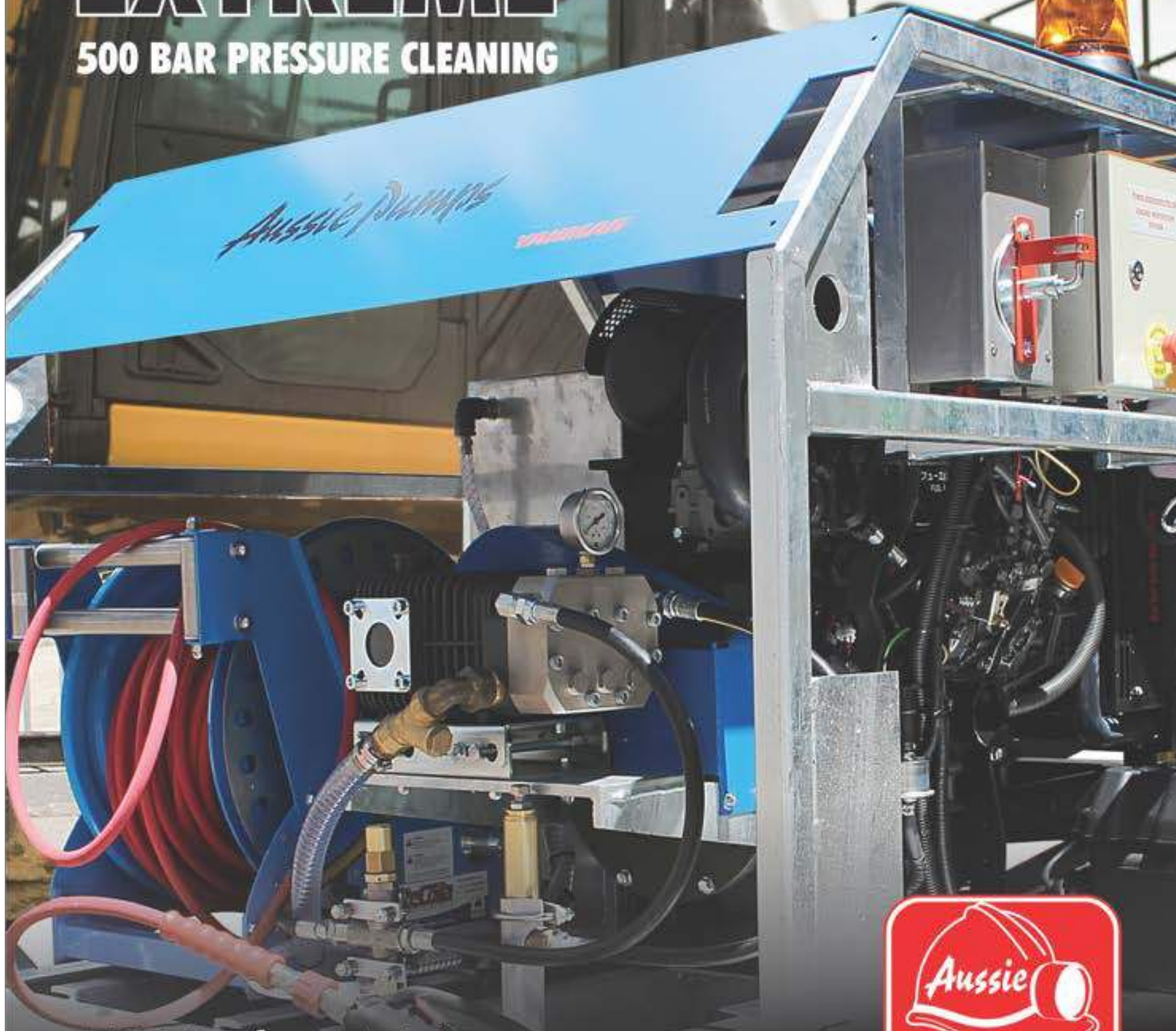
\$US/t  
LME Price

Nickel prices have plateaued in recent months but are expected to rise in coming years amid the battery storage revolution.



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# Climate Action for WA

WA Premier Marc McGowan says the creation of new environmentally-minded portfolios in his Cabinet should not concern the resources sector.

The WA Labor Party was returned to power in March in an historic landslide, and now reigns over both houses with absolute majorities.

Among the new portfolios created were a Climate Action role for incoming minister Amber-Jade Sanderson, and responsibility for Green Hydrogen to veteran Alannah MacTiernan.

The moves come as WA gears itself as an emerging renewables energy hub up, with a rise in battery production plants, wind turbines and blade production facilities.

Its vast area is able to host large-scale solar and wind power farms to power hydrogen and ammonia plants, which can fuel a domestic manufacturing industry, as well as supplying ammonia and hydrogen to Asian markets.

With the State depending on royalties from mining and in particular iron ore, Mr McGowan said he did not think the focus on reducing emissions would be a point of concern for the resources industry.

Although he has said that no carbon targets would be legislated at a state level, both the ALP and Liberals want to achieve net zero by 2050.

"If you talk to any of the mining companies, they are totally on board with taking action on climate," Mr McGowan said.

"So [having ministers] is just a great demonstration the government wants to work with industry to achieve outcomes in this area."

Fortescue Metals Group chief executive Elizabeth Gaines said the introduction of the hydrogen industry portfolio was recognition of the critical role green hydrogen would play in the global energy transition, required to meet the targets established by the Paris Agreement.

"Fortescue has set an ambitious, industry-leading target to achieve carbon neutrality by 2030, supported by our wholly-owned subsidiary Fortescue Future Industries, which is focused on harnessing the world's renewable energy resources to produce green electricity, green hydrogen, green ammonia and other green industrial products," she said.

"We welcome the appointment of Ms MacTiernan to this position and with the continued support of the WA Government and the minister, we are confident that WA can be at the forefront of the establishment of a global green hydrogen industry."

The Chamber of Mines and Energy said it looked forward to continuing to work closely with the WA Government around key issues that will help ensure the State remains safe, globally competitive and has the capacity to grow.

Chief Executive Paul Everingham said this included:

- Delivering on government's streamlining reform agenda to reduce duplication and administrative burden, while maintaining robust approvals oversight
- Government support to ensure the mining and resources sector has access to the right people, with the right skills at the right time to seize current opportunities. While the sector is strongly focused on creating jobs



WA Premier Mark McGowan (right), FMG chairman Andrew Forrest and FMG chief executive Elizabeth Gaines, turn the sod at FMG's new Eliwana mine.

and training West Australians, and the 135,000 people currently working within it is a record, there are significant labour pressures in the current environment.

- Continuing to refine leading risk-based COVID-19 protocols that have enabled the sector to operate safely and effectively through the pandemic, and managing the rollout of vaccinations across the sector's workforce.

The Australian Petroleum Production and Exploration Association welcomed the reappointment of Bill Johnston to the Mines, Petroleum and Energy portfolios.

APPEA's WA State Director Claire Wilkinson said Mr Johnston had been "a steady pair of hands for the oil and gas industry".

"He has a deep understanding of the sector and I'm looking forward to continuing our strong working relationship," she said.

"When COVID-19 hit, we worked very well together to keep the industry running and support local jobs."

Ms Wilkinson also looked forward to working with Deputy Premier Roger Cook, who will take on State Development, Jobs and Trade, and Science.

"With the addition of the State Development, Jobs and Trade and Science portfolios to his responsibilities, I expect to work even more closely with Mr Cook to ensure natural gas can continue to support local jobs and drive the economic recovery of our State," she said. **AMR**

# Digital Platform For Spodumene

Pilbara Minerals has introduced a new digital trading and sales platform for spodumene concentrate production from its Pilgangoora Project in WA.

The company will work with GLX Digital to provide Pilbara Minerals with a further avenue for sales growth, offering interested parties the ability to access current and future unallocated spodumene from its operations.

GLX Digital already provides a digital trade platform to the natural gas industry which has been successfully deployed over the past five years, with multiple buyers and sellers over multiple jurisdictions.

Known as the "Battery Material Exchange", the new platform is intended to facilitate discreet sales of its spodumene concentrate product by either auction (screen trading), tender process or bilateral sales agreement.

It provides anonymity to all users ensuring secure customer relationships, with the information security management 2 system being certified to ISO 27001, which is widely regarded as best practice in relation to information security.

The selling platform will define a timeframe for sale of each cargo and will utilise the company's existing sales terms and conditions, inclusive of a letter of credit.



The Pilgangoora lithium-tantalum project in WA.

In the case of a sale by auction, the platform will provide a channel for multiple potential buyers to anonymously bid on that cargo.

The successful bidder (who will continue to remain anonymous) will then have the cargo loaded on a vessel in accordance with the defined terms and conditions for that sale, including the final auction price.

The facility will operate in conjunction with the company's existing and new or future offtake agreements and will initially be used to sell unallocated or available spodumene concentrate that sits outside existing offtake terms.

Pilbara Minerals Managing Director and CEO, Ken Brinsden, said the introduction

of the Battery Material Exchange should position the company well to maximise its participation.

"Creating a digital marketing and sales platform represents a logical evolution for the industry and we are pleased to be working with GLX Digital to lead the industry," he said. **AMR**

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# Red Tape Hinders Iron Ore

By Kathleen Southway



Atlas Iron chief executive Sanjiv Manchanda speaking at the WA Mining Club on government legislation, cost reductions and alternative markets for Australian iron ore.

There are renewed calls for governments to tackle inefficient legislation and red tape in the Australian mining industry, amid warnings that the current prices of iron ore will not remain high over the long-term.

Atlas Iron chief executive Sanjiv Manchanda, speaking at the March WA Mining Club event, says it is critical for Australian producers and governments to actively look at ways to reduce costs, particularly from red tape, compliance costs and payroll tax.

"We must speak up against inefficient legislation and government red tape that restrict us from being able to develop and continue and contribute," he said.

"The mining industry improves the living standards of each individual in this nation including helping to pay for defence, police, hospital, health services, roads, state kindergartens, emergency services and much more.

"It provides the metal that are essential for people's lives around the world."

Mr Manchanda is also calling for a review of tax incentives that will allow plant upgrades in order to improve iron ore grades and therefore remain competitive on the global market.

"This will help Australian producers maintain our market share and cost-competitive basis."

Hancock Prospecting took over the financially-troubled Atlas Iron in October 2018, and under the leadership of Mr Manchanda, developed a strategic plan which included paying off debt, bringing down the cost base and investing in new developments to capitalise on strong market conditions.

The company has completed the Pardoo, Wodgina, Abydos and Mount Dove mines, with several new projects underway to meet global demand for iron ore.

A total of 100mt of iron ore has been shipped from the Pilbara to-date, at a rate of about 26-27t per day and about 8.5mtpa.

"In producing and shipping that 100mt, we've contributed \$1b in state royalties for the wellbeing of the state and the nation and to every individual," Mr Manchanda said.

The company's operating model is more agile than the larger players with a focus on smaller mines and contractor-based partnerships across all stages of operations and value chains, including mining, crushing, screening, haulage and port operations.

It explores, develops and ships iron ore in a direct shipping ore (DSO) format that allows Atlas to size to exact specifications without the need for beneficiation.

"We export the ore as it is mined in terms of quality," Mr Manchanda said.

Its primary operation is the Mt Webber mine in Pilbara, WA, about 230km from the Utah Point stockyard at Port Hedland.

"Annual production rate for FY20 and FY21 is marginally above 9mtpa and it's a combination of lump and fine products," Mr Manchanda said.

Its new Sanjiv Ridge mine, previously known as Corunna Downs, about 239km from Utah Point, hauled its first shipment of ore by road to Port Hedland in February this year.

"The mine will provide a boost to our annual output within an expected 5mt of lumps and fines to be hauled by road to Utah Point adding another 5-6 years to the Atlas value chain and lifecycle," Mr Manchanda said.

Miralga Creek, an extension of the completed Abydos mine, will commence construction in mid-2021, subject to final regulatory approvals, and is expected to produce an additional 2.5mtpa for another three to four years of life.

Atlas Iron is also developing, in collaboration with its sister company Roy Hill, the McPhee Creek project while also exploring, on its own, a number of other tenements with the intent to create new operations.

When asked if India was the next major export destination for Australian iron ore, Mr Manchanda said that India plans to add 100mt of steel production capacity over the next five years, to its current 250mt.

"The challenge is that India also has iron ore mines with the capacity to produce that 300-350mt of steel," he said.

"We have historically shipped small tonnages to India [and] we keep getting enquiries but there is nothing sustainable yet.

"However there is some very strong anticipation that it could change over the next five years [and] we remain keenly interested."

Mr Manchanda also believes African iron ore supply will impact Australian producers in future.

"I think one day it will," he said. "We must take steps to make sure that we remain competitive in the international market as an iron ore producer." **AMR**

# Bryah Strikes Gold Bonanza

Latest drilling at Bryah Resources' Australian Vanadium project at Gabanintha has registered bonanza gold grades of up to 182g/t.

Bryah holds the rights to all of the nickel, copper and gold at the WA-based project, while AVL holds the rights to all of the cobalt as well as the vanadium-titanium-magnetite deposit and the resource itself.

Managing Director Neil Marston said the latest gold assays were an outstanding result for the company and confirm the exciting gold potential of the historic mining area of Gabanintha.

"Last year we started assaying for gold from historical drilling within the vanadium deposit at Gabanintha," he said.

"Recording exceptionally high-grade gold assays of 10m, grading 27.5g/t gold with 1m assays of up to 182g/t Au within a fault cross-cutting the high-grade vanadium zone, opens up a whole new exploration concept for the company to target."

The discovery comes after Bryah recently

sold its Tumblegum South gold deposit within the Gabanintha Project to Star Minerals.

The company has struck an agreement that will enable it to receive \$500,000 cash, nine million shares (valued at \$1.8m) and seven million in performance rights, which will convert upon achievement of milestones into 7m Star Minerals shares.

The move enables Bryah to focus on its core copper-gold exploration projects while still retaining significant exposure to near-term gold production at Tumblegum South.

Bryah will likely hold 21.6% equity in the new explorer upon its successful ASX listing, which could increase to over 30% through conversion of performance rights upon commencement of gold production at Tumblegum South.

Both transactions are conditional upon Star Minerals undertaking its \$5m IPO and obtaining ASX approval to list by May 31.

Selling the Tumblegum South gold deposit allows Bryah to focus on exploration for



The Tumblegum South gold deposit has an Inferred Mineral Resource of 600,000t, grading 2.2g/t gold for 42,500oz.

new high-grade copper-gold deposits at its flagship Bryah Basin project and on the remainder of its Gabanintha project.

The Tumblegum South gold deposit has an Inferred Mineral Resource of 600,000t, grading 2.2g/t gold for 42,500oz.

"The Tumblegum South gold deposit sits on a mining lease which was granted in November 2020," Mr Marston said.

"In December 2020 Bryah signed a Development Agreement to potentially access the Kirkalocka gold processing facility to treat gold-bearing material from Tumblegum South.

"This Development Agreement with Kirkalocka Gold remains in place and Star Minerals will assume Bryah's rights and obligations under the agreement at completion." **AMR**





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# Call to Broaden Trade Base

Australia has been encouraged to broaden its trade base to reduce reliance on any one market.

The recommendation was made in the Pivot: Diversifying Australia's Trade and Investment Profile released in March by the Joint Standing Committee on Trade and Investment Growth.

The report states that broadening the customer base will improve the security of demand for Australia's industries, just as security of supply is vital for countries with which Australia trades.

It said it was important to note that Australia's resources sector is not overexposed to China: for example, when iron ore is excluded from the trading profile, China only represents 15% of Australian resource exports.

Iron ore, gold, bauxite and nickel were listed as the commodities most dependent on a single market, while coal and precious metals have the most diverse markets.

"Australia has capitalised on its natural advantages to grow its exports, particularly in the resources and agricultural sectors," the report stated.

"While this has been highly profitable, a low level of economic diversity in Australia's exports may create longer-term challenges

for economic growth."

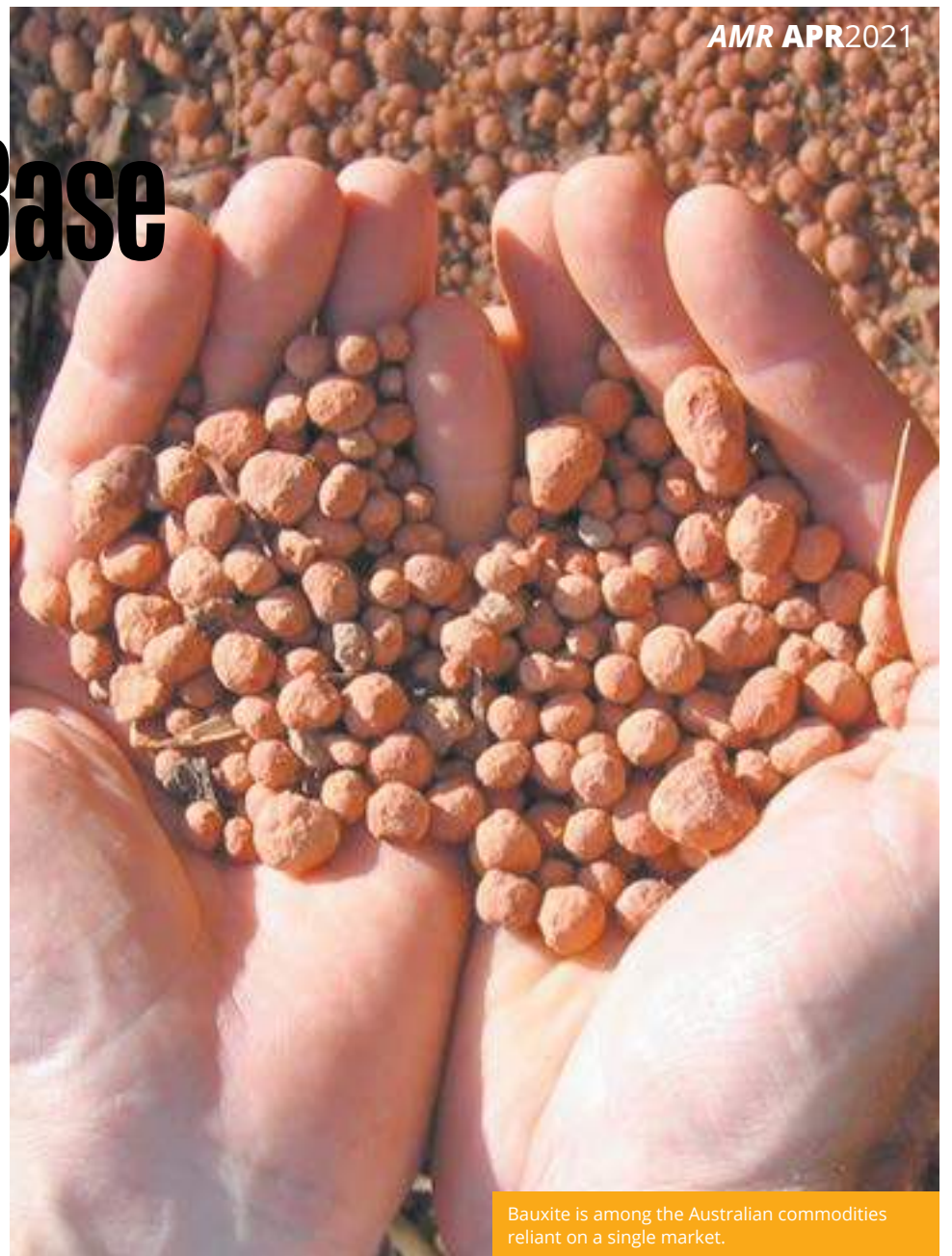
Agreeing with the findings, the Minerals Council of Australia said Australia's resources sector is assertive in expanding trade with its long-standing partners across Asia, Europe and North America, while seeking out and establishing new markets, particularly with ASEAN countries.

CEO Tania Constable said Australia also exports a wide array of commodities, including the metals and minerals which are propelling global decarbonisation.

"The development of trade requires a deep and broad understanding by governments of industry and economic policies which can guide and support opportunities in trade, investment and co-operation," she said.

"The MCA has been a long-term advocate for free trade and trade expansion and diversification through trade and investment agreements which can help build and maintain strong and enduring government to government connections.

"Challenges to global and multilateral trade regimes in recent years highlight major shifts in the global strategic, political and economic environment, changes which have been accelerated by COVID-19 and present both risks and opportunities to industries and exporting businesses in Australia." **AMR**



Bauxite is among the Australian commodities reliant on a single market.

# Dust-free Data Centre

Perth-based data centre innovator, Zella DC, is celebrating 10 years at the forefront of micro data centre provision, bolstering its client base to more than 35 companies across six continents, largely due to its breakthrough mine site solutions.

Minesites have traditionally been the toughest locations for IT data centres due to their remote locations and hostile conditions.

Zella DC founders, Angie and Clinton Keeler, knew if they could create a cost-effective solution for cyber-secure, dust-free IT data storage, they would corner a massive and untapped global market.

From that idea, the husband-and-wife team created a micro-data centre which has completely replaced the need for a purpose-built server room.

It is now the preference for a raft of major mining and energy companies including Chevron, BHP, Atlas Mines, PetroEquador and Bariq Saudi Arabia (amongst others).

Ms Keeler said the company is enormously grateful to the mining companies for being early adopters of the Zella DC technology.

"Early adoption helped us grow into the global company we are today. Starting out in such a tough environment meant we had to learn quickly and optimise our products to the highest standards," she said.

Those standards are embodied in a data centre which, to the untrained eye, resembles a sort of futuristic refrigerator.

Its features include easy deployment and maintenance, dust-free containment (and all-round environmental resistance), cyber-security, scalability and cost efficiency.

"It has also allowed us to develop a product that is climate friendly. That has become a key part of the data centre's huge appeal. It can reduce energy costs by as much as 70 per cent in some situations," Ms Keeler said.

With the products rapid pickup, Zella DC is now selling its product across a raft of different sectors including government, defence, healthcare, pharmaceuticals and not-for-profits.

Mr Keeler said this included a contract with the WA State Government which wanted a critical on-site IT infrastructure for the State Emergency Department.

"Zella DC's high standards of health and safety, certifications, reliability and cyber-security have been recognised by Governments and businesses alike," he said.

"The modular micro data centres give customers the flexibility to supplement or completely replace their existing fixed server room infrastructure and be up and running within days instead of months.

"It's reliable, minimising downtime from overheating and human error, and it allows all hardware and software to be seamlessly integrated."

Zella DC's global enterprise accounts include:

- Iron Ore: Atlas Mines needed a solution that would withstand the rugged conditions of their remote offices.
- Disaster Recovery: ShadowSafe is a backup and disaster recovery company with three modulated Zella DC micro centres.
- Healthcare: Southern Cross Care installed Zella DC micro centres as a space-saving initiative.



The micro-data centre has completely replaced the need for a purpose-built server room.



Zella DC CEO Angie Keeler next to a data centre which, to the untrained eye, resembles a sort of futuristic refrigerator.

- Media: Community News moved their IT equipment from their server room and into a Zella DC micro centre to overcome overheating problems in summer.
- State Government: WA Government required critical on-site IT infrastructure for the State Emergency Department.
- Government: Chile needed to keep their data close and secure, so secured Zella DC micro centres across multiple sites and departments.
- Nickel: BHP needed an IT solution for a remote site in WA. Zella DC was installed by local contractors.

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# Electrification Avenue

Chief executive officers from the mining and resource industries have joined forces to decarbonise the mining industry in response to climate change.

Fourteen companies, including OZ Minerals, IGO, Gold Fields, Barmenco, South32, and led by research group State of Play, have established the Electric Mine Consortium to help reduce their scope 1 and 2 carbon emissions in line with global objectives, and achieve the significant economic and social benefits that come from clean energy, large-scale storage and battery electric vehicles.

The Consortium said that electrification is a game-changer for the mining industry as it allows the complete removal of diesel from mines.

Aside from drastically cutting emissions, the removal of diesel reduces exposure to volatile oil prices and eliminates the exposure of workforces to diesel particulates while allowing zero-emissions electric mine sites.

The mining leaders have taken the unprecedented step of co-signing a statement of intent regarding the electrification of their mine sites with the goal of accelerating change in the industry.

They are supported by various suppliers, including global equipment leaders Epiroc and Sandvik – each with aggressive corporate CO<sub>2</sub> emissions reductions commitments – software giant Dassault, utility Horizon Power, engineers Hahn Electrical, renewable energy company Energy Vault and new economy start-ups Safescape and 3ME Technologies.

Several consortium members compete in the rapidly growing battery minerals markets in which major end-customers such as BMW and Tesla have made clear statements of intent regarding the carbon content of their supply chains, of which mining is a key element.

IGO Chief Operating Officer Matt Dusci said the company was focused on discovering and producing metals critical to a clean energy future.

“Throughout our business, we aspire to be proactively green and have a strong commitment to reducing the impact our activities have on the environment, our people and our communities,” he said.

State of Play co-founder, Graeme Stanway,

said cost was often a hurdle despite industries’ best intentions of achieving minimal emissions.

“Our data shows renewables, all electric systems and batteries will help fuel the change towards a healthier, economically viable future of mining, but uncertainty remains when it comes to which area to invest in first, and how,” he said.

According to a recent survey of global mining executives undertaken by State of Play, 87% believe that all existing mine sites will become fully electric within 20 years and 60% believe the next generation of greenfield mines will be fully electric.

OZ Minerals CEO Andrew Cole said company aspired to emit zero scope 1 emissions and systemically reduce scope 2 and 3 emissions across its value chain.

“We are committed to investigating various technologies and strategies, such as the electrification of mining equipment, to reduce greenhouse gas emissions at our assets,” he said.

## Cost Barriers

Electrification of mine sites is a key technical foundation for the automation of equipment, which itself provides a large step forward in productivity and safety, while also improving economics through simplified, interoperable electric-drive equipment.

The CEOs collectively agree that the industry should focus more on collaboration to overcome cost barriers and uncertainty in technology choices that may be beyond the capacity of individual companies alone.

“we are proud to support and be part of the Electric Mine Consortium and look forward to working collaboratively with our peers toward the decarbonisation of our industry,” Mr Dusci said.

“Solving complex challenges, innovating, and achieving sustainable value creation will require us to harness the best minds from both inside and outside the mining industry to help us connect dots in new and exciting ways,” Mr Cole said.

“Australian mining companies have a huge advantage compared to their global counterparts when it comes to alternative energy sources,” Mr Stanway said.

“Here in Australia, we have an abundance of



## Examples of Energy Products

- Rio Tinto is developing a \$98m solar plant at its new Koodaideri iron ore mine. The 34MW facility will deliver 100% of the site's electricity requirements during peak generation hours and approximately 65% of the mine's average electricity demand. It will be supported by a lithium-ion battery storage system and is predicted to reduce Koodaideri's annual CO<sub>2</sub> emissions by 90,000t.
- Gold Fields is introducing a hybrid energy project at its Agnew gold site. Energy will be generated through wind (18MW), solar (4MW) and a gas plant (16MW), with the potential for 100% renewable energy during periods of high winds. The estimated annual emissions saving is about 40,000t of CO<sub>2</sub>.
- OZ Minerals plans to power its proposed \$1b open-pit West Musgrave Copper Nickel mine in Australia on up to 80% renewable energy. Through a mix of solar, wind, battery and diesel, the site is expected to become a leading, fully off-grid mine powered largely by renewable energy. This will eliminate the emission of more than 220,000t of CO<sub>2</sub> emissions per year.
- Newmont Goldcorp has deployed a mobile solar array to its Akyem gold mine in Ghana. The solar photovoltaic tracker is a modular and prefabricated solar generator designed to be quickly deployable and scalable in 30kW segments, allowing the location of the array to be flexible as changes in mining activity occur.

renewables that the industry is tapping into, particularly in our most remote operations. Local mine sites have the opportunity to install solar, wind and battery energy storage systems to power their operations at a much cheaper cost than many global players.”

Energy Vault CEO and co-founder Robert Piconi believes minimising CO<sub>2</sub> and diesel particulates through innovative technology choices, such as energy storage, is essential to the Electric Mine Consortium as it pursues the goal of fully electric mines.

“Our unique, long-duration storage technology is especially well suited for use in mines given that it provides the opportunity for the beneficial re-use of waste tailing materials as well as other localised materials, avoiding cost disposal and environmental hazard,” he said. “Importantly, Energy

Vault's solution also economically deals with severe weather environments, in particular high ambient temperature climates, with an unprecedented, low operating cost sustainably.”

Geovia Dassault CEO Michelle Ash said for the country to fully realise the opportunity of zero-emissions mines, it also needed to be able to effectively test and implement new technologies.

“To do this rapidly we need to be able to model and simulate them in the virtual world so we can then de-risk in the real world,” she said. “We need to modernise our regulatory framework and consider what skills our sector will need across the entire workforce, from trades, technicians and university graduates, through to our scientists and PhDs.” **AMR**

# Curtin Second in World

Curtin University has again been named the world's second-ranked university and number one in Australia for Mineral and Mining Engineering in the 2021 QS World University Rankings by Subject.

The latest results show Curtin achieved ranking in 30 subjects, including four subjects in the top 50 in the world and 20 in the top 200.

The Mineral and Mining Engineering course held its position as second in the world and first in Australia, Geology ranked equal 43rd in the world and fourth in Australia, Petroleum ranked equal 44th in the world and fourth in Australia, and Earth and Marine Sciences ranked 50th in the world and fifth in Australia.

Curtin University Vice-Chancellor Professor

John Cordery said the latest results further cement Curtin's position as a global leader in Mineral and Mining Engineering.

“I am delighted that Curtin has upheld its place as the world's second-ranked university for Mineral and Mining Engineering for the fifth year in a row,” he said.

“Curtin's strong position in these latest rankings across a number of subjects is a testament to our commitment to high-quality research and teaching and the continuing focus on industry collaboration and connection, particularly in the fields of mining and mining engineering.”

The latest edition showed Curtin achieved nine subject rankings in the top 100 globally, with five placing in the 51-100 band including Architecture/Built Environment, Engineering



– Civil and Structural, Nursing, Geophysics and sport-related subjects.

Curtin has also ranked for the first time in the subject of Sociology, placing in the 301-320 band.

The 2021 QS World University Rankings by Subject considered more than 1453 universities across 51 academic disciplines and five broad Faculty areas. **AMR**



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# Successful Float for DDH1

A DDH1 rig.

**D**DH1 Ltd has successfully listed on the Australian Securities Exchange (ASX).

DDH1 completed an Initial Public Offering (IPO) that secured gross proceeds of \$150m through the issue of 136,363,636 shares – or about 40% of DDH1's shares on issue as at its listing date – to new investors at \$1.10 per share.

IPO proceeds were used to allow existing shareholders to realise part of their investment in the company and to repay borrowings.

The IPO was one of the largest by a WA-based business in the past decade.

The ASX listing marks a significant milestone in the evolution of DDH1, which was established in Perth in 2006 with the vision to create Australia's premier mineral drilling contractor.

Over time, DDH1 has earned the custom of Australia's premier mining companies through its repeated and meticulous service offering of gathering the critical geological data that supports the decision-making in respect of all mining activity through the complete cycle of a mine's life.

DDH1 chairperson Diane Smith-Gander said the company was led by a highly

experienced management team with a proven track record of operating across all phases of the mine life cycle, as well as a Board of Directors that brings a diversity of directorship experience with some of Australia's leading companies and a history of building shareholder value.

DDH1 managing director and CEO Sy Van Dyk said the growth and success to date was testament to the commitment of the whole team, which strives to ensure the safety of all stakeholders while delivering exceptional service to our clients.

"Our long-term client relationships are built on the provision of quality drilling services and a deep understanding of our client's business needs. The Company's significant market position reinforces the strong levels of industry recognition," he said.

"There is growing demand in the Australian mineral drilling sector for DDH1's services because of increased exploration, development and production spending by minerals exploration and mining companies.

"As an ASX-listed company with a strong balance sheet, a committed shareholder base, a disciplined approach to growth and access to capital markets, DDH1 is well positioned to pursue its growth strategy."

DDH1 non-executive director and significant shareholder Murray Pollock, who co-founded the company in 2006, said the strategy had always been to define a long-term vision and then balance short-term profitability with investment in growth.

"This strategy and the guiding principles developed to underpin it have yielded continuous profitability and significant growth," he said.

"I am confident this focus on achieving both short-term targets and long-term returns will not change now that DDH1 is a publicly listed company. Nor will our priority on safety, one of DDH1's core pillars.

"We are excited about the opportunities the future will bring and delighted to welcome new shareholders to the DDH1 family."

Mr Pollock and his fellow DDH1 co-founders retain a collective 33.3% stake in the company while funds managed by Oaktree Capital Management LP, a long-term investor since 2017, hold a 22.1% interest.

DDH1 has an extensive portfolio of approximately 102 clients, with a FY2020 pro-forma revenue of \$249.8m. About 88% of the revenue was repeat revenue, defined as revenue from a client that had been a customer with DDH1 prior to FY2019.

DDH1's earnings are diversified across multiple commodities and geographies to avoid overexposure to any particular element. The client base includes Newcrest Mining, BHP, Evolution Mining, Gold Fields, Independence Group, Kalgoorlie Consolidated Gold Mines, Newmont Corporation, Ramelius Resources, Rio Tinto, Roy Hill Iron Ore and St Barbara.

DDH1 currently intends to declare a dividend for the period from the date of its ASX listing to June 30.

DDH1 employs around 930 people and operates a fleet of 96 modern and highly specified drill rigs across its three brands – DDH1 Drilling, Ranger Drilling and Strike Drilling – to offer clients the full suite of specialised drill services.

Included in the fleet line-up are dual-purpose rigs able to perform air core and reverse circulation (RC) – a precursor for drilling deeper – and diamond core drilling to enable clients to secure high-quality mineral samples.

Central to DDH1's strategic approach is the pursuit of long-term relationships with clients, built on quality drilling services and a deep understanding of their business needs. **AMR**

## Red Letter Day for Macmahon

**R**ed 5 has sent a letter of intent to Macmahon Holdings for mining services at the King of the Hills (KOTH) gold mine in WA, as it gears up for operations to begin in early 2022.

The KOTH project is a major open pit and underground gold deposit located in the eastern goldfields region of Western Australia, with a projected mine life of over 16 years.

Red 5 has commenced the construction of the camp and processing facilities on site and first gold production is expected to occur in June 2022.

Under the letter of intent, the parties are working to finalise the documentation by which Macmahon will provide all surface and underground mining services to the project

over a five-year contract term, commencing in the first quarter of 2022.

Macmahon expects this documentation will be completed by June 2021 and that the contract will add over \$650m to the company's order book.

Macmahon CEO Michael Finnegan said the company had a strategy to expand its presence across the mining services value chain.

"This project highlights the benefits of being able to offer a combined surface and underground mining solution from the outset," he said.

Red 5 recently appointed a mine manager for the KOTH project, Andrew McRae, who previously worked for Evolution Mining at



Underground mining at the KOTH project.

the Cowal gold mine in NSW.

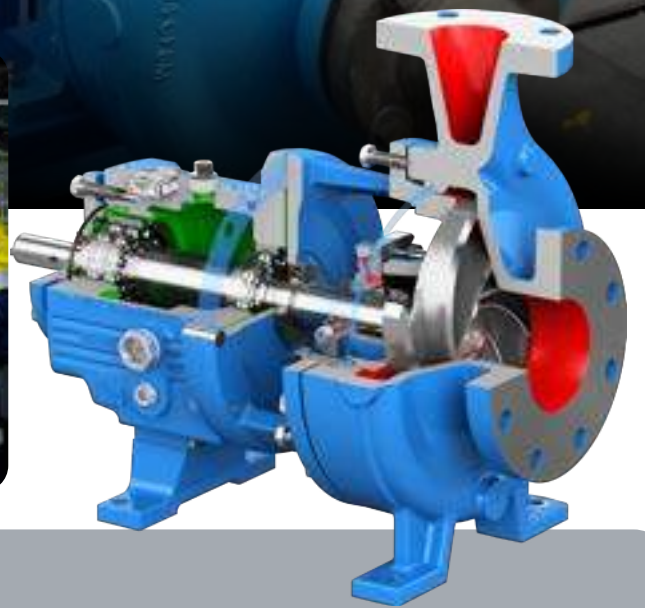
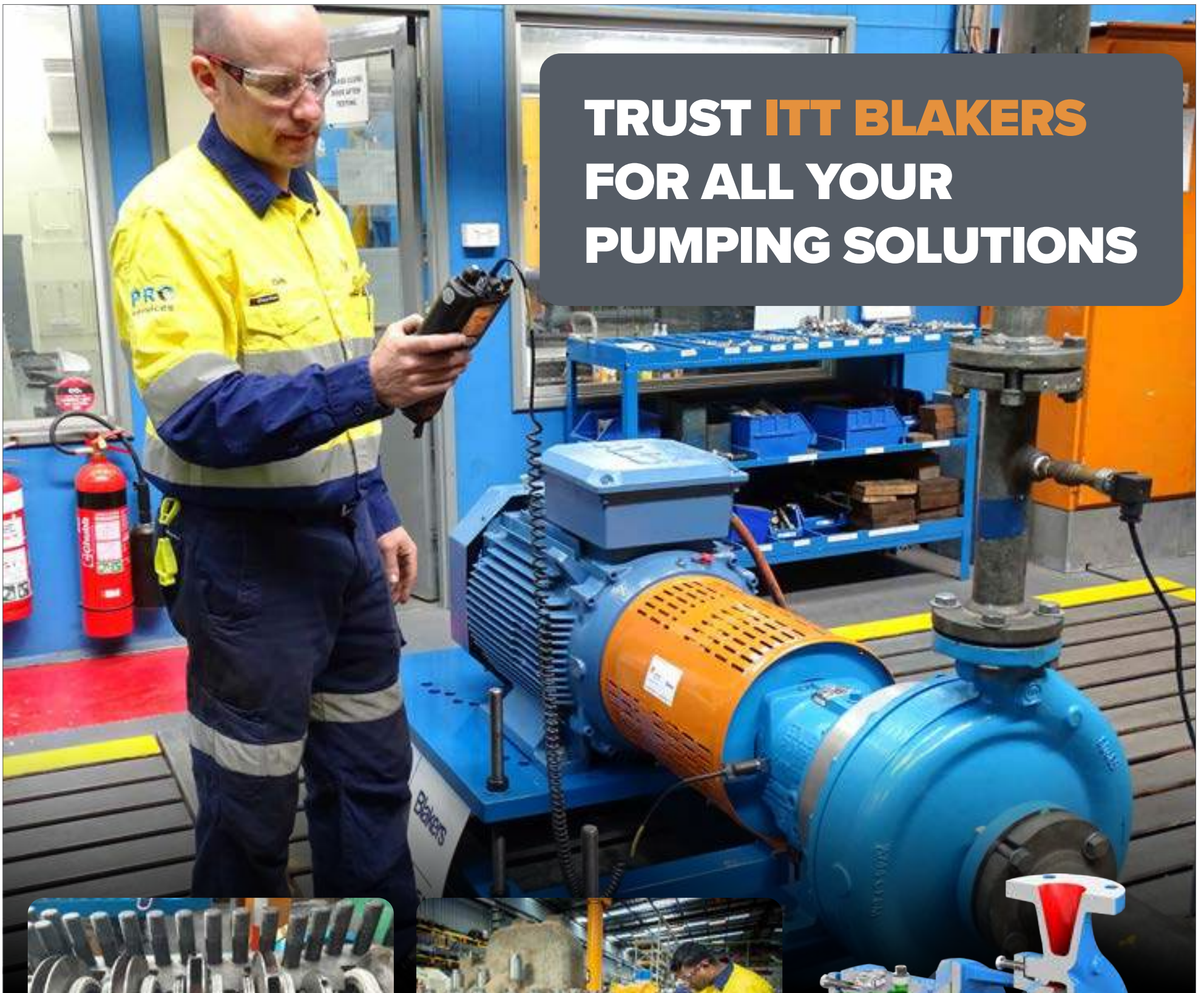
Red 5 managing director Mark Williams said the latest developments promised to benefit the project over the long-term.

"We see a number of important operational efficiencies and cost benefits in having both mining operations managed by a

single contractor.

"We are also very pleased to welcome Andrew McRae to the Red 5 team as the KOTH mine manager... he will play a key role in planning and preparations to ensure we remain on commencing activities at the KOTH gold mine in early 2022." **AMR**

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# ASM Spreads Korean Wings

Australian Strategic Materials has signed a memorandum of understanding (MoU) with the Chungcheongbuk-do (Chungbuk) Provincial Government and Cheongju-si (Cheongju) City Government to locate its first metals plant (Korean Metals Plant or KMP) within the Ochang Foreign Investment Zone in Korea.

The Chungbuk Provincial Government MoU covers supply of utilities, administrative licenses and permit procedures, including the Korean Standard Industrial Classification code for rare metals and rare earth metals.

The MoU also includes a government grant, in accordance with the Foreign Investment Promotion Act.

Chungbuk is located 115km south of the Korean capital, Seoul, and 20km north of Daejeon, the site of the metalisation pilot plant. The region has substantial existing infrastructure and a competent technical workforce.

Provincial Governor Si-Jong Lee said to sustain the growth of the Chungcheongbuk-do economy, he strongly supported this investment.

"ASM is establishing its Korean headquarters, R&D centre and metals plant in the Ochang Foreign Investment Zone.

"This will provide key rare earth metals to the Korean economy and local employment

to revitalise our local economy."

ASM Managing Director David Woodall said the MoU, along with the strong support from the Korean Ministry of Trade, Industry and Energy (MOTIE) and the Chungbuk Provincial Government, provided ASM with confidence to build the metals plant in the Ochang Foreign Investment Zone.

"With key Korean manufacturing companies like LG Chemical, Samsung SDI, SK Hynix, and Hyundai Mobis within close proximity, we are confident that building our first metal plant in this well established industrial area will provide significant benefits," he said.

ASM's Korean Metals Plant will initially produce high-purity neodymium-iron-boron powder and titanium powder using the innovative, low-energy metallisation process developed by ASM's Ziron Tech team.

Last week, ASM announced it had completed an internal scoping study for the initial 5200tpa metals plant, with the results demonstrating the feasibility of the project. As a result of the positive outcome of the study, the ASM Board approved an expenditure of about US\$1.5m for detailed design engineering.

This will provide a fully engineered scope of works and further refine capital estimates, before making a final investment decision by June 2021.



Construction of the Korean Metals Plant is expected to be completed by mid-2022, with metal production to progressively increase, expecting to reach full capacity of 5200tpa by mid-2022.

ASM will continue to pursue its collaborative strategy with Korean manufacturers to independently produce key critical metals, focusing on rare earths, titanium and zirconium metals, alloys, and powders. ASM expects to expand the capacity of the KMP to over 16,000tpa by the end of 2024, to meet the potential Korean demand.

"Our ability to commercially produce high-purity critical metals for advanced technology manufacturers in Korea gives ASM an excellent foundation to be an independent fully integrated critical metals producer globally," Mr Woodall said.

"Korea is phase one. Once complete, this will provide the template for future ASM metals plants in other regions.

"We'll now continue to progress our 'mine to manufacturer' strategy using our pilot plant furnaces in the second half of 2021, with the production of titanium and rare earth permanent magnet alloy powders. This will enable ASM to commence providing critical metals directly into the Korean manufacturing sector."

The Scoping Study demonstrates the potential for the KMP to deliver a profitable standalone downstream business for ASM while the company progresses the Dubbo Project.

ASM's KMP will supply high-purity products direct to the Korean market, providing manufacturers with a stable and secure domestic supply of metals.

ASM will continue discussions and negotiations for offtake contracts to grow its customer base and market presence. **AMR**



## Using AI for the Mine Face

The University of Queensland has developed an artificial intelligence-based scanner which can identify valuable minerals and waste rock in a mine face.

New automated mining technology, developed at The University of Queensland with research partners Plotlogic, will allow workers to be removed from hazardous parts of the mining process and improve efficiency.

Innovative research shows how AI can use scans of the mine face to almost instantly identify valuable minerals and waste rock, allowing each stage of the mining process to be planned more effectively in advance.

UQ School of Mechanical and Mining Engineering head Professor Ross McAree

said the new technology used visible and infrared light to automatically classify materials.

"Each mineral has its own characteristic response to different wavelengths of light, so by scanning the mine face with our system we can map out the minerals present in the rock and their concentration (ore grade) almost instantaneously," he said.

This real-time mapping allows the mining process to be planned out before digging even starts.

"Beyond this immediate efficiency gain, the enhanced ability to recognise ore grade could also underpin future autonomous mine systems," Professor McAree said.

"Machines equipped with this imaging system would be able to recognise ore grade as they were excavating it.

"Linked to artificial intelligence, this could allow automated machinery to operate in the mine environment, removing workers from hazardous parts of the mining process."

The research was supported by the Minerals Research Institute of WA (MRIWA).

MRIWA CEO Nicole Roocke said investment into research like this helped to position Australia's minerals industry at the leading edge of technology development.

"This imaging approach could prove particularly valuable, where rapid extraction and consistency of ore grades could provide a competitive advantage to those leading the way," Ms Roocke said. **AMR**





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# Be Yourself and Thrive

**Belinda:** Fitter and turner, Boyne Smelters, Gladstone, Queensland

"When I first joined BSL, there weren't a lot of ladies here. So I started an informal lunch group so we could get together with all the other lady tradies here on site – we call it an 'aunty lunch'.

"It gives us an opportunity to confide in each other if we have any issues, or just to have a good old laugh.

"I have a colourful life history which can either knock you down or lift you up, but it gives you a lot to contribute to someone who is in a difficult situation – and it comes straight from the heart.

"One of the proudest moments in my career was being nominated for BSL's general manager's award for the work I do with our Peer Support program, which is about mental health and being there for your mate when they need you most.

"I became a fitter and turner because I was



looking for security. I wanted a future.

"And in my family there wasn't a lot going on at the time. I couldn't see how I could support my children in the future – and I wanted to show them a different way of life.

"Over 20 years later and I'm still a fitter and turner. What I love most about my job is the people I work with. We genuinely care about what we do – and about doing it well."

On International Women's Day in March, Rio Tinto canvassed some of the women who work across the company's business, from Australia to Madagascar, and beyond. Here eight talented women share their experiences in the mining industry.

**Uuganbayar:** Environmental Superintendent, Oyu Tolgoi, Ulaanbaatar, Mongolia

"Our team's role is to manage environmental monitoring and protection. We make sure that the company is complying with all relevant environmental requirements.

"I am passionate about environmental protection and sustainability, and so I did my master's thesis on mine land reclamation. Then when I graduated, I joined Oyu Tolgoi.

"I really like my job. And I am very proud that the company is taking climate change seriously and working towards reducing our carbon emissions.

"If your passion and vision aligns with the company's vision, then I say go for it!"



**Mhairi:** Fixed Plant Manager, West Angeles iron ore mine, WA

"As the fixed plant manager, I manage the processing plant at a large iron ore operation and lead a team who operate and maintain the plant.

"I've had a fantastic career working in mining and I invite any woman considering going into the industry to reach out to your broader network to see if there is anyone who might be able to share their experience.

"And be yourself – you might think as a female working in the mining industry that you might have to behave in a certain way, act like one of the boys. But that's just not the case.

"You'll find that you're respected for who



you are.

"We need to continue to encourage inclusive behaviours to create a more inclusive environment around us."

**Gillian:** Chief Financial Officer, Aluminium, Montreal, Canada

"I joined mining by accident – I'm originally from Ireland and mining isn't a really big industry there. I moved to Australia almost 20 years ago and needed a job, and the first job I got was in mining.

"I've stayed in the industry because it's wonderful, and while we are not perfect and we make mistakes, Rio is a brilliant company. We're producing the materials the world needs – it's really great to be part of that.

"My job is all about performance – how do we optimise the performance of our assets for all stakeholders, and how do we do it in a safe and sustainable way.

"To anyone considering a career in mining: Just do it. Don't question it for a second. Just do it."



**Mhairi:** Fixed Plant Manager, West Angeles iron ore mine, WA

"Every woman working in a mining company is the strength of that company. I supervise all the drilling activities at QMM, which allows us to understand the orebody we're working with and make sure we meet our production targets.

"As a geologist, I always dreamed about working in a big mining company. I joined QMM three years ago, and I'm proud to be part of the Rio family."



**Sugar:** Senior Manager Communities, Oyu Tolgoi, Ulaanbaatar, Mongolia

"As a professional working in Rio Tinto and mining industry for 15 years, I'd offer three pieces of advice: first, embrace any challenges with a positive attitude and behaviour – accept them as a learning opportunity.

"Secondly – be authentic, you don't need to change yourself, build on your strengths and talent. Lastly, build a network to support each other."



**Zanele:** Manager Communities and Corporate Relations, Richards Bay Minerals, South Africa

"Mining was never on my radar and it was quite an adjustment – I went from wearing corporate attire and high heels every day to personal protective equipment like steel cap boots and safety glasses.

"I also had to adapt to an environment that attaches so much importance on safety. I had to do away with many unsafe habits!

"The industry requires you to adapt, be resilient and think outside the box. It's been a very fulfilling three and a half years – and I'm so glad I joined the industry."



**Erika:** Senior Transformation Adviser, Aluminium, Montreal, Canada

"As part of the transformation team, my job is to introduce changes in our business – like new technology or new skills or ways of working – and help our teams adapt.

"I didn't know much about the mining industry when I joined Rio a year and a half ago. What attracted me was the diversity of people I could meet and work with.

"Your title, background, culture, language or sexual orientation make no difference to me – what really matters to me is your story."

AMR



# Resourceful Women Recognised

WA's mining and resources sector gathered in early March to celebrate the power of gender diversity, with the 12th annual Chamber of Minerals and Energy of WA's (CME) Women In Resources Awards.

A crowd of almost 1000 people gathered at the Perth Exhibition and Convention Centre to see five inspiring women recognised in the individual award categories.

CME Chief Executive, Paul Everingham, paid tribute to the winners and their inspirational stories.

"These women reflect the enormous value that diversity and inclusion provide to our sector," he said.

"Some are currently in leadership positions and some will progress to those types of roles. But each is already an outstanding role model for the tens of thousands of women who work each day on mining and resources operations around WA, and many more who might be considering careers in our sector.

"I'm very proud to work in a sector that has a genuine commitment to promoting and achieving equality, inclusivity and diversity in its workforce."

## Outstanding Woman in Resources

Sara Braund, Vice President Digital Technology, South32

Sara is the Vice President of Digital Technology at South32, where she is responsible for the delivery of technology services, platforms and business applications for 10 operational sites and six corporate offices.

Growing up in northern Scotland, Sara gained an early appreciation for the economic contributions of the oil and gas sector and, after showing an aptitude for numbers at school, eventually pursued a joint honours degree in mathematics and computer science.

As a graduate with Logica UK, Sara worked with a variety of oil and gas majors and a move to Perth in the early 2000s led to a stint at Woodside, where she became the company's first female Chief Information Officer.

Sara's journey to Australia is a reflection of her determination to succeed. Despite fears of both flying and public speaking, she accepted an invitation to travel from Scotland to present at a conference at the Melbourne Exhibition and Convention Centre – and found she liked Australia so much that she wanted to stay here.

Sara is sponsor of South32's Technology Foundations program and played a major role in the company's rapid transition to remote working due to the onset of COVID-19.

She is lead sponsor for the South32 Introducing Girls to STEM initiative, serves on Murdoch University's IT Advisory Panel and regularly shares her career challenges and lessons learned at panel events around Perth.

## Outstanding Young Woman in Resources

### People's Choice Award

Pooja Haria, Reliability Engineer, Fortescue Metals Group

Growing up in a low-income background in Kenya, as the daughter of non-English speaking Indian immigrants, Pooja



Laura Allen (Woodside), Katie McDonald (BHP – company award initiative), Rebecca Prain (Cube Consulting), Sara Braund (South32), Pooja Haria (FMG) and Alison van Lent (Woodside). Image: Chamber of Minerals and Energy of Western Australia.

understood quickly that an academic focus would pave the way to a better life for her and her family.

That meant travelling overseas with the help of her community to study, initially in Malaysia and then in Melbourne, where she completed a Bachelor of Engineering (Honours, Mechanical Engineering) at Victoria University and was subsequently offered a PhD specialising in robotics.

Pooja's career in mining started with an internship at Rio Tinto's Weipa operations in far North Queensland, where she was quickly promoted to a graduate role as the only female mechanical engineer.

Pooja's leadership qualities were evidenced by her being entrusted with a \$2m capital project while still a graduate and eventually serving as Acting Railway Superintendent at Weipa.

Since moving to join FMG in April 2020 in a FIFO role at the Solomon mine, Pooja has driven key improvements in the site's lubrication systems, resulting in improved efficiencies and reduced downtime.

Pooja is a strong role model for FMG's younger engineers and has previously taken on formal mentoring responsibilities and been involved in campaigning against domestic violence.

## Outstanding Operator/Technician/Trade Woman in Resources

Laura Allen, Process Owner, Woodside Energy

Laura is a talented female tradesperson with an infectious personality, a passion for her trade and a natural leader.

ays been different – often the only woman on site and usually the youngest – which has built a resilience and drive that is an inspiration to others.

At a young age she identified she wanted to learn a trade and became an electrical apprentice, becoming Apprentice of the Year at Electrical Group Training. Laura's approach and work ethic has led her to be recognised for her capability and leadership.

She has spent about 10 years working offshore and in 2015 became Woodside's first female Registered Person Electrical, meaning Laura was responsible for the safe execution of all electrical work performed on the offshore facility she was based in.

In 2018 she moved into a leadership role supervising a team of 80 people offshore. Laura completed two overseas assignments in the Singapore shipyard leading a diverse and multicultural team.

In 2019, she moved into a temporary office role for 18 months developing more business skills and stepping up as delegate for the General Manager Operations.

## Technological Innovation Award

Alison van Lent, Commercialisation Manager, Woodside Energy

Alison started at Woodside as an Instrumentation and Controls Engineer, working on the Offshore Goodwyn asset before moving to Karratha for four years where she worked on the Pluto LNG Project team during commissioning and early operations.

After several lead engineering roles and demonstrating capacity as an innovative high performer who had the potential to move into senior management, Alison was selected as one of two employees (out of 3000+) in 2016 to be sponsored to complete her MBA full time. When she returned, she shifted from Engineering to Technology to the robotics team.

Her primary responsibilities were to guide the Operations and Projects teams to take advantage of Intelligent and Autonomous Systems. In that space of time, the team now have the highest in-house robotics capability of any oil and gas company in Australia (perhaps even in the world). In June 2020, she moved into her current role, which is looking at commercialising a product she and her team built.

The robotics capability that Alison has worked to develop within Woodside is world-class. Software, co-developed by her and her team with NASA, is being used to leverage robots on the Woodside assets.

## Women in Resources Champion

Rebecca Prain, Managing Director, Cube Consulting

Originally from New Zealand, where she trained as a geologist, Rebecca chose to work and raise her family in WA, where she became general manager of Cube Consulting in 2013.

Rebecca has been heavily involved in the grassroots championing of gender equality in the mining and resources sector. As an

active member of the Women In Mining WA community, Rebecca has spent the best part of a decade formally mentoring young women in the sector – 14 in all – and informally mentoring many more.

She has also been a driving force behind the Kambalda Geology Symposium, which in 2019 had gender-balanced speakers. Rebecca's own WIMWA Summit presentations have showcased the ability for women to have longevity in mining and resources while also managing family commitments.

Rebecca is well-regarded for her meaningful, personal and persistent advocacy for women in the sector and an authentic leadership style that easily earns people's trust.

## Outstanding Company Initiative

BHP, Office creche and family-friendly workspaces – Perth and Newman

In 2017, the BHP Perth office established a creche and two family-friendly workspaces, with the intention of providing emergency and adhoc care to parents when their regular childcare arrangements fell through.

This year, that service has been expanded to Newman, with the provision of a flexible work centre that includes four hot desks, two family-friendly rooms and a meeting room accommodating five people. BHP has also supported the Newman Neighbourhood Centre Creche next door to go from a two mornings per week offering to a full-time service.

The Perth facility has now been used by more than 400 families, who had made more than 2700 bookings by the end of October 2020. More than 40% of the bookings were male, signifying increased shared caring responsibilities that enable women to return to work.

In Newman, the service was used by 80 families making more than 300 bookings within the first four months of opening and numbers continue to rise. Some 60% of bookings were community-related, demonstrating the far-reaching social value of the initiative.

Feedback and testimonials show the initiative is helping BHP retain talented women and increase employee engagement, with significant take-up during school holidays when parents and children get a kick out of going to work together. **AMR**



# Service Trucks In Mining

A comprehensive service truck fleet is crucial to any mining operation, whether it be for the delivery of crew, equipment or other essentials needed to keep the wheels turning on a project.

Failing to deliver fuel or other supplies when they are needed at a mine site can quickly result in unplanned downtime and costs.

Whether it is to service a fixed plant, large mining operation, construction site, or to support earthmoving machinery, companies that hire out service trucks are vulnerable to a myriad of risks.

This can include damage to goods or equipment worth millions of dollars or to the trucks themselves if there is a collision or breakdown.

There are also risks for the drivers who have to manage fatigue whilst covering long distances as they traverse the vast continent to reach remote mine sites.

Service trucks are built to handle even the harshest and most rugged environments but even then, accidents and unforeseen delays do happen.

Whether a company is running a small fleet or a larger operation crisscrossing the entire country, it is crucial to have adequate insurance.

The types of cover required will depend on what services are being provided and the goods being transported.

Connect Business Insurance specialises in providing insurance cover and risk management to the mining industry and can tailor solutions that are specific to the needs of service truck hire companies.

CBI understands there is never a one-size-fits-all approach, but these are some of the relevant types of insurance it can provide:

## Mobile Plant and Equipment Insurance

Whether service trucks are transporting fuel, grease, power tools, earthmoving and mobile plant equipment worth millions of dollars, it is important to have adequate insurance in place to protect it.

In the event this equipment is damaged, destroyed or stolen, CBI can provide insurance covering but not limited to:

- Substitute Hire Costs for Mobile Plant
- Mobile Plant Damage Waiver
- Finance Payment Protection
- Business Interruption

**Carriers Insurance** protects transport operators for loss or damage to their customers' goods or equipment while in the operator's conveying vehicle or premises during transit.

Damage may be the result of a crash, overturning, jack-knifing or derailment of the conveying vehicle or the impact of goods with something outside the vehicle.

Or it could be the result of a fire, explosion, lightning, flood or a malicious act.

Carriers liability insurance covers legal liability relating to compensation for loss or damage to goods while in transit.

Depending on the company's individual needs, cover can be extended to include errors and omissions such as delays and mis-delivery.

**Motor fleet insurance** is crucial for service truck hire companies as the trucks are the backbone of the business.

The vehicles themselves are worth a lot of money and if they are damaged or written off, it could be financially devastating to a business without adequate insurance.

Having just one vehicle off the road can cause significant disruption to the operations of both the truck hire company and the client.

Full comprehensive insurance covers loss of or damage to the vehicle due to collision and other accidental damage, fire or theft and includes indemnity for legal liability for third party property damage.

Third party property damage cover only provides protection for any damage to third party vehicles or other property involved in the incident.

**Business interruption (Downtime) Insurance** provides coverage for loss of income while a vehicle is not operational.

This insurance will help keep truck hire companies on the road as a result of unforeseen circumstances, such as extreme weather events, which could cripple a business in the absence of adequate insurance.

It ensures businesses can cover ongoing costs such as staff wages, supplier invoices, rent or loan repayments during a temporary crisis to ensure its survival.

Workers compensation is always a big-ticket item in the mining industry but for truck hire companies which rely on drivers to get goods from A to B, it is crucial.

Driving is dangerous at the best of times but when you add long shifts, huge distances,

treacherous roads and unpredictable weather into the mix, the risk exposure is compounded.

Drivers who suffer an illness, disability or injury as a result of a crash or other driving duties are entitled to compensation.

**Workers' compensation** claims are complex and can be very lengthy and costly so it is important to have the right insurance.

Each year Australian workers file more than 100,000 workers' compensation claims, according to Safe Work Australia.

Standard insurance covers employee wages while they are not able to work, medical expenses and rehabilitative services designed to get them back on the road.

It is a legal requirement for every Australian employer to provide workers compensation insurance.

**Public liability** insurance is another type of cover that is commonly needed in the mining industry.



An Isuzu 4x4 service truck.



A Hino 6x4 service truck. Images courtesy of Premium Plant Hire.



A Mack 8x4 service truck.



A Mack 8x4 service truck being transported to site.

It is triggered in the event the insured company causes accidental property damage or personal injury to a third party.

It will generally pay costs relating to the investigation, defence and settling of claims as well as any compensation a business is found liable to pay.

It can even cover emotional distress or shock that a business causes another person.

While many insurers purport to offer public liability insurance, many exclude any type of mining work.

Therefore, companies may need a specialist insurance policy to ensure it covers mining related transport.

While individual insurance will vary, most small to medium-sized businesses may need a policy that covers the following:

- The cost of injuries to third parties including medical costs
- Costs of damage, destruction or loss of

physical property

- The cost of damages stemming from the actions of employees
- Costs of legal settlement or defence
- Damages to buildings or materials

**Q&A with Premium Plant Hire managing director Russell Wells**

**Q: Please tell me about the company and the services it provides in a few sentences.**

**A:** Premium Plant Hire dry hires service trucks to the civil construction and mining industry all over all Australia. Service trucks carry fuel, oil and grease to support earthmoving machinery across civil

projects and mine sites.

**Q: Can you give me a few examples of the equipment you hire out and why is so important to insure this equipment?**

**A:** Premium Plant Hire supplies 4x4, 6x4 and 8x4 service trucks, ranging from 3000l-20,000l of diesel.

Brands of trucks include Scania, Mack, Isuzu and Hino. Given the significant cost of these units and they are often used in unconventional environments, such as construction sites or mining operations, there are inherent risks compared to say the same truck that might deliver freight around town.

So having the right insurance and broker guiding our business is important, to ensure over cover is appropriate for the application.

**Q: What are the main risks involved when it comes to service trucks/equipment hire in the mining industry?**

**A:** The main risks involved in Service Truck

hire is equipment damage from other mining vehicle interaction or the conditions that it may operate in.

Premium Plant Hire takes measures to mitigate these risks, however to know that we have the correct insurance in the event something happens is so important.

**Q: What are the three most important types of insurance to have in the industry you operate in?**

**A:** Some of the insurance types that Premium Plant Hire hold are industrial plant insurance, workers compensation and public liability.

Contact Paul Cohalan at Connect Business Insurance on:

Phone: **1300 477 662**

Email: [insurance@connectbi.com.au](mailto:insurance@connectbi.com.au)

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# Shine On, South Australia

By Kate Christian

Olympic Dam is one of the world's largest copper mines and plays a crucial role in South Australia's economy.

South Australia remains among the world's most attractive jurisdictions for mining and mineral exploration investment, according to the Fraser Institute's influential annual survey.

The latest survey, released on February 23, ranks the state seventh out of 78 mining regions, with Nevada topping the list and WA coming in fourth place.

South Australia ranked eighth on the Best Practices Mineral Potential Index, which rates the jurisdiction based on how much its geology encourages exploration investment.

The survey is a massive vote of confidence in the mining industry, which plays a crucial role in driving economic development, investment, exploration and export opportunities for the state.

In 2018-2019, the production value of mining contributed \$6.9b to South Australia's economic development, \$311m in royalties and \$4.3b in exports, according to figures from the Department of Energy and Mining (DEM).

A DEM spokesman said under the South Australian Government's Energy and Mining Strategy, an expanded export goal of \$8b by 2024-2025 has been set.

This has been supported by a number of research and development initiatives including the Geological Survey of South Australia (GSSA), the exploration co-funding Accelerated Discovery Initiative (ADI), the Explore SA: Gawler Challenge Phase 2 and the National Drilling Initiative.

## All Systems Go

The growth in the price of copper and gold has created a flurry of investment in SA's mining sector, from exploration to a pipeline of new projects at long-standing mine sites.

BHP's Olympic Dam, located 560km north of Adelaide, boasts the world's fourth largest copper resource as well as the largest single deposit of uranium.

Olympic Dam copper production, which accounts for the lion's share of the mine's revenue, increased by 16% to 99kt from the previous reporting period.

This reflected improved smelter stability and strong underground mine performance, according to its latest half yearly operational review released in January.

Production guidance for the 2021 financial year remains unchanged at between 180kt and 205kt of copper, while production in 2022 is expected to be lower as a result of major smelter maintenance planned for the first half of the financial year.

BHP plans to begin resource definition

drilling by the middle of this year at its Oak Dam West discovery, which is being positioned as a long-term growth opportunity for the Olympic Dam copper mine.

This followed a successful third phase of drilling and the referral of the exploration project to the Minerals Australia Planning and Technical team for assessment.

## Carrapateena

Oz Minerals has approved and accelerated its \$1.75b million block cave expansion project at its Carrapateena copper-gold mine, where production was ramped up to 4.25mtpa in 12 months—six months earlier than planned.

The conversion of the lower portion of the current sub-level cave to a series of block caves will increase production to 12mtpa, with an average copper production of about 110-120ktpa, while gold production will be ramped up to between 110-120koz.

The block cave decline early works are now scheduled to begin in Q4 2021, according to the company's latest ASX quarterly release.

The company is targeting block cave 1 to begin operations by 2026 and block cave 2 by 2038.

Oz Minerals CEO Andrew Cole said the expansion created the potential for a world class, multi-generational mining province, considering its scale, production, mine life, low-cost base and jurisdiction.

## Prominent Hill

Oz Minerals is expected to make a final investment decision on the expansion project at its Prominent Hill mine in central South Australia in mid-2021, and has set aside funds to progress to the next study phase of the project.

"Prominent Hill again met its copper production guidance while also meeting its increased gold production targets, reinforcing its position as a low-cost reliable operation," Mr Cole said.

"The Prominent Hill expansion study demonstrated the potential to increase underground production and extend mine life by accessing deeper ore with a shaft haulage system.

"With sustainable annualised rates above 4mtpa achieved during 2020, future decline development spending was brought forward to increase mining rates further from 2022, to between 4mtpa and 5mtpa."

## GFG Alliance

GFG, through its subsidiaries SIMEC Mining, Liberty Steel and SIMEC Energy, is one of the leading resources operators in South Australia.

SIMEC Mining owns and operates a 10mt per annum iron ore mine in the Middleback Ranges in SA, about 60km from the town of Whyalla.

These operations incorporate the Iron Baron, Iron Knob and South Middleback Ranges mine sites, which produce both hematite and magnetite ore.

GFG is planning a \$1b-plus upgrade of the Whyalla steelworks, which would phase out the existing blast furnace and replace it with an Electric Arc Furnace and Direct Reduced Iron (DRI) facility to produce low-emission 'greensteel' from GFG's magnetite resources in SA.

A media release by GFG stated this would position Whyalla Steel as a world-leading, carbon-neutral steel producer.

"The new DRI plant will be fed by Natural Gas, in time transitioning to green hydrogen produced from GFG's own renewable energy projects including Cultana – one of Australia's largest solar farms being built in Whyalla," it stated.

"Combined, these new facilities will produce advanced steel long products for the Australian construction, critical infrastructure and mining industries for generations to come."

## Iluka Resources

Iluka's Jacinth Ambrosia operation — the world's largest zircon mine — produced 95kt of heavy mineral concentrate (HMC) in Q4 2020, up from 77kt in the previous quarter.

"Mining occurred at the Jacinth North deposit, with increased throughput rates and ore grades contributing to the higher production," Iluka's latest quarterly report stated.

The diesel power station at the mine will be converted into a hybrid facility after a deal was struck between Iluka and Pacific Energy

last month.

The conversion of the 10MW facility, which is operated by Pacific Energy subsidiary KPS, will involve electric turbo compounding (ETC) technology, which works by recovering waste energy from the exhaust to improve efficiencies and lower CO2 emissions.

Quasar Resources' Four Mile Uranium Mine in the State's far north was one of the world's most substantial uranium discoveries when it opened in 2014 and is still a major player in SA's mining landscape.

The DEM spokesman said SA has a pipeline of other projects including critical mineral projects for high technology materials use. These include Renascor Resources' siviour graphite deposit and Andromeda Metals' kaolin-halloysite deposits.

In 2018-19 there were 13,200 people directly employed through South Australia's mining industry and a further estimated 11,575 jobs in the related Mining Equipment Technology Services (METS) sector.

## New Port

In January, the SA Government gave Port Augusta Operations the green light to transform the former Port Augusta power station site into a new iron ore export port, to be named Port Playford.

A capital investment of more than \$100m into the local economy will mark the return of commercial shipping to Port Augusta for the first time in 50 years and create a hub for projects in key South Australian iron ore regions, including North Gawler, Curnamona and Braemar.

The project will create more than 100 jobs during construction as well as 80 permanent positions.

Construction is planned to commence in mid-2021 with the first shipment from the port scheduled for late 2022. **AMR**



Oz Minerals has approved and accelerated its block cave expansion project at its Carrapateena copper-gold mine.

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# Helping SA stay on top

The team at AMC Consultants has completed more than 130 projects in South Australia alone.

Since opening its office in Adelaide 13 years ago, global mining consultancy AMC Consultants (AMC) has supported South Australia in becoming one of the world's top performing mining jurisdictions according to the Fraser Institute's influential global survey.

Led by Johann van Wijk, the team in Adelaide draws from AMC's 38 years of global mining experience and a team of more than 160 experts across its eight offices to help miners in the state find smarter ways to unearth hidden business value.

Since 2008, AMC has completed more than 130 projects in South Australia alone.

This includes but is not limited to mine planning, geotechnical modelling and

design, valuations and estimates, technical audits, pit design, strategy optimization, technical studies, life of mine plans, and specialist reports.

Some notable clients in the state include the large copper producers Olympic Dam and Oz Minerals as well as companies like Iluka, Simec, Heathgate Resources, Hillgrove, Rex Minerals, Iron Road, and Lincoln Minerals.

One of the things that sets AMC apart from other consultancies is its Smart Data System™—the world's most comprehensive site-level validated data.

It underpins every AMC report and has been particularly useful to clients in South Australia.

Developed over 20 years, AMC's Smart Data System™ is filled with mining cost and productivity data across mining methods, commodity types, geographies, and more — collected and validated at site level to ensure accuracy.

This system enables AMC to rapidly benchmark and cross-check new data, providing an unprecedented level of insight and accuracy in its recommendations.

It also drives AMC's two world-leading cost modelling systems, which regularly deliver estimates within 5% of actuals.

Leveraging the Smart Data System™ through our Advisory division, AMC has delivered more than \$5 billion in bottom-line growth opportunities.

"Beyond our data, it is AMC's unique approach and our people that keep our clients in South Australia coming back year after year," Mr van Wijk said.

"Here at AMC, we only employ career miners and geoscientists, people who understand both the art and science of mining and won't avoid the reality of the challenge."

With more than 8000 projects for more than 1800 clients in more than 111 countries across more than 60 commodities under its collective belt, AMC's global team has seen most challenges.

And chances are, it has created a smarter solution to solve them. **AMR**

AMC Consultants helps miners in South Australia find smarter ways to unearth hidden business value.



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# South Flank Set to Soar

By Kathleen Southway

At a current 90% completion rate, the South Flank iron ore project remains on schedule for first production in the middle of this year.

Delivering a positive outlook on the global economy moving forward, BHP chief executive Mike Henry said South Flank was earmarked as a major project with high returns.

BHP estimates that once the mine comes online, unit costs in the WAIO division will be below \$13/t in the medium term as production steadily increases over time towards 300mtpa.

Mr Henry says WAIO delivered record production in CY20 with full-year shipments of 290mt, underpinned by a reliable supply chain.

"South Flank in WA will see its first production within the next six months, also on schedule and on budget," he said at the half-year FY21 results in February.

Set to replace the 80mtpa Yandi mine, the soon-to-open \$4.5b South Flank mine will produce the same output of iron ore with a mine life of more than 25 years.

## Confident Outlook

The global drive to decarbonise, shift to cleaner energy sources and tackle climate change further accelerates demand for many of the commodities that BHP produces – iron ore, copper, nickel, oil and gas – from key economies such as China, Japan, South Korea and the US.

"In a Paris-aligned, 1.5°C scenario, we expect that investment in such things as copper-intensive solar generation, nickel-intensive batteries and steel-intensive wind turbines will contribute to a more than doubling of the amount of primary copper and a quadrupling of the amount of primary nickel demand over the next 30 years, as was produced over the last 30," Mr Henry said.

"Demand for steel will almost double on this basis."

The Paris climate agreement aims to limit global warming to 1.5°C in a legally-binding international treaty on climate change.

Mr Henry also expects continuing strong demand to underpin production of more than 1b tonnes of steel in China for a third consecutive year.

"We start in a strong position," he said.

"In iron ore and metallurgical coal, our focus is on growing value through lowering costs and driving incremental growth by lifting productivity – something we've been incredibly successful at doing in recent times.

"Should market dynamics warrant additional volumes, the scale and quality of our resources provides capital-efficient expansion options and we have very clear

line of sight on how we would deliver these."

## Iron Ore Production

Total iron ore production for BHP globally increased by 6% to 128mt and guidance for FY21 has increased to 245-255mt.

WA production increased by 6% to a six-month record of 128mt (145mt on a 100% basis) due to record production at Jimblebar and strong performance across the supply chain, including significant improvements in car dumper productivity and reliability.

This was however partially impacted by weather conditions and the major tie-in activity of Mining Area C and South Flank to increase the iron ore grade from 61% to 62% and the proportion of lump production from 25% to 35%.

There is an expected further impact to the March 2021 quarter production levels due to the planned Ore Handling Plant maintenance across the mines and continued Mining Area C and South Flank tie-in activity.

## Heritage Advisory Council

BHP's iron ore rich land in the Pilbara covers an area containing at least 40 aboriginal sites and rock shelters estimated to be up to 15,000 years old.

The company is in extensive consultation with the native title holders, the Banjima people, regarding cultural significance of the region, as well as mitigation and preservation work.

BHP and the Banjima people have established a Heritage Advisory Council to provide input into mine planning at South Flank, with the consultation process continuing alongside the construction of the new minesite.

"Recognising that many of our operations are tied to indigenous communities, we continue to invest in the relationships of trust we have shared with traditional owners over many years," Mr Henry said.

"In September 2020, we further strengthened our 20-year partnership with the Banjima people through the establishment of the South Flank Heritage Advisory Council [to] ensure on-going high level dialogue between us on important cultural heritage and other matters.

"We have a long history of establishing and maintaining strong and trusting relationships with traditional owners."

## Iron Ore Prices

In the latest *Resources and Energy Quarterly* report (March 2021) published by the Australian Department of Industry, Science and Resources, the value for the nation's iron ore exports is expected to reach a record \$136b in FY21, driven by continued strong demand especially from China's elevated infrastructure spending and disrupted supply from Brazil.

Unit costs below \$13/t in medium term, with South Flank online  
(Unit costs, US\$/t) (Iron Ore production, Mtpa)

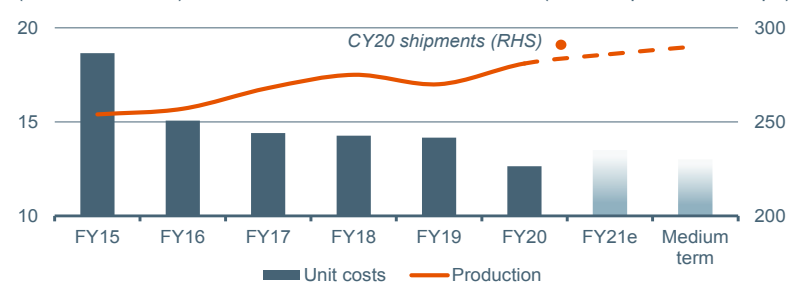


Image source: BHP

Iron ore price is forecast to remain well above US\$100/t until late this year and, with Australia being the largest iron ore producer in the world, the country's exports are expected to remain above \$100b annually for each of the next five years.

China is still the largest consumer of iron ore, making up 57% of world consumption, followed by India at 9%.

## About South Flank, WAIO and BHP

South Flank is set to become the largest iron ore processing facility in WA and one of the world's largest iron ore operations integrating the latest autonomous-ready fleets, digital connectivity and modular design.

It is expected to create 2500 construction jobs, more than 600 operational roles and generate opportunities for WA suppliers.

WAIO is BHP's iron ore asset, consisting of integrated iron ore mines, rail and port operations in the Pilbara region of WA.

There are four processing hubs and five mines, connected by more than 1000km of rail infrastructure and port facilities in the northwest region of the State.

Ore is crushed at each mining hub – Newman, Yandi, Mining Area C and Jimblebar – and beneficiated where necessary, then blended to create high-grade hematite lump and fines products.

These iron ore products are transported along the Port Hedland-Newman Rail Line to the Finucane Island and Nelson Point port facilities at Port Hedland.

BHP is a global mining company that has been operating for 135 years.

It currently employs more than 80,000 employees and contractors who work in over 90 locations worldwide.

The company produces iron ore, copper, nickel, metallurgical coal, petroleum and potash. **AMR**



Iron ore | Resources and Energy Quarterly March 2021

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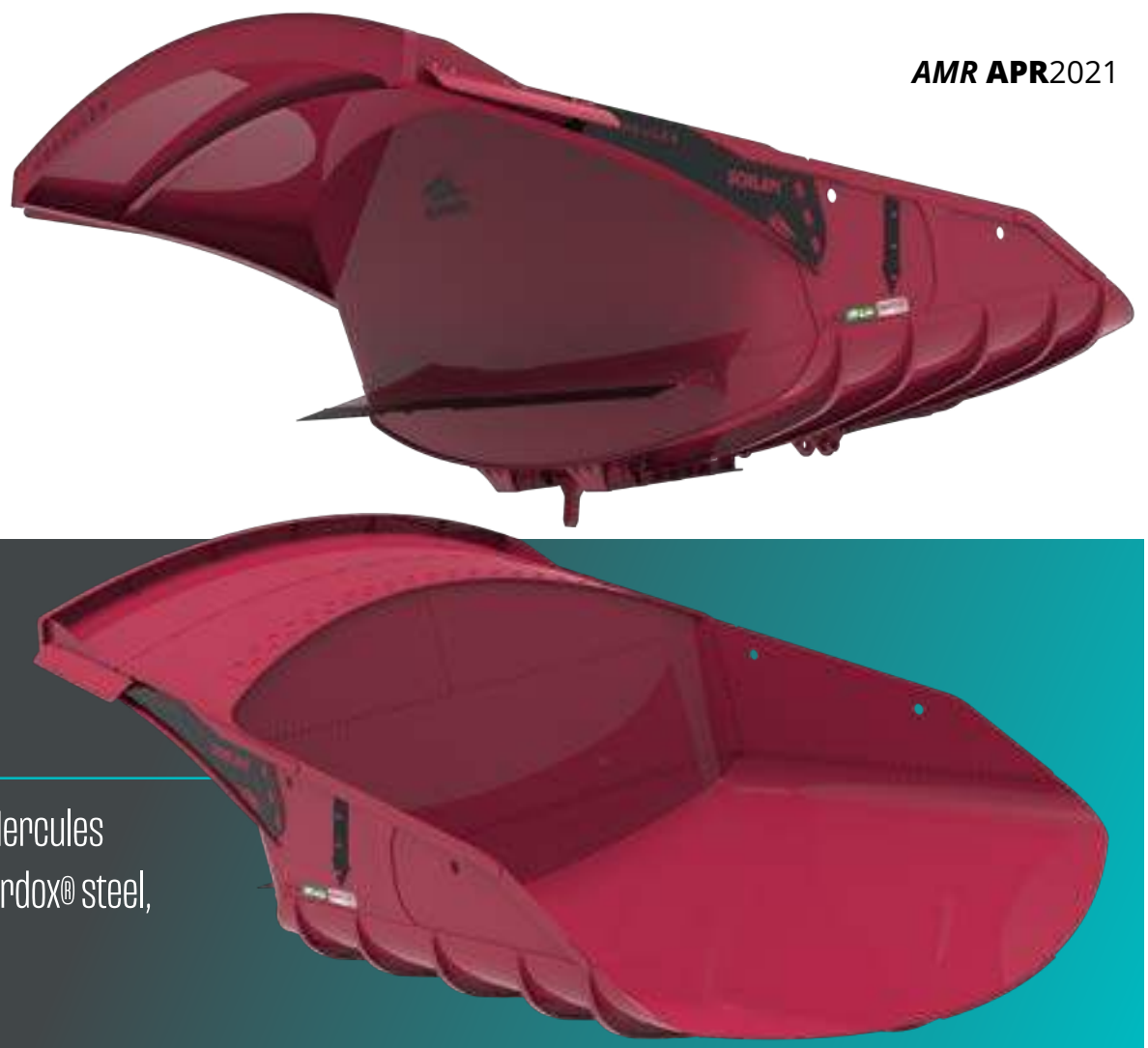
The latest data on Australian iron ore, from the *Resources and Energy Quarterly March 2021* report.

(Image source: Australian Department of Industry, Science, Energy and Resources Office of the Chief Economist.)

# No Cracks

## Under Pressure

The innovative and robust curve design of the Schlam Hercules dump body is made even stronger and tougher with Hardox® steel, which can last three times longer than normal steel.



Exciting times are ahead for the Schlam Group after the company manufactured its 1000th Hercules dump body at its production facility in Forrestfield, WA.

The revolutionary and world-renowned dump body, Schlam Hercules, proudly built and manufactured in Australia, also boasts the abrasive-resistant, wear-resistant and lightweight Hardox® wear plate.

Now in its 12th incarnation, the innovative and robust curve design of the Schlam Hercules dump body is made even stronger and tougher with Hardox® steel after teaming up with global steel giant SSAB.

Fully-compatible with all OEM open-pit dump trucks, including CAT, Komatsu, Hitachi, Terex and Liebherr, the new Hercules HX extends the life of the dump body and increases the payload capacity of all classes of haul trucks by 10-20%.

With the same outcomes across all commodities, including metal ore, gold, iron ore, coal, non-metallic minerals and quarrying, stress throughout the dump body is reduced even in the most challenging and remote environments.

All classes of haul trucks have a reduction in overall vehicle weight, leading to improved fuel economy, extended service life of the dump body, with the potential to downsize to smaller, often more fuel-efficient vehicles.

Schlam Group general manager Glenn Brearey said the company chose to use Hardox® steel due to its wear resistance, hardness, strength, and overall performance, which surpasses the metal found in competitors dump bodies.

"Hardox® has used the latest technology

to create the world's leading abrasion-resistant steel, giving our clients extended service life and high productivity in the most challenging mining environments," he said.

"The Hercules is the dump body of choice for many Tier 1 miners, OEM truck builders and mining contractors around the globe due to its lightweight and therefore greater payload potential.

"By using Hardox® wear plate in the Hercules HX, we're adding another dimension to our already world-class offering."

SSAB marketing manager Kris Chua says the Hardox® in My Body logo ensures businesses are getting a superior steel product manufactured by a qualified program member.

"Each application with the sign attached has passed our strict quality control and is approved as a premium product by the SSAB board," Ms Chua said.

"Specialists within wear and structural technology carefully analyse each application regarding welding quality, manufacturing process and design.

"Each sign has a unique ID that is traceable and can secure the origin and material."

### History and Case Study

First manufactured in Australia in 2003 under the name DT HiLoad, the Hercules dump body has been in continuous production for the last 17 years due to increased demand. Since 2016, DT HiLoad has come under the parent company Schlam Group.

One of the original Hercules bodies, delivered to a gold miner in Kalgoorlie in August 2010, received an overhaul in 2019

and is still in action today, clocking more than 52,000 hours in operation.

The client's fleet of CAT 793 haul trucks were all equipped with Hercules 10 years ago and, since then, Schlam has delivered close to 50 Hercules to the gold miner.

Over that time, the design of the Hercules was improved and customised to suit the needs of the client's hard rock mining environment.

As of August 2020, the Hercules bodies have completed over 1.1m hours of operation at the client's Kalgoorlie minesite.

### Next Milestone

Shortly after reaching its 1000th production milestone last year, Mr Brearey said he expected to reach the 2000th milestone in less than a third of that time.

"The future is bright for the Hercules," he said.

"Our engineering and R&D department are coming out with new variations of the design regularly, and our sales team have been assertively searching for new opportunities and clients."

### Lighter Does Not Mean Weaker

The superior abrasion-resistance, higher payload and fleet productivity, lower capital expenditure on fleet, reduced downtime and maintenance costs, as well as lower fuel usage per tonne and lowered emissions, are just some of the reasons the Hercules has consistently performed over the years.

Efficiency, productivity and profit are achievable through the Hercules' innovative, modular and site-specific designs, custom engineering, full lifecycle wear management,

improved dumping qualities that reduce delivery time and dozer clean up, as well as outstanding load retention that lessen rock spillage and grader clean up.

Schlam also has options for bodies that are up to 10t lighter than competitors with comparable floor thicknesses.

The decreased body weight allows for an increased payload potential, enabling a minesite to either haul the same amount of material using fewer truck hours or haul more material with the same number of truck hours, dramatically reducing the operating cost per tonne.

The Schlam Hercules lightweight bodies have a long history of performing in high impact and high abrasion environments for well over 50,000 operating hours.

### BHP and Rio Tinto

Since November 2018, Schlam Group has been supplying BHP with Hercules dump bodies and is now used across four iron ore operations in WA's Pilbara region at Mount Whaleback, Jumblebar, Eastern Ridge and Area C.

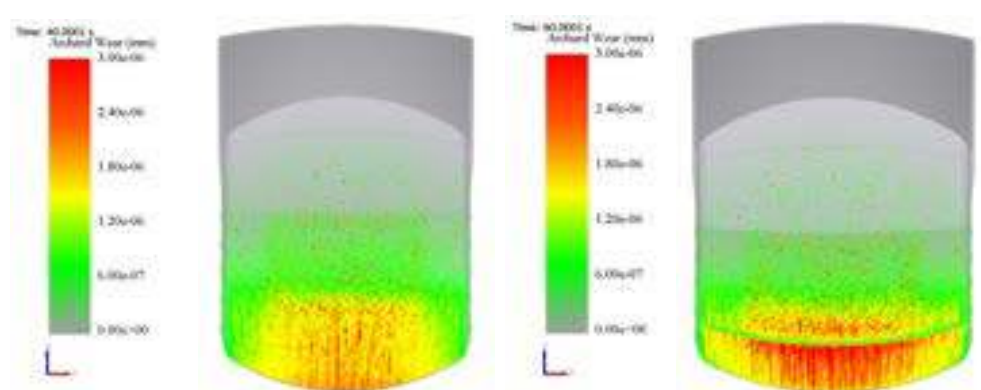
The original DT HiLoad Hercules was lightweight and had a higher carrying capacity over its competitors, allowing BHP to haul up to 10t more per load on its Caterpillar 793 and Komatsu haul trucks.

Schlam Group was also recently selected to sit on a panel to provide mining equipment maintenance (MEM) support for Rio Tinto Iron Ore (RTIO) across the Pilbara.

The three-year contract will incorporate various trades, including heavy-duty mechanics, auto electricians, light vehicle mechanics, boilermakers and more. **AMR**



The Schlam Group reached its 1000th milestone manufacturing the Hercules dump body, proudly Australian-made at its production facility in Forrestfield, WA.



Schlam engineers plotted the relative wear of two floors. The red colour indicates areas of high wear. Based on the results, the curved floor evenly distributes wear across the surface of the body. The dual-angle floor shows intense wear on the rear tall section, reducing the body's operating life.



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# Poised For The Revolution

Greenbushes is the world's biggest hard rock lithium mine.

## By Kate Christian

Home to the world's premier lithium mineral asset, the Greenbushes mine in WA's south west is perfectly positioned to take advantage of the electric vehicle revolution.

Greenbushes has been a major player in the global lithium market for many years but will face even further demand for its product with electric vehicle sales expected to increase from three million to 26m by 2030, according to the Australian Government's Department of Industry, Science, Energy and Resources latest quarterly report.

Australia is the biggest exporter of lithium in the world with the value of exports set to hit \$5.4b by 2025-2026, up from \$1.1b in 2019-2020.

Located 250km south of Perth, Greenbushes began initial development of the orebody in 1983 with the first lithium processing plant commissioned in 1985.

Since that time, the lithium processing facilities have been expanded several times to produce a range of lithium concentrates from Greenbushes, which is the largest hard rock lithium mine in the world.

In 2017, construction commenced on a second large chemical grade lithium processing plant (CGP2), which was officially opened in October 2019.

The new facility increased the number of processing plants at Greenbushes to three and almost doubled the production capacity at the mine to 1.34mtpa of lithium concentrates.

Further expansion is on the horizon, with a third processing plant (CPG3) set to help boost production capacity to about 2.4mtpa. Processed concentrates will be delivered to downstream lithium processing operations at Kwinana and Kemerton, owned respectively by China's Tianqi Lithium and

US battery metals giant Albemarle.

Greenbushes is owned by Talison Lithium, a joint venture between Tianqi and Albemarle. On December 9, 2020, Australian miner IGO announced it had entered into a binding agreement with Tianqi to acquire a 49% interest in a new joint venture, "Lithium HoldCo1", through a subscription for new shares.

The deal gives IGO a 24.99% ownership in Greenbushes and a 49% stake in its associated Kwinana lithium refinery.

IGO managing director Peter Bradford said the transaction was "transformational" for the company.

"Both Greenbushes and Kwinana are world-class assets with attractive growth profiles that together provide the platform for building a global lithium business," he said.

"We look forward to working with Tianqi to build a leading global lithium business that will play an important role in supporting the global transition to clean energy technologies, while generating substantial value for IGO shareholders for many years to come."

### Greenbushes South

It is not just electric vehicles that will drive an exponential increase in the demand for lithium.

A new World Bank Group report revealed the production of minerals, such as graphite, lithium and cobalt, could increase by nearly 500% by 2050, to meet the growing demand for clean energy technologies.

The report Minerals for Climate Action: The Mineral Intensity of the Clean Energy Transition estimates more than three billion tonnes of minerals and metals will be needed to deploy wind, solar and geothermal power, as well as energy storage, required for achieving a below 2°C future.

These sorts of predictions are driving a

flurry of exploration activity to find more high grade sources of the metal.

On January 14, Galan Lithium Limited (ASX: GLN) acquired an 80% interest in the Greenbushes South Lithium Project from Lithium Australia.

The project is located just three kilometres from the world-class Greenbushes deposit and covers the southern strike projection of the geological structure that hosts Greenbushes.

Due to Galan already holding a 100% interest in an exploration license about 15km south of Greenbushes, the acquisition secures and consolidates a significant package of exploration ground of 396m<sup>2</sup> in a world-renowned lithium district.

Galan Managing Director Juan Pablo "JP" Vargas de la Vega explained why he thinks the land around Greenbushes is underexplored.

JP started Galan privately in 2017 with the aim of proving the presence of lithium brines within South America's "lithium triangle" on the Hombre Muerto Salar in Argentina.

"This story has a similarity to Greenbushes South," JP said.

"I went to explore a very well-known salt flat where not much hope was given to the surroundings by many local geologists.

"Three years later, we now have two projects (Candelas and Hombre Muerto West) with a combined 2012 JORC under Indicated of ~3mt Lithium Carbonate Equivalent (LCE) and one with the highest lithium grade in Argentina.

"If there is something that makes sense exploring, why not try?"

Galan's main focus remains the development of Hombre Muerto West.

This year at Greenbushes South, Galan plans

to perform geochemical sampling, produce its own local mapping and potentially some ground geophysics.

"It's a large area to cover and we have identified a few areas of interest already," JP said.

"We find Greenbushes South very attractive as it has been under explored with no drilling to date.

"This is very exciting for us as we are looking at the big picture of potential mineralisation in the area.

"We may not find another Greenbushes, however there is a chance to find sections that could be of potential economical relevance.

"With the information available, we believe that Greenbushes mineralisation may extend to the south as we are only 3km south from the mine."

JP believes the area may have been underexplored due the success of Greenbushes and its world-class deposit.

"Sometimes, companies find themselves that further exploration (and expenditure) is not necessary as they have plenty already with exploration being a lower priority," JP said.

JP said there was an abundance of lithium in the world, but not enough to be economical for all future needs.

"As a result, there is a strong potential to experience several lithium supply shortages in the next 10 years," he said.

"Australia won't be immune to this world-wide phenomenon despite having a strong lithium sector, with several mines and future projects in development in Australia.

"The shift change to electrifying vehicles and the needs of batteries will change the world as we know it rapidly." **AMR**



Greenbushes South Project looking north to Greenbushes mine.



The new lithium processing plant (CGP2) almost doubled the production capacity at Greenbushes to 1.34mtpa of lithium concentrates.

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# Hexagon Trumps Isolation

Hexagon's John Dawes (Senior Safety Consultant) and Rob Marshall (Senior Field Technician) are in the Brisbane office, connected with their colleague, Field Technician, Zac Dilena, on-site in the Pilbara.

It is just over 3200km from Hexagon's Brisbane office to the Pilbara in Western Australia. Or about nine hours by plane, including transfers.

For customers who measure their productivity down to the second, there is no time like real-time.

Hexagon has been quick to pivot to technology such as body cameras and hands-free, head-worn devices during the pandemic, connecting with its customers in real-time for installations and training.

[This 40-second video](#) captures the value of collaboration and expertise projected across a continent in real time.

Hexagon's Senior Safety Consultant John Dawes and Senior Field Technician Rob Marshall are in the Brisbane office, connected with their colleague, Zac Dilena, on-site in the Pilbara.

Zac is wearing a [Realwear](#) headset attached to his hard hat with both hands-free, working on a MineProtect hardware installation for the company's collision avoidance and vehicle intervention systems.

Together, the trio solve a problem for the customer quickly, effectively and in a way that is increasingly becoming the norm.

It is a great example of how technology in resourceful hands can help us adapt to adversity in numerous different ways.

## COVID-19 restraints

Shortly after the World Health Organization declared COVID-19 a pandemic, the words "social distancing" entered the global lexicon.

As governments, healthcare organisations and the public scrambled to respond to the crisis, one thing became abundantly clear: overcoming isolation was and still is the key to maintaining our health.

Hexagon, a leader in sensor, software and autonomous solutions, was well positioned to pivot and assist in the global response to the crisis.

From simulations of the effects of social distancing to mapping the spread of COVID-19 in real time, to drone technology delivering COVID-19 tests, to providing communities with transparent geospatial information, Hexagon solutions continue to help ensure that innovation is readily available to those who need it most during uncertain times.

The effects on the public of social distancing, lockdowns and travel bans are well documented. They also present unique challenges to the mining industry.

Most mines are under immense pressure to stay ahead of the technology curve to remain safe, sustainable and productive. Human interaction is at the heart of implementing new solutions and training staff.

But how do you connect with technical experts who are prevented by laws and lockdowns from entering your country, let alone your mine?

For Hexagon's Mining division, this posed a significant challenge.

"We've built our business – our reputation – on regional, customer-focused service and support," Hexagon's Neville Judd said. "We like being close to our customers.



Hexagon's Operator Alertness System allows operators to wear face masks while still being monitored for signs of fatigue and distraction – a particularly useful feature during the COVID-19 pandemic when mines are mandating drivers to wear face masks.



Jacob Moeketsi, Project Training Officer at Trysome Group, training a Kathu-resident and DeNovo technician on how to connect, program and install the HxGN MineProtect Scope Screen.

The Scope Screen is a component of the HxGN MineProtect L7-L8 Collision Avoidance System, which is foundational to Hexagon's L9 Vehicle Intervention System.

"True to Hexagon's values of being professional, engaged and customer-focused, we innovated to overcome the distance dilemma."

## Innovating During The Pandemic

Bloomberg recently cited Hexagon in an article about the pandemic's affect on mining: 'Robots once seen as job killers now protect workers from COVID—the consensus being that interest in automation has jumped.

Implementing technology from a distance to make automation a reality has helped deepen partnerships with customers.

For example, earlier this year body cameras were at the heart of a [successful safety installation](#) at Gold Fields' Tarkwa Mine in Ghana.

More than 220 mine vehicles were equipped with MineProtect Collision Avoidance System with minimal delays, despite pandemic lockdown preventing travel by our South Africa staff into Ghana.

In addition to using Realwear and wearables, Hexagon technicians are leveraging the augmented reality capabilities of [Google Glass](#) to support hardware repairs in local offices from Almaty, Kazakhstan to Brisbane,

Australia; repairs that might once have been undertaken in head offices in Switzerland or Tucson, Arizona.

In many cases, this has reduced hardware repair times, lowered costs, captured implicit knowledge in a corporate repository, and ultimately improved customer experience.

For all the digital transformation and trend towards automation, Hexagon understands the importance of working with local communities when adding autonomy and other technology to a mine. Close and consistent communication, aligned processes, and training are key.

A [recent Hexagon case study](#) documents Anglo American's safety journey at Kumba Iron Ore in South Africa's Northern Cape.

It examines the partnership developed between Hexagon and Anglo American, Trysome Auto Electrical Engineering and DeNovo Mining Resources to ensure meaningful local community engagement while deploying the leading safety system on the world's largest haul trucks.

Some might assume that local support would lack the skills and capabilities to provide a comprehensive service while support from the technology provider would cause jobs

to be lost locally during an autonomous implementation.

Hexagon's experience with Anglo American and other companies challenges those assumptions.

The picture above shows Jacob Moeketsi, Project Training Officer at Trysome Group, training a Kathu-resident and DeNovo technician on how to connect, program and install the HxGN MineProtect Scope Screen.

The Scope Screen is a component of the HxGN MineProtect L7-L8 Collision Avoidance, which is foundational to Hexagon's L9 Vehicle Intervention System.

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# Mt Cattlin Galaxy's Shining Star

By Kathleen Southway

Bird's eye view of Mt Cattlin processing plant.

The Australian Government has identified a "pinch point" for the global supply chain of critical minerals, with an opportunity to develop the nation's processing and early manufacturing stages.

The Resources Technology and Critical Minerals Processing National Manufacturing Priority road map has recognised the gap in capturing additional value from critical raw minerals, such as lithium in which the primary growth has been in rechargeable batteries.

One such operation in the process of ramping up spodumene concentrate production to nameplate capacity is the Mt Cattlin operation, 2km out of Ravensthorpe in WA and 100% owned by Galaxy Resources.

Today, while on target to reach full capacity in Q2 this calendar year, it has commissioned ore sorter circuits to extract further value from its low-grade stockpiled ore, tailings and other by-products.

This alone has netted the operation an additional 21kt of spodumene concentrate in 2020 from processing of 217,044wmt of previously unusable ore.

With the operation's focus on treating surface stockpiles, there are plans to increase this contribution to 48kt in 2021.

Full-year FY20 guidance for Mt Cattlin was achieved with 108,658dmt of lithium concentrate produced at 5.95% Li<sub>2</sub>O.

## Production, Processing And Equipment

Australia is well-placed to meet the growing demand for lithium with many hard-rock pegmatite-hosted lithium resources mainly in WA, including Greenbushes, Mount

Marion, Earl Grey, Bald Hill, Wodgina and Pilgangoora.

The 100%-owned Mt Cattlin operation produces high-quality spodumene of up to at 6 Li<sub>2</sub>O grade based on its customer demand.

Since restarting in 2016, it has been reliably hitting production targets and achieved record sales in Q4 2020 of 75,336dmt of spodumene shipped, a 349% increase quarter-on-quarter.

After successfully operating in campaign mode in 2020, Galaxy Resources has ramped back up to nameplate capacity in Q2 this calendar year in response to increased customer demand and pricing.

The FY21 production forecast has been increased from 162,000-175,000dmt to 185,000-200,000dmt of spodumene concentrate.

Conventional mining and processing techniques are used for Mt Cattlin with open-pit mining of a relatively flat-lying pegmatite ore body.

Mining is carried out using excavator and truck operations, delivering ore to a crushing and dense medium separation (DMS) gravity recovery circuit.

Contractors are used for grade control drilling and earthmoving operations including drilling, blasting, and load and haul.

Once the ore is mined, it undergoes a three-stage crushing process, then DMS onsite to sort into either product or tailings.

The product is trucked to Esperance Port for export to an Asian customer base, while the fine tailings are stored in an onsite facility.

The conventional DMS plant processes coarse mineralisation, with a 14mm liberation size, without the requirement for milling and flotation.

Mt Cattlin's mining operation uses Johnson explosives, Dynamic drilling and blasting service, Lucas load and haul service as well as Galaxy's own management, engineering and mine planning expertise.

The main mining fleet includes a 120t excavator, two 200t excavators, seven Cat 777 dump trucks, two D10 dozers, a D9 dozer, a grader (16H), a watercart and a front-end loader.

The main drill fleet includes a D65 and two T45 machines.

As at December 31, 2020, Mt Cattlin had a mineral resource of 12.0mt at 1.3% Li<sub>2</sub>O and an ore reserve of 8.0m t @ 1.1% Li<sub>2</sub>O.

## Low-Cost And High-Quality

Galaxy Resources chief executive Simon Hay says the company experienced challenging market conditions in 2020 but Mt Cattlin continued to be a reliable, low-cost producer of high-quality lithium, even managing to reduce its production costs.

"Pleasingly, Mt Cattlin's unit cash cost of production reduced in H2 despite an increase in the exchange rate," he said.

"The cash used in operations of US\$6.3m was US\$29m lower than FY2019 due to stringent cost control and the moderated operational settings implemented at Mt

Cattlin at the beginning of 2020.

"At Mt Cattlin production outcomes were in line with guidance and the record sales quarter in Q4 is further evidence of the lithium industry recovery which is underway and which led to our decision to immediately ramp up Mt Cattlin."

## Developments

Mt Cattlin continues to examine options pertaining to monetising tailings and other by-products such as basalt and primary floats.

Strong demand from China has prompted the operation to look at ways of selling its tailings and low-grade stockpiles.

Mt Cattlin currently has 1.3mt of unprocessed tailings and is expected to have a further 900kt of future tailings, with the average grade approximately 1% Li<sub>2</sub>O.

Mining has commenced at the 2NE open pit with work continuing for 15 months and development drilling is underway at the 2NW pit, to be concluded in early Q2.

The operation will ramp up production from 2NE to full rate by Q2 this year.

Galaxy wholly owns two other global projects – Sal de Vida in Argentina, South America and James Bay in Quebec, Canada.

Construction has commenced at Sal de Vida while the company continues to plan its next growth project at the James Bay deposit.

The company's net cash position as at December 31, 2020 was US\$215m. **AMR**



Mt Cattlin processing plant.



Dense medium separator (DMS) gravity recovery circuit.



# Rising world-wide demand for Lithium leads to crushing program expansion

**A** rising world-wide demand for Lithium has led to Galaxy Resource's high-tech Mt Cattlin Lithium project expanding its crushing program to an annual output of 2 million tonnes.

Rapid Crushing's electric crushing and screening circuit has now crushed over 5 million tonnes of spodumene and tantalum in just 3 ½ years and will be increasing output again to meet the surge in demand.

The Mt Cattlin operation begun in December 2017 has to be among the world's foremost for mine-site efficiency standards.

Galaxy is utilising its experience in developing and operating the Mt Cattlin site to design two other projects – one at James Bay in Quebec, Canada and another in Argentina.

Out of the 1.28 million tonnes processed by Rapid Crushing at Mt Cattlin last year, 347,000 tonnes were processed via Galaxy's Optical Ore Sorting Circuit installed back in January 2020.

## BYPASS CIRCUIT

In order to feed Galaxy's Optical Ore Sorting Circuit, Rapid installed a bypass circuit that crushes stockpiles of contaminated ore containing high grade pegmatite (white in colour) mixed with contaminate (basalt – black in colour).

The Optical Ore Sorting circuit separates the white ore from black waste and then adds the white ore into the processing circuit to increase the grade.

Delivering to the Optical Ore Sorting circuit involves feeding the contaminated ore to Rapid's Primary Jaw Crusher where it is 'primary crushed' and then diverted from the main crushing circuit onto a separate screening & conveying circuit where the ore is screened out in various sizes into stockpiles adjacent to the Optical Ore Sorting circuit.

Rapid then feeds the various sized materials into the Optical Ore Sorting circuit after which it is then fed back into Rapid's normal ore circuit and through to Galaxy's acceptance hopper before being processed through Galaxy's processing plant.

## UNIQUE SYSTEM

The Mt Cattlin ore crushing plant and circuits are typical of Rapid Crushing's unique system of operation.

The company tailor- designs its plant to meet the grind/communion specifications, the required production output and most importantly, creates circuits and systems to a mine-site's configuration... methodology that ensures maximum site efficiency.

Rapid has the capability of tailoring its plant to a mine site's configuration and the conditions within the site because it began life as an engineering company (Irvine Engineering) servicing crushing and screening machinery some 43 years ago.

Irvine Engineering, subsequently went a step further by building its own plant, better suited to Australian conditions, and specifically able to be configured to a client's site so as to give a greater level of efficiency.

## FORWARD-THINKING COMPANY

Rapid's Operations Manager, Glenn Irvine said it has been a pleasure working with Galaxy Resources at their Mt Cattlin Mine.

'This is a real forward-thinking company with a project that is exciting to be a part of.'



Rapid's circuit in the foreground servicing Galaxy's Optical Ore Sorting plant in the background left.

'Fortunately, because of our past approach to plant design, we have absolute confidence in our capacity to serve Galaxy with the reliability that the company requires.'

'We look forward to the new challenge of increasing output to the 2 million tonne mark.'

## Company activities have an Australia-wide presence



**T**hrough its base in Mackay, Rapid is currently operating one of the world's largest track mounted crushers at a major gold mining site in Northern Queensland

This crusher, brought to Australia from Sweden by Rapid Crushing, is a Johnson L160 frame fitted with a Metso 160 jaw crusher.

Rapid is the first private contractor to operate one of these units in Australia.

This unit is the ideal mobile solution for customers with open pits requiring a seriously high capacity, heavy-duty operation – ideal for iron ore, gold and nickel as well as construction materials such as concrete and road aggregates, specialty fill materials, rail ballast, road base, blast stemming, rip rap and armour rock.

Rapid's extensive circuit with Galaxy's plant in the background



# The three key points needed to deliver to the standard required of Galaxy Resource's Mt Cattlin project:

## **Abilities:**

- The right plant & equipment for meeting project requirements

## **Skills:**

- Personnel able to design, operate & maintain plant with absolute consistency

## **Knowledge:**

- Know-how to get things done!



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# Wave Upon the Sands



Base Titanium's Kwale process plant by night.

"On behalf of Base, thank you for supporting us on our journey in developing the Kwale Project in Kenya. Your role in the owners' team has been critical to our success and your direct management of the Mukurumudzi Dam and Tailings Storage Facility has helped immensely in delivering Kenya's first world class mine".

Tim Carstens, Base Titanium

Australia has the world's largest mineral sands deposits with active operations in WA, NSW, South Australia, and Queensland supplying high-grade mineral sands globally.

Mineral sands deposits contain titanium, rare earth elements and silica, the minerals sought after in the worldwide transition to a lower carbon economy.

With the opportunity to supply rutile, ilmenite and zircon into growing markets such as electrical components, titanium metal, medical implants, digital printing, and dentistry, it is more important than ever to use the right team of experts to commission a mineral sands plant. Bringing a new or upgraded plant online for the first time requires comprehensive and integrated planning.

Wave International has extensive experience in the design of mineral sands mines and plants, site execution, integration of construction, commissioning as well as operational knowledge.

The team understands the importance of value protection when it comes to

commissioning plants, making sure the start-up and ramp-up of production is done safely and within deadlines.

The company has been involved in the commissioning of five mineral sands projects in the past eight years, with its core team executing the projects to high standards and tight timelines, all of them resulting in containment of project slip and value protection.

During the construction of two large greenfields projects – Base Titanium's Kwale project in Kenya, Africa in 2013-14 and Iluka Resources' Cataby mine in WA in 2018-19 – Wave was asked to step in and manage the completions and commissioning processes. In both cases several months of production losses was avoided.

The Kwale plant was then upgraded in 2017-18 to increase the concentrator throughput by 33%, with Wave International appointed the engineering and construction manager (ECM) and further tasked with commissioning management to a very tight 18 month deadline with a locked in shutdown period. This project was executed and delivered on time and on budget.

Wave International was also involved in commissioning three smaller trial plants at a NSW project in 2015 and 2016, followed by the design and commissioning of the mining and processing plant at the same site in 2020, culminating in a successful final trial.

Despite COVID-19 impediments, the commissioning was completed on-time and nameplate production achieved within the project timelines committed to.

Wave International is a multi-disciplinary professional services company with expertise in project life cycle from metallurgical process definition, all facets of design, project planning, control, implementation to commissioning.

From its humble beginnings in southwest WA, home to several mineral sands and silica sands operations, Wave International has now established itself as a leader in the delivery of mineral sands projects.

Wave International's recent contribution to this sector include the development of a new mining system technology, delivery of greenfields and brownfield capacity in Africa (including subsequent expansions),

brownfields capacity increase to existing operations and feasibility for future supply.

With the growing demand for technologically advanced 'green' products, Wave International is currently involved in three separate mineral sands projects with planned production over the next two to three years.

The company also supports other commodities and industries including battery minerals, bulk commodities, gold, base minerals, heavy industry, energy, water and infrastructure sectors.

Wave International supports in all areas of process and plant design and commissioning and excels at protecting value for the client.

Our ethos of clear requirements development, risk mitigation and a Safety in Design based delivery process provides the basis for effective completions and close-out, enabling optimisation of project value.

AMR

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For over 21 years, Wave International has supported the development of supply chains from our operational centres in Australia, Europe, South Africa and Mongolia.



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GOLD AND METALS



MINERAL SANDS



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WATER

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# Groundwater Pumping System

The people of north Adelaide were hit hard by the closure of the Holden motor factory with job losses and economic challenges.

The factory was a large employer in the region and also an innovator in product development.

Unfortunately, due to economies of scale, the motor industry has now virtually ceased to exist in Australia.

However, the South Australian government was far-sighted and set up the North Adelaide Irrigation Scheme (NAIS), which created 3700 jobs and add a projected \$500m per year to the economy.

NAIS developed new water treatment facilities to increase the production of recycled irrigation water by 12GL.

This recycled water is suitable for food production and has created an opportunity to get high value crops to overseas markets.

Demand in Asian countries, where Australian produce is appreciated for its freshness and quality, has been growing.

Furthermore, some water was also available for the Barossa, where premium food and wine harvesting is one of South Australia's economic pillars.

The water was pumped into large storage dams from 10 bores located around the Bolivar precinct, all using submersible pumps and Flexibore hose.

Flexibore was chosen as it was the most efficient riser in terms of pumping costs and

ease of installation. The prime contractors, Leed Valoriza, also wanted to have back-up from a local manufacturer.

Leed Valoriza project engineer Sam Doolette was particularly impressed with the service and support he received from Crusader Hose.

"We had the managing director come over from Melbourne to assist with the submersible bore pump installation," he said.

"We were very pleased to see how easily the pumps could be installed and after completing the first one, we scheduled the rest to be installed at two per day".

Flexibore was also chosen as it is Australian made and the government wanted to keep funds local wherever possible. Business SA has long been a proponent of supporting local industry, including Australian manufacturers.

"When we buy Australian-made flexible risers, we not only increase local capabilities, but we also keep funds within the country," Mr Dooley said. "The multiplier effect can bring more than five times the benefit to local industry."

Flexibore was developed in Australia to meet the needs for a riser pipe that could be corrosion-free, never clog up due to iron bacteria and also be easy to install.

Through continuous improvement and innovation, Crusader Hose has grown to become the supplier of choice for mining, irrigation and government projects needing



Unrolling the Flexibore.



Bore headworks being carried out.

to pump ground-water. Customers include BHP, Rio Tinto, Salt Lake Potash and many leading mining operators around Australia.

Crusader Hose managing director Francois Steverlynck said Australia has a clean and green image, "cultivated over years of managing our resources responsibly".

"We also have a capable manufacturing industry, brought about by hard work and investments in education," he said.

"It is wonderful when we all work smartly together to deliver projects such as NAIS as this will continue to benefit generations of Australians.

"Thanks in part to Flexibore, this scheme is able to supply consistent water flow that is completely independent of how much it rains, or how full the Murray River is.

"This will provide certainty, as well as higher quality water at the same time." **AMR**

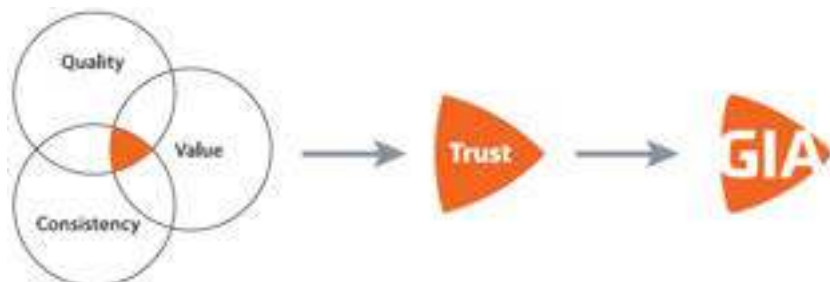


## Expression of Interest

**GIA Rock Drilling Tools** is seeking Expressions of Interest from Australian drilling and mining service companies to be official distributors of GIA Top Hammer and DTH Tools.

GIA Rock Drilling Tools are designed to offer best cost per meter for your application. The products offer a unique combination of quality, value and consistency that you can trust. Our comprehensive range of top hammer products are made to lower your operating cost, with simple and easy choice of perfect match for your every application.

GIA products are designed to match the performance with price, for winning your trust on the **quality** with **value**. And we do this again and again, every time you place your trust on us, giving you peace of mind by offering **consistency**.



**In order to be eligible as a GIA tools distributor,** your company will be required to provide evidence of:

1. Australian Registered Business
2. Three years' Financial Statements
3. Capability Statement
4. No Conflict of Interests

**For further information, please contact:**

Beau Temby  
Business Line Manager - Tools & Attachments  
beau.temby@epiroc.com

**DEADLINE FOR SUBMISSIONS: 30 APRIL**

### Top Hammer Tools



### Down the Hole Tools



# Efficiency, Innovation and Energy

When it comes to safety, efficiency and productivity in underground environments, it pays to use an engineering company that thinks outside the box.

"Tunnel vision" is the last thing that Quattro Project Engineering has when it comes to solving underground infrastructure issues.

The team prides itself on developing better ways of doing things and in doing so has revisited how underground services are hung and braced.

Having designed and installed tens of thousands of metres of underground pipe work across Australia, Quattro Project Engineering has come up with a solution that significantly reduces the time and cost associated with underground pipework installation.

Quattro Project Engineering's QClaw and QBrace constitute a structurally certified pipe hanging, bracing and installation system for underground infrastructure that is cheaper, neater, faster and safer to use.

Two rock bolts have historically been used per line of support in underground pipework infrastructure and this new innovative system halves the drilling and installation of rock bolts by creating a single line of support.

The QClaw's ability to hug the pipe greatly improves the ease of pipe suspension and it integrates seamlessly with the QBrace, which allows bracing to be fitted quickly, consistently and effectively where required.

The QBrace itself is a lightweight, multidirectional tensile bracing arrangement that is easy to install with no requirement for custom pipe fabrications allowing it to be installed seamlessly with the QClaw anywhere along the reticulation system.

The lengths of each brace can be adjusted to suit site conditions while the system's symmetry resolves loads in any direction.

To facilitate installation of underground infrastructure, the QMEWP is the industry's first certified and registered AS1418.10 compliant arrangement utilising Integrated Tool Carriers.

Developed in response to a change to statutory requirements relating to working at heights in an underground environment, the QMEWP supports single, twin or charge up arrangements allowing all manner of underground mining activity to be completed with full compliance.

When combined with the QPHA, the pipe handling aide, underground crews can install the pipe support system safely and efficiently with minimal material handling.

The solution is simple in its application.

Rock bolts can be marked out, pre-drilled and installed, allowing pipe runs to be dead straight.

The pipe is transported on custom pallets, before being rigged and lifted without the requirement for manual handling.

The pipes are then placed in the QPHA allowing them to be easily manipulated into position before the clasp portion in the Claw is installed, with one bolt to finish off.

Quattro Project Engineering performed recent installation work involving several

kilometres of 10" pipes, inclusive of ANSI flanges, in an underground environment in South Australia.

The magnitude of the installation was a huge challenge to say the least.

The QClaw/QBrace system, installed using the QMEWP and QPHA, saw Quattro Project Engineering successfully double installation rates typically seen with smaller gauge pipe in underground areas.

The peak installation rate achieved was 200m bored, bolted and hung in a 24-hour period.

The reduction in manual handling and time spent working at heights have seen significant reductions in exposure hours, further enhancing operational safety.

This improvement in installation times allows service crews more time to focus on other operational activities with less time and money spent on infrastructure installation.

Quattro Project Engineering's Managing Director, Jeremy Palmer, says the team are constantly looking at safer and more efficient ways to do things.

"Since inception, we have always looked to improve and enhance the way things are done," he said.

"So much advancement is being experienced through the benefits of electrical and control technology, however, in an underground environment, mechanical initiatives still have a place at the table and can offer huge benefit to operators.

"As such, our people continue to analyse and question and will always be encouraged to do so – that process drives change and innovation.

"Our product designs are developed with input from operational personnel to ensure that they are not only technically proficient, but are workable, practical and meet their most critical objective – to make underground mining safer and more efficient."

Quattro Project Engineering is a contract services company offering consulting engineering, product development and sales, as well as construction and operational support to the underground, metalliferous mining industry.

It forms part of the engineering and construction arm of the longstanding, Tier 1 mining contractor Byrnes Group of Companies, allowing Quattro Project Engineering to draw from the vast experience and diverse expertise across the group and offer turnkey projects to clients.

The QProducts™ range have been developed from the pursuit of improved operational safety and efficiency, a changing legislative environment and the critique of conventional methodologies.

Mr Palmer says the company plans to expand its build-own-and-operate contracting model for underground paste backfill, while continuing to offer turnkey solutions for all mine infrastructure.

"Sites are realising the significant benefits of the QClaw/QBrace system and starting to adopt it for systems such as raw water and rising mains," he said.



The Quattro QClaw and QBrace is a structurally certified pipe hanging, bracing and installation system for underground infrastructure.



The QBrace interfaces with the hanging fastener of the QClaw, with strut arms cut to length then secured to the backs via rock bolts, creating a certified, tensile bracing system that resolves loads to rock.



"Tunnel vision" is the last thing that Quattro Project Engineering has when it comes to solving underground infrastructure issues.

"This is another area we are focused on going forward and we are always looking for ways to innovate our way around the challenges of underground.

"Safety is a serious issue and we want to leave a legacy behind that markedly changes the nature of underground infrastructure, in terms of how it is designed, manufactured and installed.

"We are currently developing and trialling new products and we are constantly liaising with our operational personnel about the issues they face and how they can be overcome."

"Being brave enough to challenge convention and try new things will always be in our DNA". AMR

# Aussie-Made for Aussie Mines

**T**wenty-seven years ago, Australian Pump Industries burst on the scene with a very simple philosophy.

The company began with a small team that comprised some of the very best of the old Tutt Bryant crew.

That team has grown to turn the company from a small backyard show to a major force in the pump market, that exports their Australian designed and made products all over the world.

## AN UNUSUAL PERSPECTIVE

The three men and one woman who started the business had to do some serious rationalisation of motives before daring to tilt with both multinational and major Australian Pump manufacturers and suppliers.

**"We had ideas but no real product. but we knew that the motivation that would work related to customers, quality and customers service", Aussie Pumps Chief Engineer John Hales said.**

The team, analysing the potential growth markets and where their technology expertise could do the best, fastened on Australia's most important industries, farming and mining.

The next step was to start interviewing and meeting users. A lot of travel was involved but the research carried out left the Aussie team with a very clear understanding of the need for consistent market research and in-field experience working with users.

"Our inspirations come from that contact," Mr Hales said.

"Some of our best and most successful concept ideas came out of suggestions or issues presented by mines or quarries. We knew they had problems. They gave us the ideas to turn the problems into solutions."

## PUMPED UP FOR MINING

Every mine or quarry in the country has liquid handling issues. It goes with the job of open cut and underground mining environments.

The company first set up to develop a range of self-priming centrifugal pumps that could be used for a wide range of applications – everything from water carts to dewatering trash pumps and even high pressure fire pumps.

"It was mining companies who suggested we turn our farmer oriented lightweight, portable Honda petrol engine drive fire pumps into something more substantial," Mr Hales said.

"We rebirthed the Aussie Fire Chief, regarded as the world's best lightweight, portable fire pump into, a Mine Boss version."

The Aussie Mine Boss version of the Fire Chief is now on mine sites, not just in Australia but for operations in Kenya, Burkina Faso and even as far as Mongolia.

It features a super heavy duty hot dipped galvanised or stainless steel frame, built from 38 mm heavy duty tube, an integrated lifting bar, driven by Yanmar 4.8hp electric start diesel engine with a recoil back up and load of features that appeal to miners.

**"We made E-stop standard for the Mine Boss version and put in lock-up galvanised battery boxes, fitted with**

**battery isolation. A fire extinguisher was also included," Mr Hales said.**

## MINE FIRES... A REALITY

The Fire Chief, and the recently developed Mr T twin impeller Mine Boss version in the same family, are now considered standard equipment.

Mostly, they are built on the back of utes with 400 or 600 water cart tanks and fitted up with hose reels with high pressure firefighting hose assemblies.

"Sometimes they're fitted to bigger tankers with more capability and use 1 ½" fire hoses to really bring fires under control fast," Mr Hales said.

The Mr T twin impeller is a similar configuration but powered by 10hp Yanmar air cooled diesel with electric start and recoil backup. That machine, supplied in both 2" and 3" versions, changed the way people think about twin impeller pumps.

Instead of the usual lightweight equipment, the Mr T twin features a maximum flow of 450lpm and a maximum head of 90m. That's almost 120psi!

Again, the machine is wrapped in a super heavy duty galvanised frame and fully equipped with all the protection devices that are required to keep simple but robust equipment safe from the hazards of Australia's mine and quarry locations.

"The 3" version of the Mr T Mine Boss provides extraordinary performance," Mr Hales said.

"It can deliver high flows at high pressure, providing the ability to put out fires fast, provided the water supply is readily available."

**Mr Hales said that even at 80m head, the pump can produce 150 lpm flow. Even more surprising, at 50m head, the machine can produce 350lpm flow. All of this because of the specially configured version with 3" suction and 3" discharge.**

"Imagine running a 3" fire hose off a 10 hp pump and getting that level of capability," Mr Hales said.

## TRASH PUMPS THAT WORK

"At one stage, Australia was drowning in cheap trash pumps made in third world countries," Mr Hales said.

"Some were marketed as heavy duty machines but many fell short of the customer's expectation.

"The continued instability in the South Pacific, may mean that counting on third world product is even more insecure"

The Aussie Pump range of Mine Spec trash pumps extend from 2" lightweight but in Mine Boss configuration, all the way through to big 4" and 6" pumps. These pumps all feature the kind of Mine Spec configuration that makes them ideal for the most arduous applications in what are probably some of the most inhospitable places on earth.

The pumps will produce flows up to 6000lpm and are all equipped with E-stop, battery isolation, fire extinguishers and super heavy duty construction.

"Our big seller is a 4" pump called the QP40TMS, which delivers a whopping 1550 lpm and provides the ability to handle



Aussie's MQ60TD 6" trash pump.

spherical solids of 1 ½" diameter," Mr Hales said.

The impellers are made from high SG cast iron and are big non clog style. The volutes are also high SG cast iron.

Mechanical seals are silicon carbide for wear resistance and the pumps all come complete with Yanmar 10hp electric start diesel engines with battery isolation.

The pumps can also be used for a myriad of on-site jobs, including wastewater pump out or, in the event of flooding, fast dewatering.

The big 6" pump, called the MQ600TD, can either come trailer mounted or skid mounted. Either configuration is available in Mine Boss version.

The 6" pump has an excellent high pressure performance with the ability to deliver water at up to 46m head: that's 65psi.

A huge impeller runs in a heavy duty volute incorporated in the front opening port. When that port is opened, the pump body is exposed, including the impeller, providing clean-out to be carried out easily and with a minimum of time wasted.

"Best of all, the clean-out can be carried out without disconnecting pipework," Mr Hales said.

The big machines are also ideal for flood situations with the ability to be moved easily on a super heavy duty trailer.

The trailers are built around a steel base that includes a 152l fuel tank. That gives the big 6" pump 11 hours of run time. An integrated lifting bar is also included.

The power for 6" pump is from an 80hp Deutz diesel engine, equipped with LOFA 620 controller. Low oil pressure, high oil temperature and v-belt failure shutdown protection are all included and the control panel is shock mounted in water-resistant housing, including hour meter, ammeter,

tachometer and alternator failure light.

**"All of the above sounds pretty good but, the pump itself is the star of the application," Mr Hales said.**

**"The huge cast iron body provides fast self priming without the need for any mechanical priming assistants. It will suck up through a vertical lift of 7.6m without any assistance from compressors or vacuum pumps.**

**"The system is simple. A huge tank is incorporated into the big cast body.**

**"When the pump is primed and the engine is started, the water in the pump body is evacuated creating a vacuum which in turn, draws the water up through the suction hose.**

**"What customers love about this product is, like all our trash pumps, their robust construction and trouble free operation over sustained use in even the toughest applications."**

## AUSSIE GMP PUMPS

More recently, the company has introduced an extensive range of high and low pressure trash pumps for mine applications.

Manufactured from cast iron in the standard configuration, they're also available in cast 316 stainless steel.

"We call them Aussie GMPs because they are made in conjunction with a European first world ISO 9001 accredited company by that name. We assist with engineering support and inspiration so the products produced are a real co-operative exercise," Mr Hales said.

The pumps are available in three phase, electric drive configuration, as well as single phase, but also available in 1000v versions as well. All pumps are self-priming with the ability in many trash pumps to open up the front ports for easy cleanout.



Another line of Aussie QP40T trash pumps come off the production line.

Aussie Pumps also produce a big range of Atex-rated pumps for handling diesel fuel safety. These units will comply with use for applications involving gas zones 1 and 2 as per ATEX directive 2014/34/EU.

**"Many of these pumps wind up in dust suppression applications. For example, a new 3" semi trash pump has just been introduced that will deliver maximum flow of 1000 lpm with a maximum head of 70m.**

**It's a real breakthrough in self priming pump design and proves that self priming pumps can do amazing things and with massive advantages for the users," Mr Hales said.**

**THE SELF-PRIMING ADVANTAGE**

"The big advantage of self priming is that

the end user doesn't have to worry about priming the suction line," Mr Hales said.

"When you consider how easy it is to fill the pump body, with water and start the engine or motor, it really is so simple.

"Because the water is retained in the pump bowl, many times after the pump has shut down, re-priming is not necessary.

"It's just a matter of the pump starting and going through the process all over again."

**316 STAINLESS STEEL... NO PROBLEM**

Many mines across the country, not just metalliferous but coal as well, have real problems with corrosive liquids.

Filtering leachates is often corrosive and pumps are required to be in cast 316

stainless steel or Duplex.

The Aussie GMP self-priming pump range, right up to big 4" pumps, is available in 316 stainless steel.

These pumps are already working around Australia's major mines and performing admirably.

"They're so good that even the Australian Army now specifies them," Mr Hales said.

**A SURGE OF AUSTRALIAN MANUFACTURING**

Aussie Pumps is dedicated to the concept of an Australian manufacturing industry renaissance.

The co-operation with GMP is one that allows them the opportunity to begin the

casting, machining and full manufacture of those products at their option at some time in the future.

"My experience in engineering and Australian manufacturing tells me that it is absolutely possible, provided we get the volume. That means we have to export as well as service the Australian market," Mr Hales said.

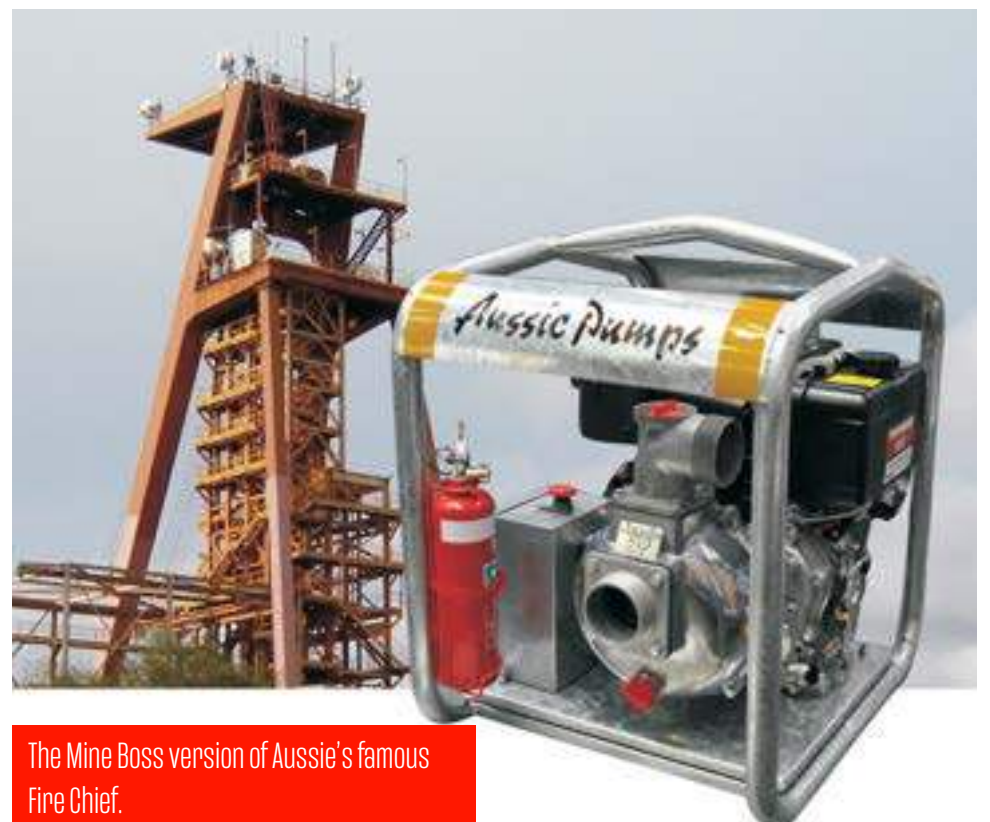
Mr Hales is an Australian manufacturing fanatic through and through and the whole team at Aussie is as enthusiastic about rebuilding that in-country capability.

"We live in uncertain times. The more capability we have in Australia the better," he said.

Further information is available from Aussie Pumps on 02 8865 3500, aussiepumps.com.au or Authorised Distributors. **AMR**



Aussie's MQ600TD going to work on a coal mine.



The Mine Boss version of Aussie's famous Fire Chief.

# Seifert Cooling Enclosures

Seifert Systems Australia offers a complete range of precision cooling products designed to support critical electronics infrastructure within enclosures.

For correct application, enclosures need to be a minimum IP54 rated: sealed from water and dust penetration.

Seifert offers IP54 rated cooling units for indoor enclosures such as process control or telecommunications. For this application, consider the Seifert Slim Line series or the Seifert Compact range.

Cooling capacities range from 320W to 4kW. Power supplies are available from 120V, 230V to 400V three-phase.

Units are available in RAL7035 powder coat mild steel or stainless steel 304 or 316. The Slim Line series is filterless technology.

Compact units have filters available if necessary.

Seifert offers IP56 rated cooling units for outdoor enclosure applications, such as renewable energy, road infrastructure or telecommunications as an example.

For outdoors, Seifert recommends the OC Series or the Slim Line Pro Series.

Cooling capacities range from 290W to 6kW. Power supplies include 120V, 230V and 400V three-phase.

Units are available in RAL7035 powder coat mild steel or stainless steel 304 or 316.

Both the OC and the Slim Line Pro models have filters available if necessary.

All Seifert A/C units are factory set at 35°C.

There is the facility to adjust the set points for specific environments.

Slim Line access to alter is via switches on the motherboard.

On the Compact, OC and Slim Line Pro series, access is via the user interface. **AMR**



An MFB IP56 S280 enclosure fitted with the Seifert IP54 Slim Line series KG-4269 500W 230V A/C unit.



# KEEP COOL

## ENCLOSURE CABINET PRECISION COOLING

Designed to keep your electronics cool and operating at optimum performance.

- Cooling capacities range from **200W to 6kW**.
- IP Ratings – **IP54 & IP56**.
- **Mild Steel and Stainless Steel** finishes.
- Seifert also offer **Heat Exchangers, Peltier Coolers and Fan Systems** - complete Thermal Solutions.

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wegweisend innovativ





# Trust ITT Blakers For All Your Pumping Solutions

**D**emand is increasing to secure more reliable and technologically advanced pump solutions in the Australian and global mining industry.

ITT Blakers, with local facilities in WA, Queensland and distributors in NSW, Victoria, South Australia and Tasmania, has established itself to become a diverse and all-inclusive end to end pump solutions provider for the mining sector.

## About ITT Blakers

ITT Blakers is a fully integrated pump service provider with a full portfolio of premier industrial products.

Providing the most widely recognized and respected brands in the global pump industry, ITT Blakers is a one-stop shop for highly engineered critical components and customized technology solutions that achieve significantly improved results. ITT Blakers covers the whole of Australia and New Zealand.

The Perth headquarters comprises a 2600m<sup>2</sup> office, as well as a warehousing, factory, repair/service/rebuild centre, and a state-of-the-art pump test bay for the packaging and after-sales service of pumping and associated equipment. The Gladstone, Queensland, facility provides aftermarket service, rebuild and repairs for a wide range of equipment in this fast-developing region.

The Perth pump test facility conforms to Australian and International standards and is equipped to test both horizontal and vertical pumps, utilising a variable frequency drive for performance testing over a wide range of speeds.

NPSH testing is conducted using vacuum suppression, noise and vibration testing, including FFT spectrum analysis.

## Client Outcomes

Through its legacy of providing innovative solutions, ITT Blakers delivers enhanced and enduring outcomes for clients.

In 2017, a leading Australian water utility company sought a solution which could make significant improvements to its process critical pumps, while improving efficiency and reducing annual maintenance costs.

Upon winning the contract, ITT Blakers' local engineering team met and exceeded the challenge, providing upgraded drop-in replacements and reducing the customer's yearly costs to nil, four years in a row and counting.

ITT Blakers partners with its customers to deliver lasting solutions for assets that underpin the sector and is a local industry leader for all pump needs.

## Why ITT Blakers

ITT Blakers offers industry leading 3D scanning and re-engineering with in-house knowledge of parts failure modes, hydraulics and metallurgy (CFD-FEA modelling).

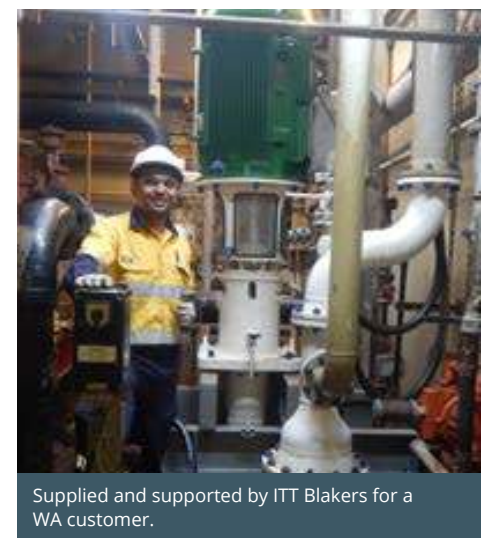
With local upgrade and retrofit solutions, along with local project management, field



An ITT Blakers staff member performing 3D scanning at the Wangara facility in WA.



A designated test bay for ITT Blakers' industrial pumps at its Wangara production facility.



Supplied and supported by ITT Blakers for a WA customer.

service and commissioning, network of service facilities and expertise, as well as preservation and storage capabilities, it is no wonder the mining industry trusts ITT Blakers for all its pumping solutions.

The cohesive multi-disciplined team combine 171 years of pump knowledge with local engineering, design and application capabilities.

The company leads the industry with:

- Plant performance services
  - Rotating equipment health surveys
  - Energy consumption audits
  - Root-cause analysis and system curve analysis
  - Inventory analysis (critical operational needs)
- Emergency call-out response within 24 hours
- Ability to performance test prior to delivery up to 2400 m<sup>3</sup>/h
- Vast network of supply agreements to obtain best price and quality
- Parts standard turnaround on quotations of 48 hours
- Fast strip, assessment and service quote turnaround
- Industry-leading service repair lead-time
- Inventory holding of major capital parts, to reduce risk and reduce turnaround time
- On-time delivery average over five years +98%
- Cost of poor quality COPQ rolling average = 0.002%
- Contractual services offerings with the flexibility to suit maintenance budgets and flexible payment structures

## Pump Products And Services

### Goulds Pumps

ITT Goulds Pumps is among the most widely recognised and respected brands in the global pump industry, serving customers in the oil and gas, mining, power generation, chemical, pulp and paper, and general industrial markets.

As the only manufacturer to make digital monitoring standard on every process pump, ITT Goulds Pumps continues to lead the industry in both mechanical pump design and the adoption of smart technologies.

### Rheinhütte Pumpen

Rheinhütte Pumpen is a market-leading designer and manufacturer of centrifugal and axial pumps that are suitable for corrosive, abrasive and high-temperature-resistant industrial process environments.

Rheinhütte's solutions serve special applications for chemistry, mining, renewable energies and refinery processes and include solutions for the production of sulphuric acid, molten sulphur, fertilisers and chlor-alkali electrolysis production among others.

### Bornemann

ITT Bornemann Pumps is a market-leading provider of multiphase pumping systems for the oil and gas industry, and also serves the industrial, food and beverage, and pharmaceutical sectors.

Recently acquired by ITT, Bornemann Pumps expands the portfolio of highly engineered pumps, systems and aftermarket capabilities for global oil and gas and other attractive end markets.

### C'treat

ITT C'treat is a leading provider of high quality water treatment systems for offshore oil and gas production platforms throughout the world.

C'treat equipment offers dependable fresh water for drinking, equipment wash-down, general utility, desalting crude and other

processes.

### Pro Services (Pro Cast, Upgrades, Repairs, Field Service)

ITT PRO Services provides replacement parts, repair and upgrade services, reliability and maintenance programs, and asset management assistance to customers with the goals of extending equipment life, reducing total cost of ownership and increasing plant output.

PRO Services includes ProSmart wireless predictive monitoring, PumpSmart variable speed drive systems, and i-ALERT2 equipment health monitors. With retrofits and upgrades, ITT engagement includes site surveys, engineering assessment and return on investment proposals for hydraulics, materials, mechanical, design and supply.

Since 1975, ITT PROCast has supplied new quality replacements parts for obsolete pumps and rotating equipment, with the latest technology reverse engineering parts to within .0005" accuracy.

### Engineered Valves

ITT Engineered Valves are essential equipment in industries ranging from mining to biopharmaceuticals, from nuclear operations to oil sands. With experience in valve development, design, manufacturing, installation and automation, product offerings include market-leading industrial knife-gate and hygienic diaphragm valves.

### i-Alert

i-ALERT is a monitoring solution using a combination of sensors, apps, gateways, diagnostics and AI platforms for zero unplanned downtime. Easy to set up in minutes, sensor installation supports threaded connection, epoxy or magnetic mounting.

The i-ALERT sensor was designed to accurately measure vibration in all three axes. Advanced vibration diagnostics are available to anyone with a smart phone or tablet. **AMR**

# A Cut Above the Rest

**W**eir Minerals has released the Isogate® WR knife gate valve, which offers miners and aggregates operators alike a step change in valve performance.

Incorporating the latest advances in design and materials technology from Weir Minerals' expert engineers, the range of Isogate® WR knife gate valves are more reliable, while producing minimal fluid discharge and weighing considerably less than equivalent mining valves.

The company's Global Product Manager for Valves and Tailings, John Abbott, said drawing on decades of wear analysis, Weir had optimised the Isogate® WR knife gate valve's body design, by reinforcing the areas subjected to the harshest wear and pressure.

"At the same time, we've reduced the weight elsewhere to produce a robust, long-lasting mining valve that's significantly lighter than comparable products," he said.

"The weight reduction can be especially significant in situations where a number of valves are used on a specific installation, such as in a hydrocyclone cluster, or where lightweight piping systems are used."

The gate has also been redesigned, with stronger materials resulting in a thinner gate that can still withstand the pressure of mining slurries. This combines with the valve's unique gate guide that reduces deflection by ensuring smooth gate movement and less stress on the sleeve

elastomer during blade transition.

The knife gate valve utilises Weir Minerals' new Isogate® WSL sleeve, which uses the proprietary Linard® HD 60 silica-reinforced natural rubber to solve the three most common problems with sleeved knife gate valves: leakage during cycling, tearing and load distribution ring (LDR) failure due to corrosion and erosion.

Leveraging the Linard® HD 60 rubber's high resilience against cut, tear and abrasive wear to improve wear life, the new Isogate® WSL sleeve fully encloses the LDR to prevent corrosion. By allowing the rubber to move as with the blade cycles, the design reduces the chance of tearing while reducing slurry discharge by up to 75%.

The Isogate® WSL sleeve can also be used in existing Isogate® WS knife gate valves, improving wear life and decreasing discharge on cycling.

Isogate® WR knife gate valves and Isogate® WSL knife gate sleeves are now available worldwide. **AMR**



The Isogate® WR knife gate valve has been optimised to deliver longer wear life, while considerably less than other slurry valves.

The valve's thin gate and guide system reduces discharge on cycling.

## Internet and Phone for Remote Mine Sites



Australian Private Networks offers communications solutions for mining operations in remote Australia.

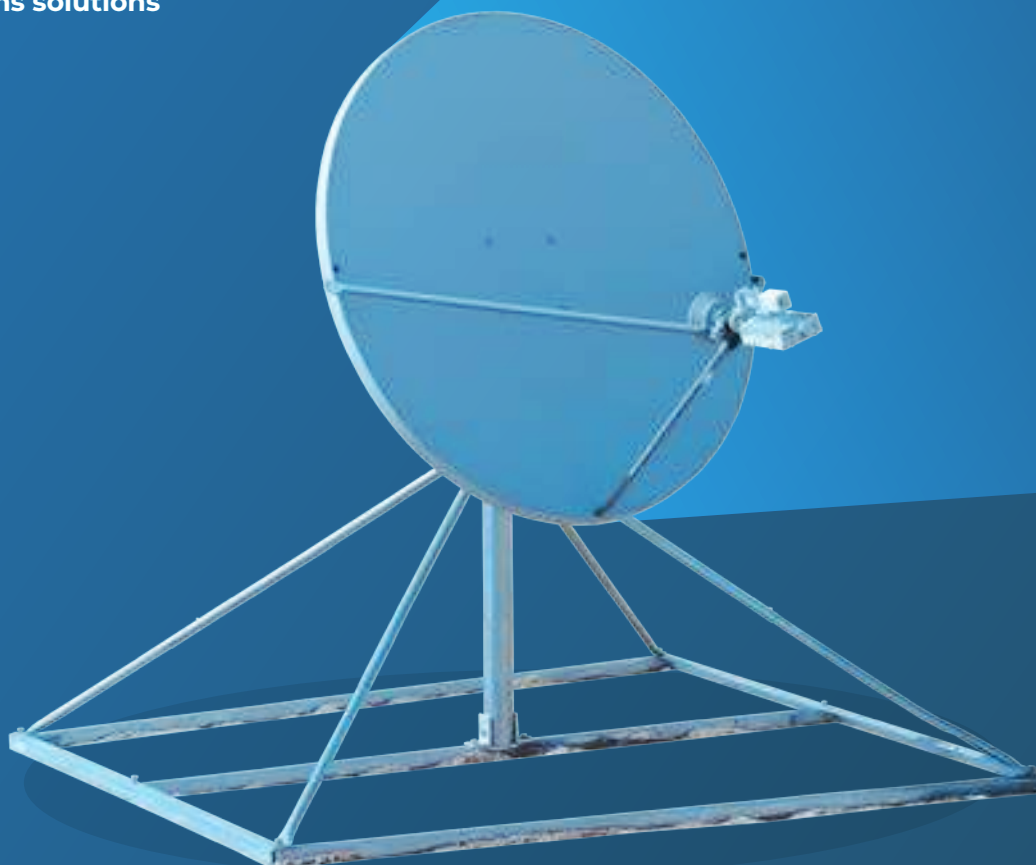
### Solutions Available:

- ✓ Unlimited data plans
- ✓ Custom contention rates
- ✓ Fixed and Portable hardware
- ✓ Extended Wi-Fi
- ✓ Public/Staff Wi-Fi
- ✓ Installation and Field Support Australia-wide
- ✓ Bespoke design options

No matter how **remote** or **isolated** the site, we've got a solution for you:

03 8566 8312 | corporatesales@apn.net.au

[apn.net.au](http://apn.net.au)



# Outdoor Furniture Made for Industry

Felton Industries is Australia's leading designer, manufacturer and supplier of Australian-made premium aluminium outdoor furniture for organisations.

It specialises in outdoor furniture for mining and industry breakout areas and has been supplying seating solutions across Australia for more than 20 years.

An Australian-owned business, Felton is recognised for its premium products, innovation and commitment to delivering the highest standards of customer service and quality workmanship.

National Sales Manager Gus White has been providing outdoor furniture solutions to mining and industry for a number of years.

"Every workplace can benefit from a comfortable area where employees can meet, relax, eat and rejuvenate so they can perform at their best on the job," he said.

"Felton Industries offers a wide range of outdoor tables and chairs and sheltered seating that work perfectly in

breakout areas."

Felton's outdoor furniture is made from premium aluminium with a marine grade anodised coating that won't rust or warp whatever the weather.

It is 100% Australian-made and built for Australian conditions.

Durable, practical, comfortable, and low maintenance, Felton's outdoor range is ideal for mining and wider industry.

Felton showcases 16 variations of tables and chairs, ranging from compact park settings to king size outdoor settings seating up to 18 people.

Felton's Advanced Park Settings are a firm favourite at Glencore in Mount Isa and Margaret River. Featuring practical spacious tabletops and sturdy bench seating with a slightly higher finish, they are a great option for lunch and breakout areas.

Felton also offers a selection of sheltered park settings that combine robust table



Felton's Deluxe Sheltered Park Setting.

and bench seating with practical shelter for excellent protection from the elements.

The Deluxe Sheltered Park Settings and Deluxe Broad Roof Sheltered Park Settings have been useful additions for Rio Tinto and Evolution Mining in Mount Carlton.

Both sheltered settings seat up to 8, feature a Colorbond roof, and bolt down lugs for maximum stability and safety.

In addition to outdoor settings and shelters, Felton offers a versatile range of customisable bench seating from free standing stackable options to inground

bench seats.

All seating is made from premium aluminium, will not crack, rust, or stain. Available with or without backrests and armrests, Felton bench seating comes with patented safety endcaps as standard.

Felton Industries is ISO 9001:2015 accredited and offers fast turnarounds and deliver nationwide.

To find out more about the Felton outdoor furniture range for mining, visit felton.net.au or get in touch on **1800 834 016**.

AMR



## TRANSFORM YOUR BREAKOUT AREAS

At Felton Industries, we believe that every workplace should have a comfortable breakout space where employees can meet, relax, eat and rejuvenate, so they can perform at their best on the job. Our range of outdoor furniture is durable, practical, comfortable, and low maintenance.

Made from premium aluminium with a marine grade anodised coating, it won't rust or warp whatever the weather and is 100% Australian made and built for Australian conditions. From outdoor settings to bench seating and shelters, Felton have outdoor furniture to suit your workplace.

Felton Industries are leading Outdoor Furniture suppliers for the Mining Industry



Scan the QR code



# Quality Ice Machines

## Kitchen and Mess Hall Supplies



AJ Baker & Sons is the exclusive importer of the Manitowoc Ice range of ice machines and dispensers Australia-wide.

Reliable ice machines are critical for catering purposes in isolated mining regions where extreme temperatures are the norm.

AJ Baker & Sons supplies ice machines to remote mining locations across the nation, including the Pilbara and Goldfields in WA, NSW's Hunter region, Queensland's Bowen Basin and Latrobe Valley in Victoria.

AJ Baker & Sons is the exclusive importer of the Manitowoc Ice range of ice machines

and dispensers Australia-wide.

Since its inception in 1964, Manitowoc Ice has been on the cutting edge of technology and conservation.

AJ Baker & Sons' ice machine range is suitable for the mining, hospitality, healthcare and building industries in various sizes, from smaller machines with an ice production capacity of 31kg, up to large, industrial high-capacity machines, which can produce up to 950kg of ice.

Paired with the industrial machines are large capacity dispensers equipped with an auger that rotates to lift the ice and push it through the chute automatically.

This eliminates the need for staff to lean into an ice storage bin and scoop ice out, reducing the risk of contamination.

Foot pedal activation makes dispensing easy while reducing the chance of injury and contamination.

There is also an interlock door switch, to prevent operation when the door is open, further enhancing safety.

Compact machines for site cafeterias and catering stations feature a hinged door and a sealed food zone to prevent contamination of ice as well as food.

A front-facing evaporator makes cleaning easier while rounded corners reduce the cutting risk during cleaning. **AMR**

# BAKER

REFRIGERATION

## Commercial Ice Machines

### Industrial sized for bulk ice production

- » Foot pedal activation makes dispensing easy and reduces risk of injury
- » Safety interlock door switch to prevent operation when door is open
- » Stainless steel exterior and interior working parts



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RTA: AU10320



MANITOWOC

KLOPPENBERG

REDUCED ICE HANDLING | TIMED AGITATION | AUGER DISPENSER

# Safety and Quality First

Founded in WA in 1973, Specialised Welding Australia (SWA) is a steel fabrication and service company.

The TVS division of SWA is a valve servicing business providing turnkey solutions to all valve and flange management problems.

First and foremost is the SWA and TVS commitment to safety and quality.

SWA services a combination of the oil, gas, and mining industries, as well as specialist valves.

The company acknowledges and thanks the past and present employees of SWA for the commitment and dedication that has provided it with the diversification in fabrication and specialist services it offers today.

The SWA mining division has a long history in supporting the Australian mining industry with technical support and fabrication capability.

The team understands the demands of mining companies for continuous operation of their processing plants.

SWA is committed to supporting them with the required resources for plant repairs or replacement, whether the work is required to be undertaken at its Kwinana workshop or the team is required to be mobilised to site.

Refurbishment and overhaul of buckets and heavy mobile equipment, ball mills and in-situ machining, including line boring jobs, are undertaken on a regular basis.

Strong communication and on-going reporting with the client throughout the assignment is a significant strength of SWA's charter.

Its capabilities include heavy structural fabrication, supply of rolled cylinders and cones, gold industry carbon column pressure vessel design and manufacture, fabrication of wear resistant hoppers, chutes and bins in Hardox plate materials and/or dual-plate lined.

With extensive experience with weld overlay, hard facing, erosion and corrosion repair work, SWA is the partner clients need to keep their plant running.

The fabrication capability is complemented by the extensive machining facilities, non-destructive testing, heat treatment and National Association of Testing Authorities (NATA)-approved hydrostatic testing if and when required to provide a one-stop service facility.

The company's clients in the mining industry include QAL, Alcoa, South 32, BHP, FQM, Boddington Gold, Yarra, Gove NT, Murrin Murrin and many more. **AMR**



SWA is a recognised supplier of crushers, tanks, pipe spooling and more.



**Providing a quality service for 47 years, SWA offers answers to mining, oil and gas and refineries across Australia.**

SWA are recognised quality suppliers of

- Heat Exchangers
- Pressure Vessels
- Tanks and Columns
- Crushers, Grillage, and Chutes
- Pipe spooling (CRA, rubber lined, coated, galvanised)

**No job too big or too small.**

Our team of motivated and dedicated engineers will find a solution to your supply needs.

SWA offers the ability to solve your problems with a comprehensive range of welding processes and procedures (high Ni, high Cr, high C) and the ability to repair most weld cast and forged pumps, valves and similar equipment.

No more waiting months for a replacement: speak to SWA regarding repair welding of your failed components

Our procedures and QMS are ISO 9000-2015 accredited with NATA testing to ensure the highest levels of safety and quality.

**SWA**

[swaust.com.au](http://swaust.com.au)

**08 6272 8000**

# Pumped for Pressure



RYCO 24/7 offers fast mobile servicing across Australia for emergency breakdowns, programmed maintenance, OEM support, installation and aftermarket businesses.

**E**mergency breakdowns and maintenance are a harsh reality for the mining industry.

For many projects that require 24/7 operations, any unplanned downtime can cause costly delays to production until repairers and the right equipment and parts are mobilised to site. But it doesn't have to be this way.

Set up with this key pain point in mind, RYCO 24/7, a division of RYCO Hydraulics, offers fast mobile servicing across Australia for emergency breakdowns, programmed maintenance, Original Equipment Manufacturer (OEM) support, installation and aftermarket businesses.

"Our professionally trained and dedicated teams are on call 24 hours a day, seven days a week offering expert technical support for all types of hydraulic and industrial systems," RYCO 24/7 business manager Wesley Bulters said.

"Our extensive national network of trained and certified Mobile Connector Specialists (MCSs) supported by fully stocked Service Centres offer quick response time to reduce machine downtime no matter what the industry or application."

Services include hydraulic hose repairs,

hose replacement, hose assemblies and hose fittings for all types of hydraulic systems. The RYCO 24/7 Mobile Program is supported by independently owned and operated franchised businesses and Onsite Container Workshops.

"The RYCO 24/7 onsite containers are an ideal solution for remote mining locations as well as construction, offshore and large manufacturing sites," Mr Bulters said.

"Whether it is mining, marine, agriculture, defence, construction, industrial or utilities, our team will be on hand; anywhere, anytime, to offer professional assistance."

#### 2020 Highlights

Despite a global pandemic, it has been a busy year; RYCO and RYCO 24/7 and construction and mining have not missed a beat.

"What that means for us is the machinery is all still going," Mr Bulters said.

"In turn it needs maintenance and servicing to keep it operating at an optimal level.

"While that remains the case, our business will keep moving ahead."

The busy year has seen the company expand its fleet, purchasing 10 trucks through Orix

and Sci Fleet Hino.

"The executive team approved the decision to purchase ten 11t rated Hino 500 Series FD1124s, a bigger truck in this instance knowing the durability of these vehicles is proven," he said.

The Hino 500 Series FD1124 is 9m in length, 3m high, with a purpose-built body that accommodates its core function as a mobile parts and service shop.

The trucks not only provide hydraulic hose breakdown service but carry a range of stock including adapters, couplings, hose assemblies and workshop tools.

Another five Hinos are currently being built with provision for two more to be delivered by the end of the next financial year.

"They handle the rough roads well," Mr Bulters said.

"We've been through a few suspensions over time which is to be expected given the loads that we carry in the back of the truck. "Having said that we've run for over 250,000km before we've had to do anything about the suspension.

"You can't fault that side of it."

#### Trusted Global Backing

RYCO 24/7's parent company RYCO has been a global leader in hydraulics for more than 70 years, specialising in the design, manufacture and distribution of a comprehensive range of hydraulic hoses and fittings.

The company manufactures and distributes a significant range of hydraulic components offering its customers more than 8000 individual items, which are found across RYCO 24/7's service centres, mobile trucks and containers nationally.

"Our product portfolio includes an extensive range of spiral and wire braid hydraulic hoses, fittings, couplings and adaptors," Mr Bulters said.

"Quality is at the core of our business, so all of RYCO's products also comply or exceed independent third-party accreditations as well as relevant international standards such as ISQ, SAE and EN (DIN)."

It is through this backing and proud history, that RYCO stands proud as the preferred and trusted service provider to the Australian mining industry.

More information about RYCO 24/7 can be found at [www.ryco247.com](http://www.ryco247.com).

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RYCO's professionally trained and dedicated teams are on call 24 hours a day, seven days a week offering expert technical support for all types of hydraulic and industrial systems.



The RYCO 24/7 Mobile Program is supported by independently owned and operated franchised businesses and Onsite Container Workshops.



**24.7**

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SERVICE**

**AUSTRALIA WIDE • METRO & RURAL**

**EMERGENCY 24.7 MOBILE CONNECTORS**

**NATIONWIDE SERVICE CENTRES**

**ON-SITE CONTAINER WORKSHOPS**

**OEM SUPPORT**

**CALL, CONNECT & GO**

**133.24.7**



# Innovative Hydraulic Engineering

Custom Fluidpower is Australia's premier independent fluid power solutions provider supplying quality hydraulic, pneumatic, filtration, and lubrication products and services.

Highly regarded for its end-to-end approach, Custom Fluidpower develops new and innovative ideas, giving customers the competitive edge in the mining, exploration, materials handling, construction, energy, renewables, marine, agriculture, aerospace, industrial, transport, utility and defence industries.

Using the power of IoT technology, electro-hydraulic systems, and specialised engineered solutions, Custom Fluidpower can increase the precision, efficiency and safety of all fluid power needs.

Custom Fluidpower has manufacturing facilities across Australia, including Custom Safe Brakes and Custom Manifolds, and build centres for Denison Pumps, Parker P1 Pumps and Danfoss PVG Valves.

Maintenance, asset management, installation and commissioning are delivered through national strength and local service, including the provision of workshop repairs and field service, leading to minimal downtime, efficient customer operations and increased machine reliability for customers.

Well-positioned as a one-stop provider, Custom Fluidpower delivers exceptional solutions, utilising the best products available from our global supply chain including pumps, motors, valves, gearboxes and hubs, manifolds, hoses and fittings, electronic controls, filtration, accumulators,

coolers and heat exchangers, lubrication systems, hydraulic tools, braking systems and power units.

An ISO 9001 approved company with quality management systems, the team of more than 200 including experienced sales, engineers, fitters, and manufacturers work directly with customers and their operations, resources, and local environment challenges to achieve the best outcomes.

Custom Fluidpower trains its people and industries through its Registered Training Organisation alliance with The Outsource Institute (RTO Provider Code: 31560), providing nationally recognised qualifications within the hydraulic industry nationally as well as the upskilling of workforce for the future.

A proud standalone subsidiary of Sun Hydraulics, global leaders in hydraulic and electronic control solutions for diverse markets, Custom Fluidpower consistently exceeds industry expectations in market segments using its innovative and custom-designs approach.

Custom Fluidpower has worked on a diverse range of mining projects, examples of which are:

- Designing a system to boost the engine power of a coal hauler travelling up inclines.
- Providing hydraulic motion control solutions for safe lifting and handling of heavy components including the removal and installation of mine haul truck tyres.



AMR APR2021

Custom Fluidpower's mine winder power unit.

- Developing a recovery unit that utilises the existing hydraulic fluid reservoir of the off-highway-equipment to supply all essential systems with hydraulic, pneumatic and electric power to recover the machine.
- Develop and supply hydraulic and mechanical control systems for underground coal seam gas directional drilling machinery. Intrinsically safe component and circuit design included.
- Providing controlled movement and braking systems during reline operations and maintenance of an existing sag mill resulting in an inching drive with flexibility controls to hold the machine safely.

Powered by two 2.2kw electric motors driving 10.5 cc/rev pressure compensated pumps, each unit has four visual break isolators for two main motors, a heat exchange motor and an offline filter motor.

All electrical components are pre-wired to power within an integrated junction box.

The integrated control manifold eliminates additional pipe work and leak points while the flushing circuit ensures oil circulation through calipers, providing clean oil and eliminating air from the circuit.

Contamination during maintenance is resolved with fortress lockable isolation valves, an offline 3 micron filter, plus fluid cleanliness sensory devices.

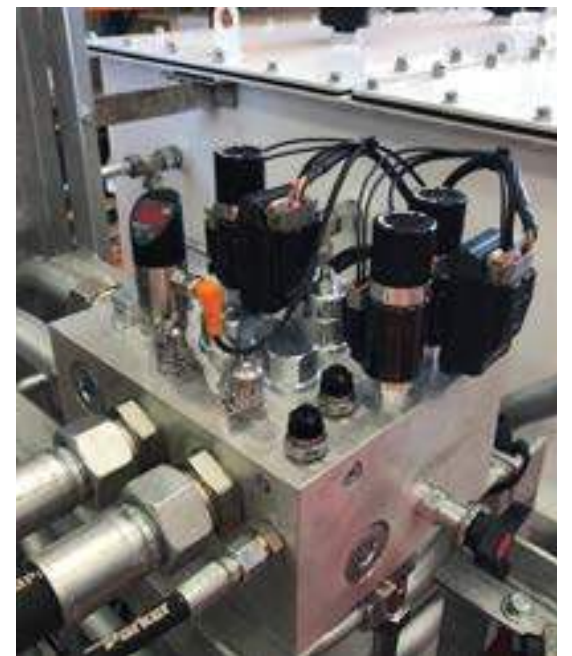
A unique safety feature is the poppet style directional control valves incorporating a 4-10mA LVDT that constantly monitors spool position and instantly signals a jammed spool. **AMR**

### Mine Winder Power Unit

The Custom Fluidpower mine winder power unit, fully compliant to mine specifications MDG33 and MDG41, features a 75l stainless steel tank fitted with condition monitoring equipment.



## National Strength, Local Service



Custom Fluidpower designs, manufacturers and supplies quality solutions across an expanding portfolio of services in:

- Hydraulics
- Pneumatics
- Industrial Brake Systems
- Filtration and Lubrication
- Complete System Automation
- Installation and Commissioning
- Service and Repairs

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**CUSTOM**  
fluidpower



# Any Job, Anywhere

Jetcrete Oz has been the trusted provider of shotcrete solutions to the Australian mining industry for more than 35 years.

Now the company is also earning a reputation as a leading ground support specialist, adding two more capabilities to its broad range of services.

Jetcrete Oz employs the latest techniques in resin injection and cable bolting, which offers an alternative active rock support system in underground mining.

The company is also the first and only shaft lining contractor in Australia equipped to safely operate in ERZ1 hazardous environments.

Over the years, Jetcrete Oz has introduced most of the modern technologies used for shotcreting in Australian mining, such as overhead wet shotcrete, robotic shotcrete units and hydroscaling.

New technologies such as these have increased development rates for miners through faster excavation cycles, improved early strength support, and increased bonding between the fibrecrete and substrate surface.

### Resin Injection

Jetcrete Oz has been a major presence in hard rock mining and is having success with resin injection for ground stabilisation at Argyle Mine.

Resin is injected into the foundation and expands like a gel to create pressure and achieve stabilisation of rock, sand, gravel, concrete and caved material.

It has proven to be a faster and less-invasive solution than previously used methods.

### Cable Bolting

Cable bolting is an established technique and an alternative active or passive rock support system for underground mining, with the bolts dramatically improving the shear and tensile strength of the rock mass.

Jetcrete Oz does the majority of its cable bolting work in major mining operations in NSW, such as at Broken Hill and at Newcrest Mining's Cadia Valley Operations in south Orange, and is actively pursuing more mining contracts in this field.

### Shaft Lining

Jetcrete Oz is also a leading innovator of shaft lining solutions and successfully completed projects all over Australia, including coal mines in Queensland.

The ISO-accredited company can deliver remote application of shotcrete in shafts up to 400m deep and 6m wide including vent shafts, escape ways, ore passes and more.

Its state-of-the-art shaft lining unit is purpose built, and features include:

- Industry-first EX d Group I equipment
- Continuous CH4 safety monitoring and end-of-life protection units
- Remote speed control of lining applicator
- Compliance to AS/NZS 4871 standard for electrical equipment for mines and quarries

Jetcrete Oz also carries out the mandatory requirement for pre and post shotcrete



Jetcrete Oz has been the shotcrete contractor of choice for Australian miners for more than three decades.



Jetcrete Oz operates on 19 mine sites across Australia.



Cable bolting offers an alternative active rock support system in underground mining.



Jetcrete Oz is a leading innovator of shaft lining solutions.

application camera surveys.

Jetcrete has refined the remote shaft lining system that has eliminated the need for personnel to enter the shaft during the entire process, saving time and reducing safety risks.

The business currently operates in North America and on 19 mine sites across Australia, with a number of mid-tier and major clients including Goldfields, Northern

Star Resources, Glencore, Metals X, MMG, Evolution Mining, Oz Minerals, Newcrest and Rio Tinto.

With 13 batch plants, 68 agitators, 41 remote concrete units and mobile plant and equipment, Jetcrete Oz can do any job, anywhere. As the core business, Jetcrete Oz has extensive experience in all aspects of concrete spraying and is able to establish sites in remote areas in a matter of days.

The business is capable of providing a complete service for all stages of underground shotcreting, from onsite concrete products manufacture, to delivery and application.

Jetcrete Oz is also capable of delivering surface and underground mining construction works including earthworks, underground concrete structures, heavy workshops and site offices. **AMR**

# Leaders in Magnetic Equipment

For specialists in electro and permanent magnets, look no further than Mecal.

The team at Mecal can custom-build magnets at no extra cost to suit a diverse range of projects, which are applicable to all industries including mining, heavy processing, steel warehouses, scrap yards, recycling plants, local councils and more.

Mecal magnets remove tramps to make material cleaner and prevent larger tramps such as bucket teeth entering and damaging crushing systems, effectively minimising down times and costly repairs.

Proudly Australian-owned and made, Mecal has been building magnets out of its base in Melbourne for more than 50 years, with clients such as BHP, Ausdecom, QME and overseas companies in Indonesia and Singapore.

With an optimum selection program to suit each particular application, as well as installation choices such as overband cross-belt installation or inline at conveyor head, Mecal's electromagnets are exclusively designed to give maximum flux density and force-index with minimum weight and power requirement.

A recent project Mecal supported with was dealing with a tramp iron problem in the coal supply system of an Australian power station.

Open-cut mining equipment were recovering roof bolts up to 2m length and other tramp iron in large quantities from an area previously mined by

underground methods.

Measures were needed to protect the crushing and screening equipment from the tramp metal and this required a magnetic separator of substantial size and weight.

The roof bolts would have to be removed from a conveyor operating at a speed at 3.3m/s without damaging the belt.

Mecal provided the total engineering solution to this problem, installing the unit into the existing system that was not designed to take the additional structural load, as well as removing roof bolts from the conveyor that was operating at a constant speed of 3.3m/sec.

From initial conceptual discussions through the design stage to the installation and final successful commissioning of this customised tramp separator and its support structure, the client relied on Mecal's exclusive experience with magnetic equipment and professional engineering support to carry out this project.

The staff are qualified in all areas of engineering and manufacturing, with a proud record of quality, excellence and world-class innovation and design.

The company's full range of top-quality products and services are easily accessed by both local and international markets.

The products include magnetic separators, lifting magnets, vacuum cleaners, loading chutes, dust suppression systems, belt cleaners and scrapers, Whittington



A magnetic separator above a conveyor belt removing tramp metal from material.



Mecal provides self-cleaning magnetic separators which automatically discard tramps to the side of the equipment and machinery.

spiral drums, scare guns and security disintegrators.

The company is also fully conversant with international licence agreements including import and export requirements.

Clients can trust Mecal, the leaders in the field of magnetic equipment, with the application of magnets in separation and material handling at their operations. **AMR**



## CLEANER PRODUCT WITH ELECTROMAGNETIC SEPARATORS



Trust Mecal with the installation of strong and efficient electromagnetic separators.

- ✓ Cleaner product through the removal of metal tramps – large and small.
- ✓ Save on expensive crusher repair and downtimes.
- ✓ Self-cleaning or manual-cleaning electromagnets available.
- ✓ All types of installations – inline, overhead pulley, cross belt and more.



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[www.mecal.com.au](http://www.mecal.com.au)



CleanSpace respirators are a revolution in respiratory protection.



### Should I be concerned about Silica Exposure?

Crystalline silica is a natural mineral found in construction materials such as concrete, bricks, tiles, mortar and engineered stone. The amount of crystalline silica in products can vary. Examples include:

- Brick Up to 30%
- Concrete/Mortar 25-70%
- Tile 30-45%
- Sandstone 70-100%
- Granite 20-45%
- Engineered stone 90%+

If you're not sure if a product contains crystalline silica, check the safety data sheet (SDS) or other information from the supplier.

**D**angerous silica dust can be formed on site from concrete cutting, grinding or polishing and using power tools on stone.

Breathing the silica dust can result in irreversible, untreatable diseases, including silicosis and lung cancer. Some dust particles can be so small that they are not visible: these are referred to as respirable particles.

Respirable silica dust particles are those that are small enough to breathe in and penetrate deep into the lungs causing permanent damage that can lead to serious illness or death.

Dust-related diseases caused by respirable crystalline silica, such as silicosis, is on the rise. There is no known treatment to stop the progression. Silicosis is permanent and untreatable.

In Australia, there are more than 350 cases associated with silica dust. Annually, about 600,000 Australian workers are at risk of inhaling silica dust at their workplace.

Occupational exposure is high for workers in industries including mining and quarry, constructions, agriculture and stonemasonry.

Safe Work Australia publishes exposure standards for airborne contaminants in the workplace.

The exposure standard for crystalline silica dust, listed under quartz (respirable dust), is 0.05mg/m<sup>3</sup> as a TWA (time-weighted average) airborne concentration over eight hours.

An eight-hour time-weighted average exposure standard is the average airborne concentration of a particular substance permitted over an eight-hour working day and five-day working week.

The workplace exposure standard for respirable crystalline silica is based on the levels found in a person's breathing zone, outside of any respiratory protective equipment that may be in use.

WorkSafe Victoria has gone above the national standard and recommends that employees are not exposed to levels above 0.02mg/m<sup>3</sup> as a TWA. This is a precautionary measure to prevent silicosis and to minimise the risk of lung cancer.

Employers are required to ensure employee exposure does not exceed this standard.

Managing risk and worker exposures to silica can be achieved by selecting and implementing measures using the hierarchy of controls:

- Substitution such as sourcing composite stone benchtops with a lower percentage of silica
- Isolation of the hazard – using principles of safe work design to designate areas for tasks that generate dust and appropriate worker positioning during these tasks, using enclosures and automation to conduct dust generating tasks
- Engineering controls that minimise the risk of exposure to generated dust, for example, local exhaust ventilation, water suppression (wet cutting) or using tools with dust collection attachments
- Should a risk still remain: administrative controls, including good housekeeping policies, shift rotations and modifying cutting sequences, personal protective equipment including appropriate respiratory equipment (generally a minimum of a P2 efficiency half face respirator) and work clothing that does not collect dust.

Respirable crystalline silica is harmful toxic

dust. It is preventable with precautions to minimise exposure and maintain a safe work environment.

It is highly recommended that workplaces provide adequate respiratory protective equipment (RPE) specifically designed and certified to protect workers from inhaling hazardous airborne contaminants.

With regards to respiratory protection, PAPRs (Powered Air Purifying Systems) with at least a P2 filter are the new benchmark across most industries.

Australian-made CleanSpace Respirators meet and exceed the minimum requirements for respiratory protection, with a P3 filter.

Unlike other Powered Air Purifying Respirators (PAPRs), CleanSpace Respirators are easy to put on (in under 10 seconds) and do not have heavy belts or hoses.

They also deliver cool fresh air to the wearer via a tightly sealed silicon mask that will eliminate moisture and fogging.

CleanSpace Respirators are AS/NZS 1716 Respiratory Protective Devices certified.

According to CleanSpace Technology CEO Alex Birrell, one of the main reasons

people go unprotected is because of low compliance.

"If masks are uncomfortable or not quick and easy to put on then it simply doesn't get used," he said.

CleanSpace Respirators are a revolution in respiratory protection.

They are lightweight, offer the highest level of protection and have no belts or hoses. Being reusable, they reduce costs and reliance on supply chains and stockpiling.

CleanSpace Technology, established in 2009 by world-class biomedical engineers, has designed and developed several respirators for various industries.

CleanSpace ULTRA is IP Rated 66 and water-tolerant, making it perfect for anyone wet-cutting stone or concrete.

CleanSpace EX is intrinsically safe, certified for use in potentially explosive environments, and CleanSpace2 is for use where water tolerance or intrinsic safety is not required.

"As Australia's only respirator company, we are proud to be supporting all those on the frontline in industry and healthcare stay protected from airborne contaminants," Dr Birrell said.

CleanSpace Technology believes employees are an essential part of a business and the workplace environment must be safe for them.

The company hosts online presentations to share information on effective risk control, industry best practice and experiences to case studies from people in the industry.

There are two upcoming opportunities to join live sessions to learn more about CleanSpace Respirators and how they can protect you and your workers.

Scan the QR code with your camera to reserve a spot.

CleanSpace Technology supports on-going learning, product training, fit testing to provide instructions on maintenance and care with attentive customer support.

Respirable Crystalline silica is preventable.

Contact CleanSpace Technology:  
[sales@cleanspacetechnology.com](mailto:sales@cleanspacetechnology.com)  
[www.cleanspacetechnology.com](http://www.cleanspacetechnology.com)



# Advances in Dust Control Automation and Monitoring

The efficient yet powerful V22 Dust Controller throws a plume of fog over 80m.

In a world first, mine and quarry operators can now control dust and odours automatically and remotely from a PC, laptop or smart phone.

- Dust sensors
- Weather stations
- Photocells
- Ultrasound

Introducing CURT – a Control Unit for Remote-controlled Turbines – a fully automated, site-wide monitoring and control system for dust and odour suppression.

CURT will monitor onsite atmospheric conditions and dust levels to activate and deactivate the site's various dust control systems as they are required.

This sophisticated software allows mine operators to automate, control and monitor their dust suppression equipment site wide from a centralised control room.

It can sense environmental conditions such as wind speed and direction, dust, rain, humidity and temperature to activate specific equipment when conditions reach pre-defined parameters.

This gives greater quality control, improved work conditions and operator safety and reduces the risk of EPA fines as there's no need to rely on onsite staff to operate the systems.

With electronic 'noses' and dust sensors, CURT can measure dust or odour levels at different locations around the site and automatically respond by activating the most appropriate dust control equipment in your CURT system.

CURT minimises energy and water usage as the dust and odour suppression equipment can be completely automated so that it will only operate when required.

Equally, CURT will ensure dust and odour suppression equipment are deactivated in high winds or rain.

It uses a combination of:

- Electronic noses

Using ultrasound and photocell technology,

the CURT system can be set to automatically activate dust control equipment when vehicles enter an area for loading or unloading.

EmiControls dust controllers stand out from the competition with their unique, patented nozzle head, incorporated into the rotating fan, and outer nozzle ring generate a fine atomised mist which binds the dust particles to prevent them from spreading.

Likewise, the system can be set to react to triggers from other equipment and systems for example, transfer chute fog sprays switch on when conveyors start operating.

The V22 Dust Controller has three different water consumption rates and fan speeds, so you can adjust the fog according to the amount of wind and/or dust being generated.

There is also an option to implement a timer control with calendar function.

It also has a faster rotation speed throughout the 360° programmable oscillation angle range.

This allows equipment programming to coordinate with certain operating processes or to coincide with the beginning and end of each shift.

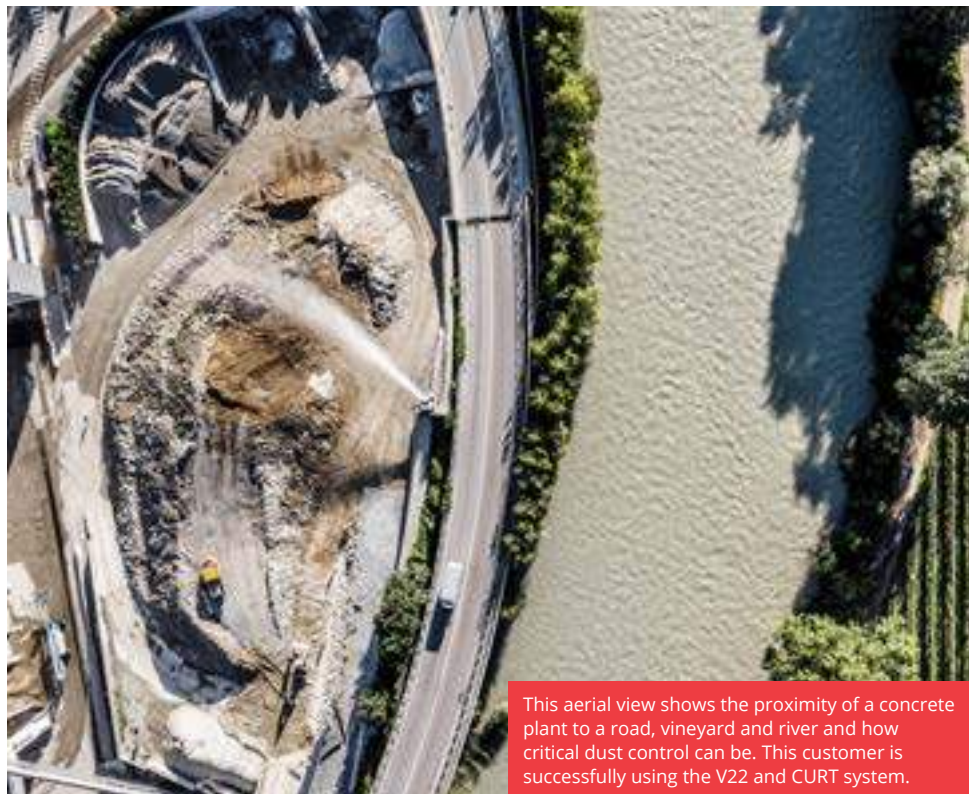
Apart from fixed installations, the CURT system can also be paired wirelessly with the EmiControls range of dust control cannons.

CURT dust automation and monitoring software is the brainchild of the Italian emission control experts, EmiControls.

Units such as the V22 Dust Controller which is ideal for suppressing dust over large areas such as open cut mines, ship loading facilities, recycling or composting plants and landfill sites. With a throw range of 80m with 90% saturation.

The automated system can be retrofitted to all EMI dust and odour suppression equipment to provide a total, and fully automated package.

This equipment is available through EmiControls Australian partner Tecpro Australia, award winners in the field of dust



This aerial view shows the proximity of a concrete plant to a road, vineyard and river and how critical dust control can be. This customer is successfully using the V22 and CURT system.



The CURT system allows site wide monitoring, control and automation of dust suppression equipment.

control with more than 30 years' experience solving dust suppression problems for clients all over Australasia.

**About Tecpro Australia**

Founded in 1982, Tecpro Australia specialises in providing reliable technical solutions for a vast range of industrial applications. Through its technical expertise and comprehensive knowledge, the Tecpro team prides itself on being able to solve the most challenging engineering problems.

Tecpro distributes all types of stainless steel hose reels, spray nozzles, tank cleaning equipment, ergonomic guns, odour control systems, fogging nozzles and fog makers for dust suppression and evaporative cooling.

Tecpro Australia is an award-winning consultant in the area of dust suppression, offering a diverse range of bespoke solutions for mining, construction and any situation where dust is a problem. **AMR**

SOURCE  
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P 02 9634 3370  
E sales@tecpro.com.au  
W www.tecpro.com.au



The V22 helps to protect the surrounding environment by keeping generated dust within the site boundaries.

# The Future of Dust Control is Here

Innovative automated operation and monitoring of your dust suppression systems and dust control machines.



Call (02) 9634 3370 or email sales@tecpro.com.au to discuss the best dust suppression solution for your application.

**Tecpro**  
AUSTRALIA  
Technical Solutions You Can Rely On

[www.tecpro.com.au](http://www.tecpro.com.au)

# EnviroMist Case Study

## Significant Reduction of Dust Levels in Blast Hole Drilling Operations

An EnviroMist multi-nozzle spray bar.

In early 2020, Action Drill & Blast (ADB) approached EnviroMist® with the goal to reduce the levels of dust emitted during blast hole drilling operations.

The existing water used during drilling operations was effective in suppressing dust whilst drilling, however a secondary source of dust suppression was considered important to reduce exposure for any on-bench workforces.

Introducing a high energy water mist while drilling ensures that the hole collar is damp and creates a crust that is able to sustain dust suppression for a longer period of time.

This has significant benefits in terms of health and safety for shotcrew, maintenance personnel, and other mine personnel working out in the open, as well as the improvements to environmental responsibility.

The project testing phase was initiated with workshop bench testing and then moved onto site validation, testing and implementation. No additional mechanical or electrical systems were required during implementation due to the utilisation of the existing hydraulic circuits and onboard water storage present on the drill rigs, reducing costs and minimising extra components.

The system designed and implemented by EnviroMist and ADB has spray nozzles mounted within the plenum chamber of the drill mast, which can either be manually or automatically activated to supply a fine spray of water particles to the collar of the drill hole.

This in turn dampens the drill cuttings as they are dispersed from the drill hole and creates a crust on the collar of the hole once the drill has finished drilling and moved away. The crust then remains solid, and minimal dust is allowed to be exposed to any personnel loading explosives or working in the vicinity of the drill collars, dipping holes and dewatering holes.

Results have been overwhelmingly positive since completion of the project, with plans for further implementations of the EnviroMist systems.

### The EnviroMist Approach

EnviroMist is a leader in dust suppression technologies, supplying systems for a wide variety of mining applications.

The systems are currently being used in surface mining, underground mining, ROM bins, COS stockpiles, transfer chutes, drill and blast operations, materials processing plants and ship loading-unloading operations.

In conjunction with the International Solids Handling Research Institute, EnviroMist has conducted research into varying sized water droplets to better understand their particle size distribution, spread and characteristics.

The development of Computational Fluid Dynamic (CFD) models as part of this research provided insight into droplet dispersal and reactions to external influences such as air cross flows.

As a result, the company is able to create specialised systems that deliver unsurpassed dust suppression capabilities for even the most difficult to contain areas.

A major aspect of the research showed that matching water droplet size to the size of the dust particles significantly increased the chance of capturing dust when compared to larger droplets.

By customising our spray nozzles to each application, EnviroMist can deliver water in a form that efficiently reduces the dust liberated from iron ore or coal material streams alike.

This is possible due to the utilisation of high pressure in the systems, as this produces a large cloud of specified-sized water droplets that significantly increases the chance of droplets coming into contact with airborne dust particles.

In contrast to other low pressure, large droplet systems, the company's technology supplies a significantly increased number of water droplets while using significantly less water to reduce dust to environmentally acceptable levels.

In fact, testing on the installed systems has shown water usage reductions of over 50% when compared to low pressure dust suppression systems.

The water filtering and pressure boosting equipment is utilised to ensure that clean water reaches the sprays nozzles at the required output pressure. This is necessary to ensure the systems are able to fully cover a large ROM bin or COS stockpile in an efficient and reliable manner.

In the EnviroMist ROM bin systems, the power delivered behind the water results in a pressure curtain that prevents the air displaced from truck dumping from penetrating. Thus, the resulting dust cannot escape and is captured right within the dump pocket, as opposed to low pressure dust fogging systems.

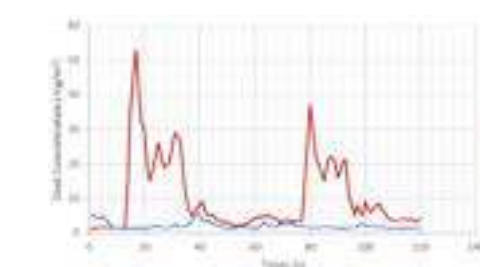
The captured air and dust are now contained for a sufficient enough time to ensure all the dust liberated from the material has been suppressed.

The COS systems are similarly designed to encapsulate the falling material stream within a high-pressure curtain of water droplets.

These droplets penetrate the material stream as it separates, reducing dust liberation from surface turbulence, cross winds or when the material comes into contact with the stockpile.



Wetting of the drill hole with the EnviroMist Dust Suppression System.



Dust Concentration measured with and without the EnviroMist Dust Suppression System.

EnviroMist uses certified stainless steel in its spray blocks and nozzles to provide a greater product life, and its experience with installed systems has shown that a correctly filtered system will result in nozzles that last for years without needing replacement.

The company makes sure its nozzles are manufactured using the latest in machining technology, and as a result it can provide nozzles that have never broken in operation.

By designing systems individually for each project, EnviroMist can adjust the required pressures and nozzle designs to achieve maximum dust suppression for the specific application while also meeting specific space, material, and site requirements.

The creation of 3D models as part of its

design process also ensures complete compatibility with existing equipment and communicates the design of the system to the client prior to manufacture and installation.

A customer-focused company, EnviroMist meets all reasonable client requests and has supplied emergency systems to meet short term, high priority customer requirements.

More information:  
[www.enviro-mist.com.au](http://www.enviro-mist.com.au)

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Application Of CAE Techniques In Combination With High-Energy Dust Suppression Technology To The Handling Of Coal



# EnviroMIST®

Micro Mist • Macro Solutions

## AN INDUSTRY LEADER IN DUST SUPPRESSION

We provide large scale dust suppression applications in iron ore and coal underground and above ground operations, with immediate and significant dust level reduction around material handling areas.

Our systems ensure maximum dust capture effectiveness through the control of droplet size, velocity, water consumption and spray angle based on CFD modelling techniques.

### APPLICATIONS

- Stockpiles & ROM Bins
- Crushers & Conveyors
- Mining Machinery
  
- Ship Loaders & Unloaders
- Transfer Points & Chutes
- Construction Machinery

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# Real Time Dust Monitor



Kelair Pumps fully support customers from initial project conception consultation to installation and beyond.

Trident Australia was established in 1998 when its founder Nick Hansen identified a need for a company that could source any pressure equipment a customer required, regardless of the manufacturer.

The WA-based, family-owned company originally began with the focus to support the oil and gas industry, but is now also heavily involved in mining, defence and agriculture.

General Manager Jono Hansen, Nick's son, said the company started small and has grown over the years due to its unwavering commitment to outstanding customer service.

"We are still interested in finding out what it is our customers need to make their life easier and we welcome the opportunity to find out what you need so we can give it to you when you need it," Jono said.

"Our expertise has also grown to include electrical products and services on top of our original fluid systems and components." Trident has two locations — in Canning Vale in WA and Mentone in Victoria.

A team of highly dedicated staff are trained to support the customers in sales, service and rental.

### The Air XD Difference

Trident Australia has also branched out into particulate monitoring and is the WA agent for Trolex. Trolex delivers best-in-class safety technology to ensure workers in challenging environments are never put at risk.

Seven years ago, Trolex set out to solve the biggest health challenge in industrial workplaces – how to accurately and continuously monitor airborne respirable particulates such as coal, silica dust and construction dusts, even when heavy loads are present.

The Air XD is the world's first and only open-path, full-spectrum, highly accurate real-time dust monitor that can operate successfully in a wide variety of harsh and hazardous industrial locations.

With no filters and no pump, Air XD is five times more accurate than pre-existing dust detection technology, and capable of dealing with 10 times the dust loading.

"With a typical maintenance cycle of six to 12 months, you can relax knowing you're providing the most robust and comprehensive particulate monitoring for your business and employees without the high costs and hassle associated with older dust monitor models," Jono said.

"Our dust monitors utilise pioneering safety technology that sets them apart from any pre-existing models.

"These particulate monitoring systems are designed to make your life easier, save you money and make your business a safer place to work."

The open-path Air XD sensing system, combined with an advanced algorithm, means continued particulate monitoring accuracy even in heavy dust loads and complex mixtures.

The Air XD stays operational in dust concentrations of 1500mg/m<sup>3</sup> – that's typically 10 times as much as competitors' dust monitors.

"You don't solve a puzzle with only one or two pieces of the jigsaw, so why monitor for only one or two sizes of dust particulate?," Jono said.

"Air XD simultaneously monitors every dust particulate from 0.35 to 40µm, continuously and in real time.

"No more guesswork. Our dust control solutions deliver the complete picture with unrivalled accuracy."

The AirXD is available both as general purpose (GP) equipment and ATEX/IECEx Grpl certified for mining.

The Trolex TX8060 XD One personal dust monitor is specifically designed as a compact and robust, wearable or mountable platform to support the real-time detection, warning and logging of hazardous particulate concentrations.

With personal exposure in mind, the XD One allows users to monitor and log their immediate inhalation zones and associated risks in real-time. The device allows for body-worn, locally mountable or fixed cab installations as required.

Designed for use in a range of applications and environments, the device is suitable for monitoring both indoor and outdoor particulate conditions and is built to sense both high and low concentrations accurately.

Adaptive flow rate technology supports measurement accuracy in atmospheres with varying airflow ranges.

Ease of monitoring and warning is presented through the design of a simple user interface, L.E.D status indications and high frequency audio alarm.

Devices and logged data can be reviewed, maintained and user configured via the accompanying Trolex BreatheLITE PC and Mobile applications.

### Benefits

- Reduce maintenance and manpower costs.
- Deploy PPE and use particulate monitoring to control dust suppression in intelligent ways.
- Identify process leakages and inefficiency.
- Reduce health and safety incidences and protect your business from litigation.
- The Air XD dust monitoring range is there to save lives, save money and improve efficiency.
- Get real-time, accurate and comprehensive information that gives you real control over your process and your facility.

Contact the team at Trident today to talk to one of our AIR XD specialists. **AMR**



Monitor all of the dust, all of the time.



The XD One personal dust monitor.



**TROLEXK**

A dust monitor that's  
not afraid of dust



**The Air XD** - the world's first and only open-path, full-spectrum, highly accurate real-time dust monitor that can operate successfully in a wide variety of harsh and hazardous industrial locations.



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**TRIDENT** AUSTRALIA  
FLUID SYSTEMS & COMPONENTS





# Custom-Made Solutions

Spraying the tailored solution from Erizon's customised HydroRig Trailer.

**W**hen it comes to dust management, Erizon understands there is never a one-size-fits-all approach.

Innovation is at the heart of the company's ability to develop custom-made solutions that are sustainable in the long term.

Erizon's unique approach pulls together a wealth of talent and experience in the areas of science, engineering, project management and technology.

Its experienced team of agronomists, horticulturalists and soil scientists take the time to fully understand the variables in each project to develop effective solutions based on scientific analysis of the environmental issues at play.

The Australian Mining Review spoke to Erizon Operations Manager Tom Corkhill about the dust control solutions the company provided at one of Australia's biggest gold mines, and how this has led to the development of innovative equipment that will revolutionise the industry.

**Case Study**

Erizon won a major contract to devise a solution for a 700ha tailings storage facility (TSF) at a large gold mine in Orange, NSW.

The client had experienced several failures

in dust suppression from alternative products and companies, which offered solutions that had no functional longevity.

Erizon took part in a trial alongside other market leaders in dust management to allow the client to determine the best fit for the site.

At the conclusion of this trial, Erizon's innovative solution had the long-term desired effect, meeting project requirements and exceeding longevity targets.

Previously at the site, a polymer solution was being dissolved within three months, due to the high salinity level of the TSF.

Rather than continuously apply a polymer solution every three months, Erizon tailored a solution that involved growing specific vegetation to provide greater dust suppression results, while adhering to EPA and community requirements.

The solution took into account the results of scientific trials and testing, which confirmed it would be difficult to grow numerous types of vegetation in the hostile environment created by this particular TSF.

Furthermore, the mulch needed to be hydraulically applied via the use of customised HydroRigs, which would face a

high chance of getting bogged or sinking if they were mounted on standard trucks.

"There are tailings dams in the world which have trucks and equipment stuck at the bottom of them, so to avoid that we have developed some innovative technology to reduce the pound-per-square-inch (PSI) on our equipment," Tom said.

With Erizon, a HydroRig is mounted on a purpose-built truck with low bearing capacity (LBC) capabilities, which is then towed by a mine-spec, wide-tracked tractor.

The new PSI of just 5.8, thanks to the clever distribution of the weight over a larger surface area, is smaller than the PSI of a human footprint, which is about 11.

Erizon has an engineering department and devotes significant resources to research and development.

The company is developing exciting new equipment with a PSI of less than one, which would be a game changer in the mining industry.

Erizon's equipment can access areas that other providers simply can't.

"With our LBC HydroRigs, we have direct access to areas that other equipment

can't," Tom said.

"It allows us to have more control over application. When accessing TSF's directly there are numerous safety concerns. Our equipment addresses these concerns.

"Aerial options are always an option, but this comes at a greater cost, due to the need for pilots, helicopters, fixed wing planes and increased safety requirements.

"It can cost up to \$2,500 an hour to hire a plane, so if we are on-site applying solutions directly, there is an opportunity for cost savings.

"It also allows us to apply a better product because we are not applying it aerially, we are applying from our trucks and we can monitor the quality of the application in real time.

"The other problem with aerial is availability; they are not always available, and they are unable to fly in heavy fog or high winds."

Other availability issues with using aircrafts arise in emergency situations, such as when many of Australia's planes and helicopters were diverted to the bushfires that ravaged the entire country.

FibreLoc is a heavy-duty dust suppressant



Recent update from the site, with new grass growth. Erizon's customised HydroRig Trailer setup is working on a new section in the background.



The standard HydroRigs are suitable for most sites, but TSFs present additional restrictions due to the requirement of low ground pressure.



Grass growth on the TSF in Orange, NSW.



Erizon's modified HydroRig trailer onsite.

that has been scientifically engineered for extreme conditions, such as substrates with high salinity levels like tailings dams.

**On-site Solution**

Envizo is a real time, on-site performance monitoring system that provides updates and alerts for unexpected weather events.

Monitoring stations and a live feed give Erizon and the client 24/7 access to a full range of performance indicators, including PM levels, Wind speed and direction, temperature, humidity, soil moisture levels and rainfall.

"We can pinpoint where the dust is coming from through the tactical placement of sensors; we will know if there are going to be possible dust issues before impacting the local community," Tom said.

"Many sites have this sort of equipment and EPA monitors, but what you will find is, a lot of them monitor dust from outside the perimeter of the mine.

"The point of difference with Envizo is we are monitoring at the source in real time, which triggers an alert so action can be taken.

"Envizo is enabling us to take full ownership of our dust management solutions for our partners."

When coupled with scientifically developed solutions and expert application methods, Erizon is able to develop an end-to-end solution which allows Erizon to provide a Supply, Apply Guarantee™.

"We have created our own product range, solutions, monitoring systems and applications which allows us to take full ownership - and that is something that a lot of our competitors can't do."

Each project comes with a tailored Quality Management Plan and Inspection and Test plan (ITP) to identify and record project specifications and requirements.

**HydroRigs**

With hydraulic cannons mounted on state-of-the-art HydroRigs, Erizon can apply their dust suppression product to areas in a fast and efficient manner.

Erizon's HydroRigs feature in-built agitators to maintain solution uniformity and homogeneity and are also fitted with hydraulic hoses with an extended hose capacity over 500 metres.

The power, speed and design of its machines optimise efficiency and effectiveness by providing unparalleled coverage of extensive areas and difficult terrain such as steep slopes.

All of Erizon's HydroRigs have the ability to apply product to upwards of 50,000m<sup>2</sup> per day.

Every HydroRig is mine-spec compliant, equipped with rollover protection systems, edge protection and harness attachment points, interlocks and emergency stops, fire-fighting equipment, spill containment kits and first aid equipment to protect the safety of its operators.

Erizon also uses advanced drone technology for spraying, seeding and the application of fertiliser in hard-to-reach places or where the terrain is uneven.

With more innovation in this space in the works, progressing the use of drones for this industry is something Erizon is investing into heavily.

**Pushing the Envelope**

Erizon is not only an expert in dust suppression.

With more than 25 years of experience, Erizon is also an industry leader in large-scale mining and civil environmental solutions including revegetation, rehabilitation, and erosion control.

The mining industry is known for sticking to old-school, traditional methods because

that is the way it has always been done. Erizon is all about innovation and pushing the boundaries to come up with better ways of tackling problems.

The company researches and develops cutting edge solutions that are tailored to Australia's climate and individual project requirements.

"We work closely with our partners to develop custom-made solutions for their sites, and we are moving away from the one-solution-fits-all approach by developing exciting equipment that should revolutionise the industry," Tom said.

"We also place a big emphasis on working with local suppliers wherever possible, such as sourcing seed locally."

With an Australia-wide footprint and more than 50 staff and contractors, Erizon has the ability to take on the big projects.

The company has worked with the likes of Newcrest, Rio Tinto, Ventia, AGL and GHD, providing tailored solutions for all. **AMR**

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Alternative options for TSFs are typically via aerial application, which come at a higher cost and with less flexibility onsite.



Another alternative aerial option for treatment of TSFs is via helicopter.



# Water On Dust Is Water Lost

A bird's eye view of the salt pans in Karratha in the Pilbara, WA's north. RainStorm manufactures its DustMag product – an excellent road dust suppressant – at this site.

With 40% of dust at minesites consisting of coarse particles generated from mining activities, it is imperative to control and suppress dust at the source.

The application of water by uniform wetting as near as possible to the point where the dust is produced prevents these particles from becoming airborne.

All sizes of particulate matter impact minesite facilities, equipment, workers' health, the environment and surrounding local communities.

Particles larger than PM10 (particle sizes 10µm in diameter or greater) are generated from mechanical disturbance of rock and soil materials by draglines or shovels, bulldozing, blasting, vehicles on dirt roads as well as wind blowing over bare ground and different types of stockpiles.

About 5% is made up of fine particles from vehicle exhausts and mobile equipment.

The Australian Mining Review spoke to RainStorm group technical sales and marketing manager, Mason Trouchet, about determining the source of dust – roads, wind, materials handling or blasting – and the scientifically-based solutions available that put a lid on these dust issues.

## Roads

Roads, especially unsealed dirt roads, generate airborne dust through truck and vehicle movement.

RainStorm brought an idea over from Canada when it first started 31 years ago and created DustMag, a hygroscopic liquid solution that can be applied to unsealed road surfaces, with effect of suppressing dust for up to three months in remote and dusty areas.

Proven to reduce dust levels by 90-95%, this durable control treatment consists of an effective stabilisation and compaction agent within the DustMag product that tightly binds the surface together.

In comparison, alternate products such as water extenders typically provide a 25-50% reduction in dust levels.

Traffic can continue along the road straight after application with DustMag and, since starting more than two decades ago, the product has been applied to more than 10 million m<sup>2</sup> of road in the Pilbara, South Australia and Victoria at the request of

mining companies, local government and civil construction companies.

## DustMag

The active ingredient in DustMag is a Hygroscopic material.

"This concentrated product is sprayed on dirt roads, and because pure DustMag is so hungry for water, it immediately sucks moisture out of the atmosphere which keeps the roads damp and dust suppressed for three months," Mason said.

While water sprays are touted as one of the usual ways to suppress dust at minesites, water is a scarce, valuable resource in reality. Running an operation in a remote location is thirsty work, requiring water for more important tasks such as operations, processing minerals and keeping staff hydrated.

"Instead of getting water from underground wells, DustMag pulls water out of the air, a free water source," Mason said.

"We've been servicing BHP, FMG, Rio Tinto and all the mining majors for more than 20 years. Once you put 2l of magnesium chloride out per square metre on the roads, it sucks enough moisture into the road surface that it does not need to be watered for up to three months and you're knocking out about 90-95% of the dust."

This is more than just opinion: RainStorm created a dust monitor that straps to the front and back of a long vehicle or road train. Used by BHP at its Pilbara Iron ore mine, the monitors attach to the front of the vehicle to measure the amount of ambient dust per cubic metre, while the monitors at the back measure what comes off the vehicle movement. This level of real-world data is critical to a complete dust management strategy.

## Wind

Wind generates dust from open areas such as stockpiles and dirt whipping across the ground on construction sites.

Mason says the biggest danger zones for dust come from tailings dams. New policies in Australia limit the amount of water stored inside and on the surface of tailings dams since the collapse of the dam in Brazil will only exacerbate the problem.

"Deposits of mud used to be circulated around the tailings to keep the water on the surface to around 90% and dust was prevented from lifting off by this water seal

they were using on the top," he said.

"With this water area limit now reduced to 10% in the tailings dam, it's become a massive dust risk and, with most of the tailings being softer in nature, it is challenging to trek out there due to the soft, dusty soil."

RainStorm came up with a solution to provide high-performance veneering by way of a versatile water-bound polymer emulsion called Gluon that can be applied as a surface veneer or a soil stabiliser.

Once applied, the polymer bonds upon hydration creating a surface mesh –binding the soil and ore fines.

In wind tunnel testing, Gluon achieved zero dust lift-off at 20m/s, which makes it highly effective in containing stockpiles, embankments, tailings dams and quarry dams, as used by companies such as Iluka Resources, Rio Tinto, BHP and FMG.

The dust suppression and soil erosion factors can be contained for as long as 12 months and the polymer can be easily mixed with water for applications using standard technologies such as spray booms and water carts.

Not one to shy away from innovation, Mason has sought inspiration from a variety of different industries to expand the ways RainStorm delivers its dust suppression products in remote and challenging areas, from helicopters to drones, from water carts to spray booms and from tractors to snowmobiles and off-road buggies.

## Materials Handling

Dust can be generated in materials handling when coarse and fine particles come off the edge of stacker or the surface of a stockpile, blown away by the wind.

Examples of other mining activities that generate dust include bulldozers moving dirt, front-end loaders transporting material, or when blasting rocks.

"The materials handling dust can be a lot harder to resolve depending on where it is and what is being done," Mason said.

Important factors to consider in dust suppression during the materials handling process include enclosing transfer points, ensuring the materials being conveyed are adequately wet and making sure the top, bottom and underside of the conveyor belts are sufficiently wet too.

"In iron ore, water will be added to primary crushers to get enough moisture into the ore so that it doesn't fly away," Mason said. "There is an exact science behind it called dust extinction moisture level."

In another example involving materials handling at another minesite, Mason invented a product using sugar and organic acids to spray onto its iron ore, as water was not providing uniform moisture and was waxing up like beads.

"This changed the electrical charge in the iron ore so that the particles became wetter and stuck together," Mason said. "Injected into water and sprayed onto the iron ore, it lowered the dust extinction moisture by 1%, (eg lowering the DEM from 6% to 5%) which is more than enough to make a compelling business case."

The Dust Extinction Moisture (DEM) level provides a guide on the moisture point required to minimise dust in processing material without impacting on the quality of the material.

This allows minesites to select an acceptable dust level and an associated target moisture level, based on the types of materials being handled, the nature of their composition and the behaviour of the materials when they come into contact with moisture.

"We measure at what moisture point the body of ore no longer flies away during shipment," Mason said. "When the mining giants ship their iron ore up north, it is done to a predetermined dust extinction moisture point stipulated by the Chinese, Japanese and various other ports receiving the shipments – and it could be as high as 7%."

However, when it comes to tonnage, there is no way to differentiate between ore and water. "If you have approximately 200t of ore transported in one rail car and you change the amount of water in that rail car by 1%, that's 2t more ore per rail car that would be worth a few hundred dollars more to the mining company – per rail car! Over the year, the savings add up to millions of dollars," Mason said.

This is precisely what RainStorm has been achieving for its clients over the years – looking at ways to show that when dust is managed effectively rather than viewed as a problem, the cost-benefits to the business are overwhelmingly in favour of savings and profit. Careful management like this can turn a cost centre into a profit centre.



**Rail Veneering**

RainStorm stepped in to assist a mining company that was transporting black magnetite by rail between its minesite and Port.

"Magnetite is super fine and it was landing on paddocks and farmland in the surrounding region, impacting crops and wildlife," Mason said.

The team attached cameras to the exterior of the trains to visually see what was happening during the travel between the mine and the port.

They then aligned the scales of the minesite with the scales at the port to measure ore loss, based on weight, during the journey.

A complete system was then designed and built to minimise this ore loss and the small cost per rail cart of containing the lost magnetite is far outweighed by the additional product that actually reaches the

port for export sale.

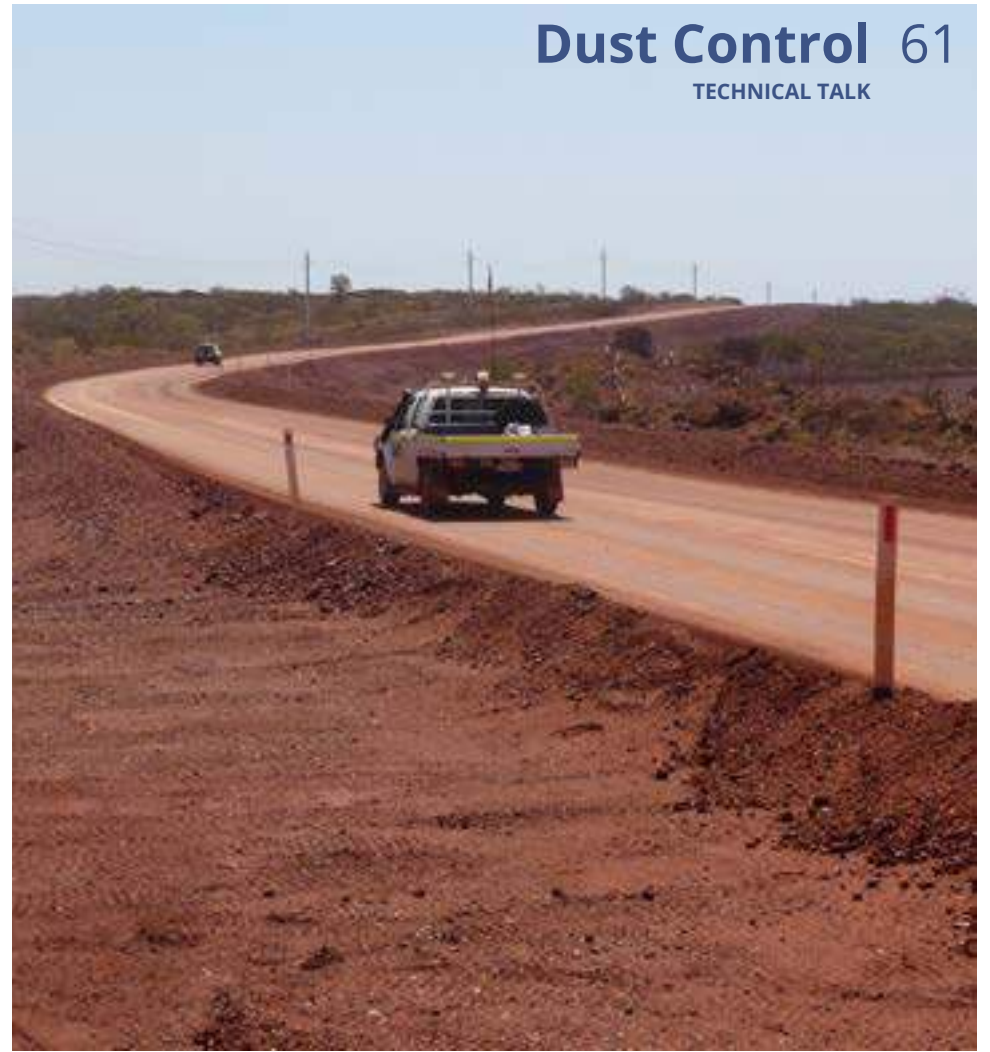
"Now there are lasers capable of measuring load change to within 10kg increments and there are autonomous spraying rigs in a veneering station that sprays water and Gluon on both sides of the train," Mason said.

The RainStorm system now successfully suppresses ore flyaways at a cost considerably less than the ore value lost in the transport process. The mining company saves about \$50 per rail car from no longer losing ore during transport.

So, from a \$4 Gluon spray per rail car, the system returns a net gain of ~\$46 per car and has also resolved an environmental issue and a potential compensation issue that was impacting the local community.

**Hydromulch and Rehabilitation**

RainStorm rehabilitates mines and open areas through its product mix of seeds and



paper called hydromulch, which it sprays out on large blocks of sandy land to bind soil surfaces, prevent erosion, dust emissions and encourage seed germination.

With its own specialised fleet of hydromulching and rehabilitation trucks built at the RainStorm facilities in Maddington, WA, the application is a one-step process, able to be deployed at short notice.

Special binders and additives are added and thoroughly mixed in the high-capacity agitator tank on all the mobile units, comprising 4WDs and 6WDs, that can handle all types of terrain. The resulting slurry is sprayed on using either a specialised, high-capacity water cannon, fan or boom sprays or even a hand-held hose where necessary.

**Blasting**

Mason says that one issue that keeps being presented to him by the mining industry is dust generated from blasting, which sends a

huge plume of dust upwards and becomes an accumulation and concentration of point-source dust.

With minesites often blasting as many as 500 holes a day, 27 days a month, natural factors such as weather inversions can push dust out to the neighbouring communities and subsequently halt the blasting process for days at a time.

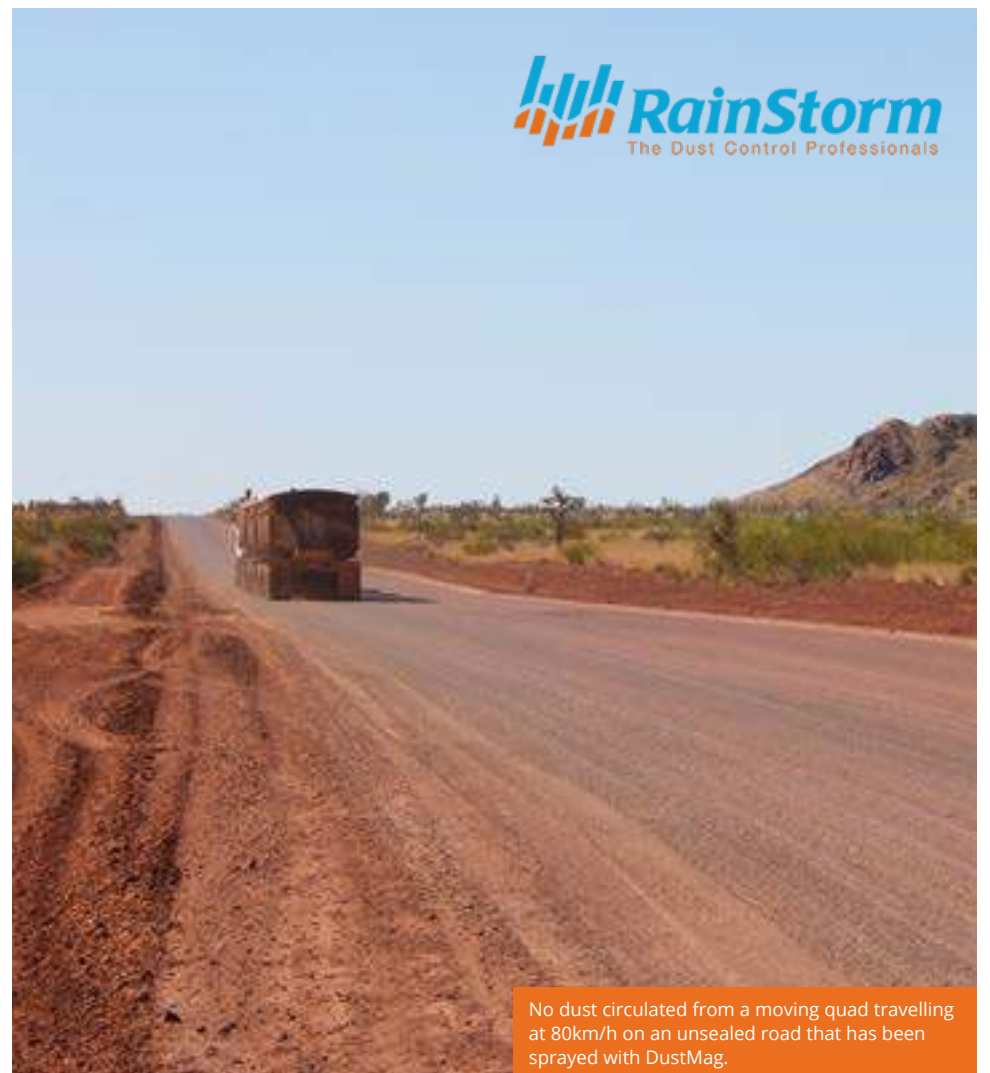
Minesites are taking the dust generated from blasting very seriously, not only for these social and environmental reasons but also due to the high cost of lost production if blasting has to be halted.

The current method of using blast aggregate or even iron ore to stem the hole is not only wasteful but provides a column of potential dust, metres long, in each hole.

In response to this blast dust problem, RainStorm is a licensed provider of Shockwave's stemming and containing



An unsealed road that has been sprayed with DustMag prevents dust from becoming airborne during vehicle movement.



No dust circulated from a moving quad travelling at 80km/h on an unsealed road that has been sprayed with DustMag.





A versatile water-bound polymer emulsion called Gluon can be applied as a surface veneer to iron ore stockpiles to prevent wind-blown dust and erosion.

material, which is an advanced polymer capable of reducing noise and dust after detonation, called StemGel.

Admitting that this step towards dust suppression in blasting is an unusual step for a dust control company, Mason is excited that RainStorm is at the forefront of this patented technology.

"The polymer turns the water in StemGel into solid, not a jelly but more like snow with discrete particles of water which you can effectively stand on," he said.

"When the pressure wave comes up in advance of the gas, it is impeded when it hits the solidified water and can't travel at the same speed through water, making the S-wave, another type of power wave, simply stop at that point.

"When the gas finally comes through, it does so in a vapour explosion with a small proportion of the stemming gel, and milliseconds later, the rest of it gets shot out of the hole like a big vapour steam.

"The total volume of particles ejected out the top of the hole are only about 10-20% the volume experienced prior to the polymer being used inside the blasting holes.

"If a minesite can save about 20% of its explosive energy, it can therefore cut back

on the amount of explosives used to break up the same burden of material from the bench. Once again, dust generation is minimised and a cost centre can be converted into a profit centre."

**Chemistry and Science**

RainStorm urges minesites and companies to consider dust suppression, not as a problem or a nuisance, but rather holistically - as a cost-saving and profit-producing exercise for their operations.

There are options to spend less on water-based products and explore other avenues including magnesium chloride hygroscopic material, super absorbent polymer water extenders, binding agents that can be added to road edges and rail car veneering, which can add millions of dollars per year to an operation's bottom line.

"As an industry, we need to look at dust suppression and management in a more holistic and integrated way by engaging the science and understanding the chemistries behind dust when it presents itself," Mason said.

"It is no different from adding chemicals such as flocculants in mineral or water treatment processes.

"RainStorm excels in having deep technical expertise and understanding the science

behind every single chemical process that we have ever produced. We advise our clients what it is and why they should or should not be using a specific solution from an evidence-based perspective."

As part of an innovative business that has been in dust control, suppression and management for 31 years, the team at RainStorm are fully focused on anything pertaining to dust and land rehabilitation - by presenting all data to the clients, innovating and providing new ways of dispensing products as well as changing the industry's perspective on dust.

"Almost three decades ago, I started with a 44-gallon drum and a broomstick," Mason said. "Now, dust is a major issue, so is water shortage, and we at RainStorm are continually pioneering new ways to help minesites tackle dust and generate more revenue at the same time."

**The Future**

Mason says the industry is rapidly heading towards fully autonomous trucks and circuits that manage dust suppression in tandem with normal production and operations.

"We are closer to using live-data beamed off trucks in the circuit to activate the water carts using a dial-in traffic lights system - where green means no dust, orange

means a slightly nuanced situation and red meaning there is a problem requiring immediate attention," he said.

"There are also autonomous buggies with large spray booms that can head out and be remotely monitored and controlled by an operator from a different location, so that no one has to physically enter challenging terrains to suppress dust."

Taking the lead from agricultural spray systems that are all driven by computers, where GPS systems let operators know where they are, smart systems plotting out travel lines for the trucks and variable speed drives determining the speed the truck is travelling, Mason says the precision of autonomous systems gets more out of the product per square metre, making it 10-20% more efficient in that context alone.

The innovation in the dust suppression space will continue to keep pace with the enormous technological leaps experienced by the mining sector in recent decades. It's just a question of the right expertise mixed with an ongoing mandate for improvement.

**AMR**

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A time-elapsd photo of a rail bridge in Pilbara, WA, showing (from right to left) the outcome of hydroseeding and hydromulching in rehabilitation work. Seeds and fertilisers are mixed into a combination of water and mulch for revegetation of large, sandy tracks of land. The green shield that grows over time suppresses wind-blown dust and prevents wind erosion.

# Fog-based Dust Suppression Systems

**G**ood dust management is essential to mine operations.

Any dust, no matter how small, poses a threat to workers' health and the environment, and can have a significant impact on the running costs of machinery on a mine.

The migration of dust off-site can have an adverse effect on neighbouring areas. Plants, eco-systems, people, communities, and cultural attributes can be threatened.

Achieving effective dust control throughout the various processes of mining is a challenge faced by many mining operators.

Since 2005, CoolMist Systems Australia® has become an industry leader providing professional and specialist service.

With over 15 years of focused experience in the field of high pressure misting and fogging applications, the company provides efficient dust suppression solutions for a range of operational issues, and to meet EPA compliance requirements.

CoolMist tailors dust suppression systems unique to the needs of the mining operation and the clients' facilities. The industrial systems safely suppress dust particles emitted during mining activities and processes around the work site.

Systems can incorporate fog concentration at specific high dust points or cover large scale areas.



Mist cannons and misting systems suppress dust and reduce its significant associated health and environmental impacts.

Services offered by CoolMist include system design, supply, installation, on-site commissioning, service, and maintenance.

The company is a leading provider of high-quality equipment used globally. Products include high pressure static line fixed nozzle systems and large area AJet® Mist Cannons.

High-pressure misting systems, also referred to as fog systems, are efficient and cost-effective with minimal power and water use.

CoolMist's range of products can control dust from crushers, conveyors, stockpiles, ROM bins, jaws, screens, transfer points,

loading and unloading operations on the mine and at the port facility.

More information can be found at: [www.coolmist.com.au](http://www.coolmist.com.au)

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## AJET Fog Cannons and Mist Systems

### Tailored Dust Suppression Solutions.

CoolMist specialist dust suppression systems help you comply with EPA regulations by creating a safe and healthy work environment.

Purpose built fogging systems and mist cannons, proven and effective dust suppression for Rom Bins-Stockpiles-Bulk Material Transfer-Port Operations-Crushing-Storage facilities.

Our expert team can work with you to find the best solution for dust suppression with their professional advice, system design and installation service.

Call 1300 266 564 or email [sales@coolmist.com.au](mailto:sales@coolmist.com.au)



# Dust Control Technologies Are Not All The Same



DustTamer Windfence for dust control at a stockpile

As just about everyone involved in the various aspects of mining and quarrying knows these days, respirable dust under 10 micron (PM10) in size poses a health hazard where workers are exposed to dust, and it is considered the main contributing factor to lung disease in the industry.

Legislation around occupational exposure limits for Crystalline silica dust, which is a mineral found in many ore bodies, as well as other dusts (classified as not otherwise specified (NOS)) is becoming more in the spotlight in Australia, and Occupational Exposure Limits (OELs) for these dusts have been reduced in recent months across the various states, following on from an extensive review of safe exposure levels by Safe Work Australia.

New Occupational Health and Safety legislation in some states also re-inforce the application of these limits and mandatory compliance is being enforced in more and more sites. Producers are being required to tighten up controls for areas where dust generation exists, usually wherever the product is disturbed, such as at truck dumps and hoppers, crushers, screens, conveyor transfers, stackers and reclaimers, train loaders and unloaders, and shiploaders, as well as in stockpiles where wind has the potential to lift dust off of the piles. All can create harmful fugitive dust emissions and require an effective control method to eliminate the problem.

Engineered solutions incorporating a few different technologies in a holistic approach can make a huge difference to controlling fugitive dust in various parts of the mining process, and incorporating these technologies in the right way will ensure compliance. MARC Technologies have

developed unique strategies that use these technologies to provide impressive results with minimal water use and without the need for the use of expensive chemicals.

Combinations of systems such as Dry Fog™, and medium pressure misting systems work in different ways to minimise emissions and reduce the 'dustiness' of material (by effectively altering its moisture content, without overwetting), providing targeted suppression where required, and controlled moisture addition that minimises water and avoids handling issues.

Windfences, which are being seen more and more in Australia and are already extensively used elsewhere, are an effective method of preventing dust migration due to wind effect, and also can be used to complement existing dust suppression systems to increase their effectiveness.

## Dry Fog™ Dust Suppression

Where there is no opportunity to condition the material as it is introduced into the handling process, such as at a truck dump or load hopper, then control of fugitive dust using Dust Solutions Inc (DSI) Dry Fog™, which creates microscopic water droplets that are able to bind with the dust particles in the air, is a proven method of effectively 'scrubbing' the dust, and preventing it from migrating out of the area.

Dust Solutions Inc Dry Fog Systems use an ultra-sonic nozzle that uses low pressure air and water to produce water particles less than 10 microns, which scrub out fugitive dust by agglomeration of like-sized particles – they effectively bind with the dust particles and drop it them out of suspension.

Dry Fog™ uses around 1/5th of the water used in a traditional water spray, producing

a fog that is dry to touch and helps avoid associated issues with carry back and belt wear. Nozzle blockages are rare as the venturi design within the nozzle means that the water and air orifices are relatively large, though these systems also have dual filtration as standard to factor out poor water supply.

Dry Fog™ is not a new technology, and it is widely used in the US and many other countries, with a proven track record of well over 500 installations with the major miners. With proven results of as much as 90% effective reduction of PM10 emissions, these systems are especially effective at eliminating dust plumes from truck dumps or loading operations, including shiplading.

## NESCO Misting Systems

Traditional low pressure water sprays are ineffective against dust once it's in the air,



Stacker dust pre-treatment.



Stacker after NESCO misting.





DustTamer Windfence panels around a dump hopper

the droplet size from these sprays will dwarf the dust particles the sprays are trying to control, and as a result the dust will migrate round the water droplets, and escape the area.

Also, most water sprays are designed to wet the material surface, but unless these are applied in the right way, they will also cause problems with overwet product such as carryback, avalanching and blockages.

Once the material is disturbed again, either at conveyor transfers or into secondary or tertiary crushers for example, more exposed dry surfaces appear and are likely to cause fugitive dust. Add to that, the increasing cost of the precious water resource, and it becomes an expensive way of not dealing with a common problem.

NESCO systems are a water only system

based around a philosophy of controlled moisture addition within a range of 0.2 to 1% to the product.

Where there are operations such as crushing and milling, careful water addition in a controlled fashion, with targeted moisture addition using properly selected spray types and positions can ensure minimal dust emissions further down the process, including at stackers and transfers.

Nozzles are positioned in key areas to both inject the appropriate volume of water into the material and also utilise atomising sprays where necessary to knock down fugitive dust.

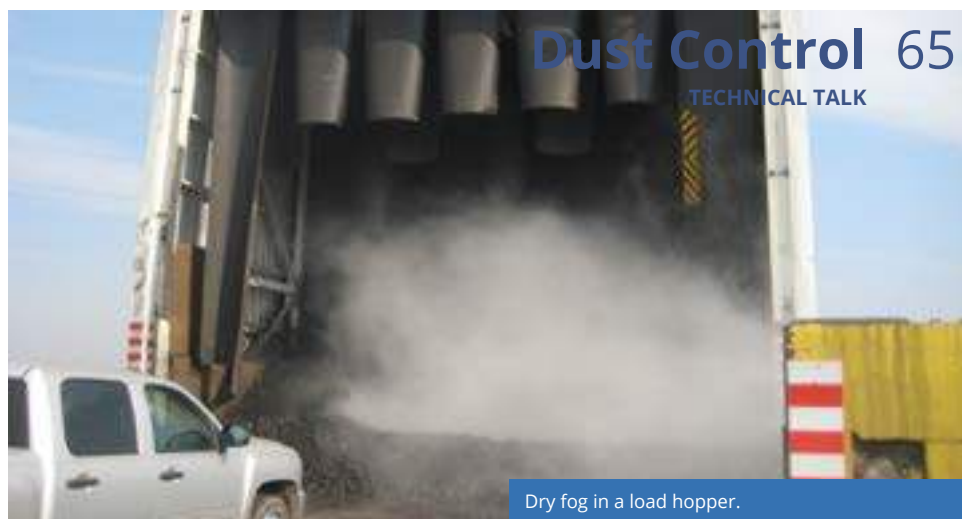
These systems give optimum injection of water into the ore stream without simply flooding water over the top of the material. This has a flow-on effect with less dusty



Feeder dust pre-treatment.

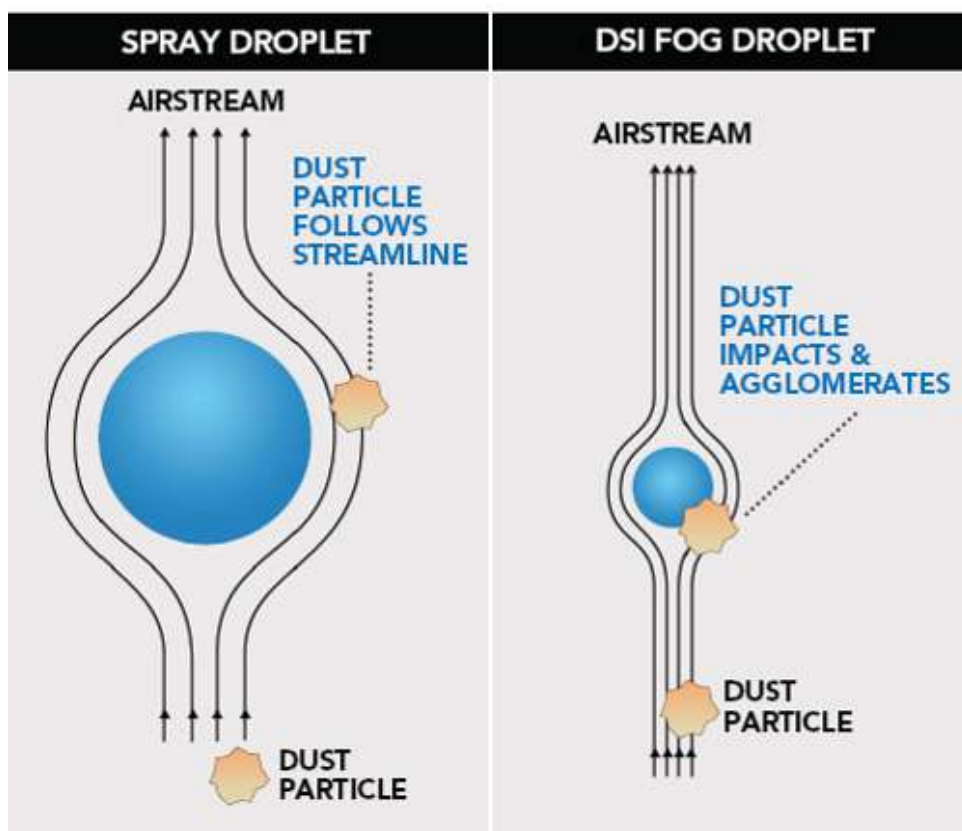


Feeder after NESCO misting.



Dry fog in a load hopper.

## HOW DROPLET SIZE AFFECTS AGGLOMERATION



material further down the process and significantly reduced dust from handling operations such as conveyor transfers and ultimately the stockpile stacker.

These systems are cost effective, often with an entire plant able to be treated from a single system, and they also use far less water in comparison to traditional, low pressure water sprays.

### DustTamer™ Windfences

DustTamer™ Windfences are an effective dust control method for larger areas such as stockpiles and tailings piles, as well as being used for more local control in areas such as ROM bins and crushing and screening buildings.

Dust take-up from stockpiles due to wind effect can result in liberated dust travelling large distances, across the plant, into

neighbouring properties and potentially nearby populated areas. Controlling the top surface of the pile with water cannons offers limited protection, but this has to be constantly applied, and there are detrimental and unwanted effects with excess water on the material.

The windfence is a permanent structure, and uses a hard wearing, UV stable kitted polyester material that is strong enough to be used in cyclonic regions, and is guaranteed to last 20 years without the need for maintenance or replacement.

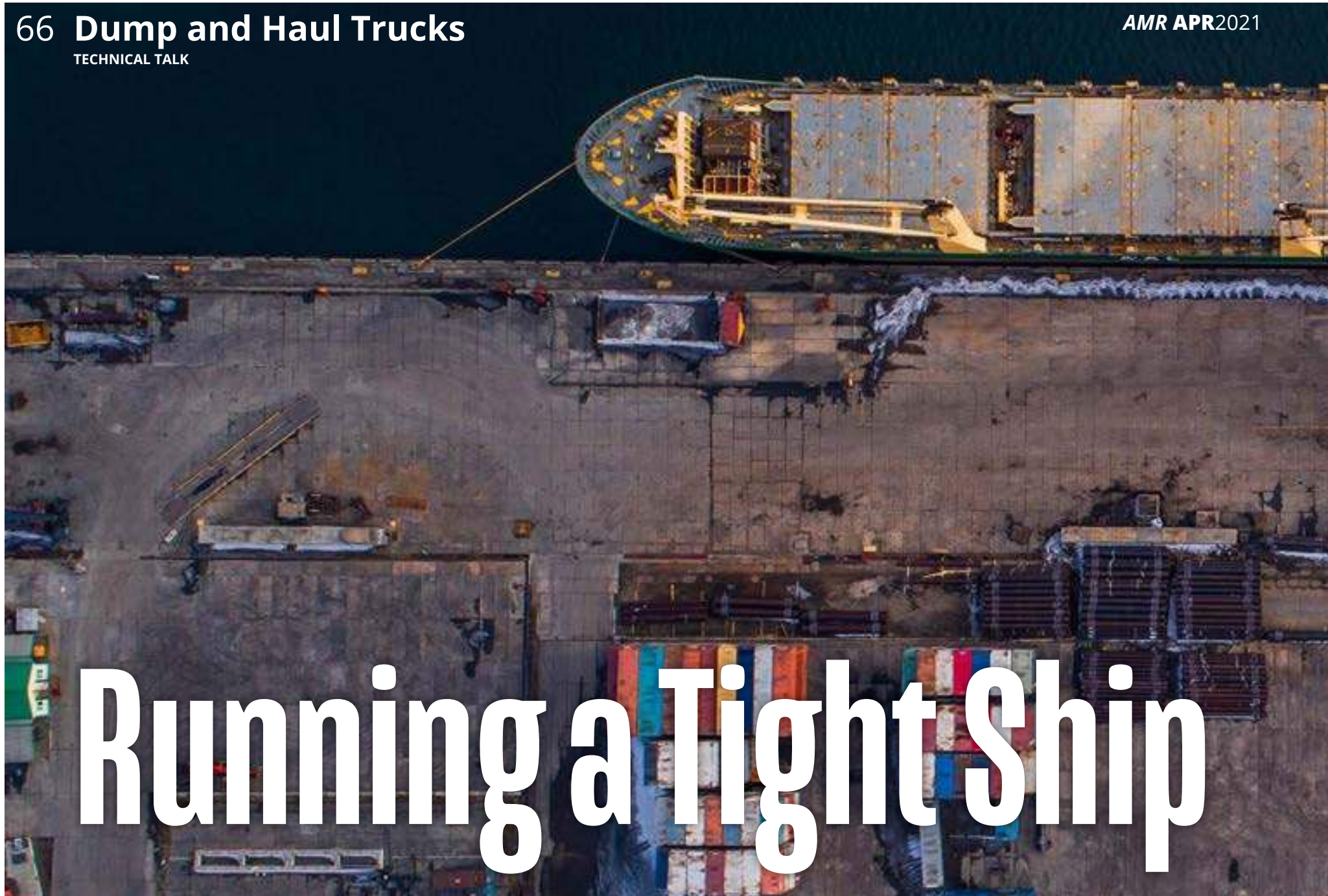
This material exerts a drag force on oncoming wind velocities, equalising pressure on either side of the fence and allows a 'bleed through effect', with a portion of the wind volume allowed to penetrate through the screen as well as deflect the remainder of the wind up and over sheltered area. CFD modelling of the area also optimises the fence and can prove it's effectiveness given the terrain and surrounding infrastructure.

Implementation of one or more of the above technologies can significantly improve dust control in a variety of applications, and help to bring operations into compliance and future proofing with ever tightening regulations.

MARC Technologies has been successfully delivering specialist dust control solutions to the mining and industrial sectors since 1995. We can provide site audits where required, and tailor a solution to suit any requirement. [www.marctech.com.au](http://www.marctech.com.au)

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# Running a Tight Ship

Transporting heavy machinery between mines is never guaranteed to be smooth sailing, but there are even more challenges to deal with when it comes to shipping equipment between sites that are oceans apart.

There are many factors to take into account, from ensuring the engineering is right to safely navigating complex routes and road transport restrictions, rigging and lifting, and biosecurity and customs requirements.

Australian Mining Review spoke to Freightplus chief executive John Gleeson about the complex logistics involved in such procedures.

"The cost of one mistake could be millions of dollars," John said.

"There is much more to transporting massive machines from site to site than booking space on a ship."

Freightplus is an international freight specialist for heavy industry, providing a comprehensive door to door international forwarding service for oversized cargoes, with an extensive range of ancillary support services.

The company has been operating for more than 20 years and has never had cargo rejected at destination, despite shipping in some of the most difficult conditions.

#### Domestic Dependability

According to Freightplus' technical services manager, Ben McKirdy, one of Freightplus' most recent shipments between Mackay in Queensland and Port Hedland in WA was a prime example of the level of work that goes into getting heavy machinery, even within a domestic setting.

"We've just completed a job moving a whole ship load of dump and haul trucks from Mackay, around the coast to the other side of Australia," he said.

"The first step in the process, no matter where you're shipping to, is gaining an intimate understanding of the route and getting all the necessary road transport permits in place because the machine has to get to the ports, within a specific timeframe, before they can even be shipped. Globally, that's often a difficult process.

"The second step is working out the best configuration for both domestic transport and shipping."

Machines often need to be taken apart or fitted out with specific equipment to ensure safe shipping and make it through the ports. Every machine also needs to be completely cleaned.

"On this recent domestic move, we had to get a special exemption from the Port of Mackay to set up a large area for us to do all the work and manage various processes, following all the protocols of the port to satisfy their needs and then also work through the engineering requirements," Ben said.

"Each port has unique load-bearing capacities, so we have to go as far as advising how much ground pressure is going to be applied per square metre on the port.

"We have to provide a full methodology statement of exactly how we're going to lift the machines and provide engineers' rigging plans, because there are differences in every machine and we need to understand those differences.

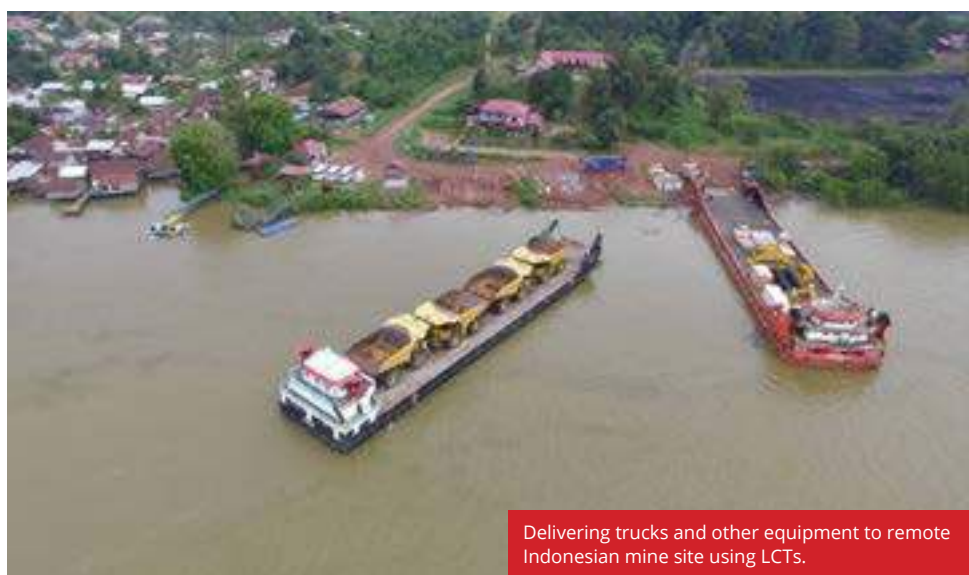
"Even when you look at the CAT 793, for example, there might be C,D and F series trucks in a single shipment, and even though they're all 793s, they have different

lift points."

Australian ports have strict guidelines and according to John, anyone looking to ship heavy equipment through them can expect to have a Freightplus project manager attending at every stage, inspecting each machine to ensure it meets the various standards of multiple parties and authorities – Customs, Department of Agriculture, port authorities at origin, destination and sometimes transshipment, road transport authorities, and so on – in conjunction with the ship owner's local port captain and any buyer's or seller's representatives.

"A Freightplus project manager is appointed to attend loading at origin and destination sites and load ports. For loading this recent shipment at Mackay, the attending project manager was the key contact for the port captain, who was responsible for overseeing the whole project, and the multiple service providers coordinated by Freightplus and our customer. They go over each machine together to identify for any areas that may present a problem," he said.

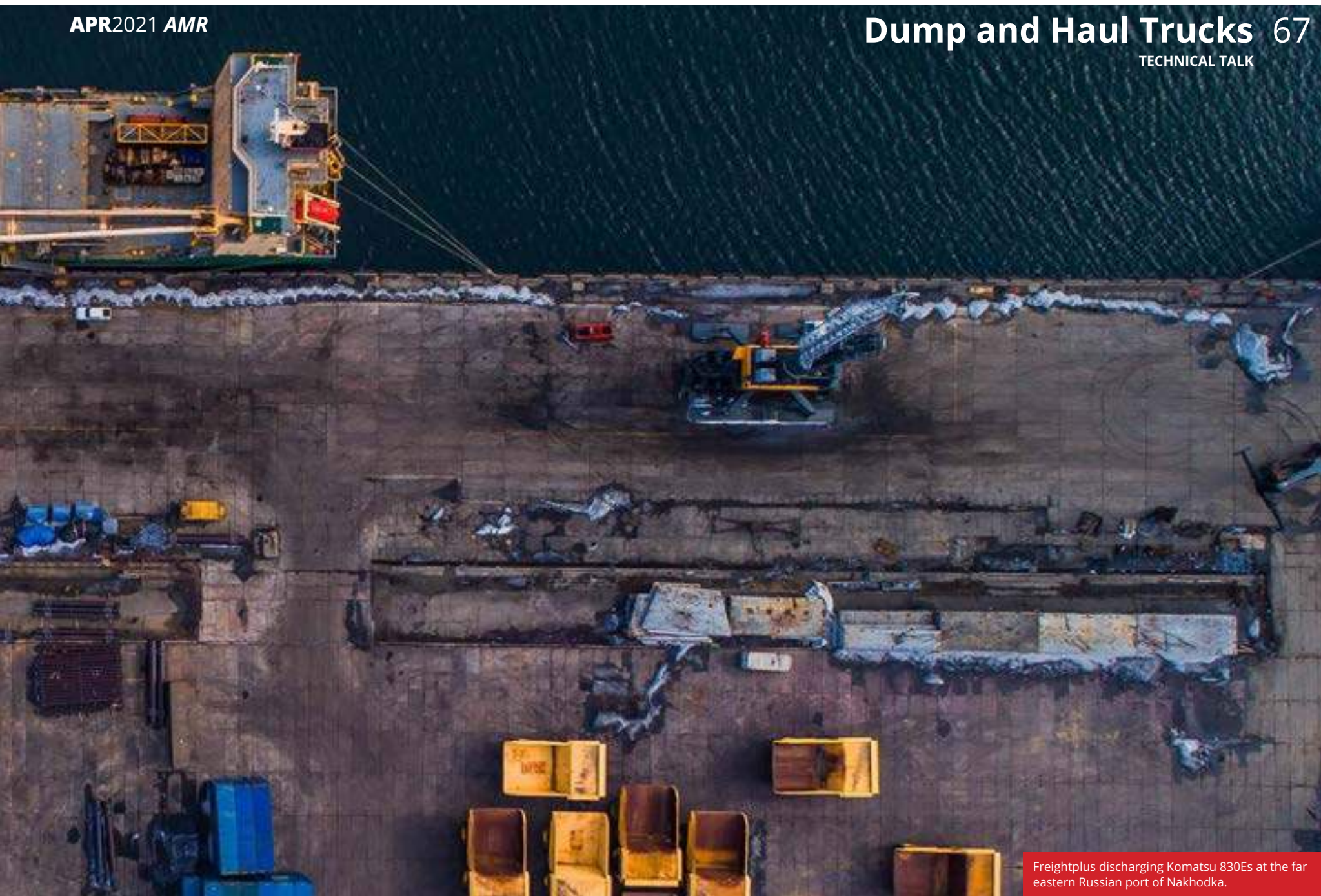
"That could be the rigging that they use for lifting, or something as simple as an after-market walkway, which has been added and



Delivering trucks and other equipment to remote Indonesian mine site using LCTs.



Transferring 13 172t Komatsu 830E dump trucks from barge to a multipurpose heavylift vessel at Anchorage.



Freightplus discharging Komatsu 830Es at the far eastern Russian port of Nakhodka.

can get in the way of rigging.

"If and when those are found, we have to remove them.

"In one case, a fire suppressant was in the way. In another, there were sharp edges that could have become an issue, so we had to have special steel items built up so that the wire ropes didn't touch the steel edges. Our project manager coordinates the necessary labour, equipment, permits, workspace, and so on.

"When we're lifting something that's 150 or 200 tonnes, and you're lifting it with wire ropes rubbing on sharp edges, that weight is dangerous, so that was an engineering feat in just some of the protection that we had to make up for the job."

John said tides and swell and also need to be taken into account, along with shipping lines, which can have restrictions on what size lifts can be done at various times to accommodate safety concerns presented by the elements.

The Freightplus team also has to position each machine on the ship perfectly to make the best use of the space while ensuring the

machines are absolutely secure.

"With the very heavy lifts, you're not actually lifting with a crane, you're lifting using ship's ballast," he said.

"It's a really careful, slow, calculated process. They will literally lift a truck off a berth just by pumping water into the other side of the ship.

"Once we've got cargo onboard, we have to make sure it's secured quite significantly, especially if it has to be shipped on deck.

"In addition to protecting the cargo against the elements, they may be secured eight times or more their actual weight, to compensate for the forces of motion."

Ben said preparing a shipment of trucks and getting them to the appropriate load port, often involves 30 or more people, for days, or weeks, depending on location. A typical team might include diesel mechanics, boiler makers, cleaners, biosecurity specialists, stevedores, crane operators, truckers and machinery operators.

"We had a big team come in for the Mackay shipment, but we were overseeing the whole

project and just making sure that everyone understood exactly what needed to happen, and when," he said.

"There's a lot of face-to-face management. It's not like we were dealing with just one company. We are often dealing with a dozen different parties, involving two or more languages and quite diverse cultures"

**Navigating The Seas**

Although Freightplus was founded in Sydney in January 2000, it has since spread its wings to locations across Australia and into Asia, Europe and the Americas.

Its core business is the international shipment of heavy and large cargo, predominantly for the mining sector, for which the company has various means at its disposal.

"There are always one or two markets that are going gangbusters for various reasons, often political, so one region may be a hotspot for a year or two and then it will shift somewhere else," John said.

"Because we've been moving mining machinery for 21 years, it's common for us to be moving haul trucks out of a mine site

somewhere in the world, that we delivered there six or seven years earlier.

"I can confidently say that we have a really good reputation, especially with big excavators and big trucks and it's because of our consistent and strong capabilities across the world."

According to John, one of the most important assets to have in the business is good local contacts, which is why Freightplus has opened multiple offices across the world.

"We have some exceptional partners in a number of different countries that we use quite regularly, and exclusively," he said.

"If there's a reason that we have offices in different countries, it's because we haven't been able to find a partner that can perform to our desired standard in a specific location - it's not just a matter of putting a lot of dots on the map.

"It's invaluable to have good people on the ground who really understand the local protocols and bureaucracy and have the right connections to get things done properly. Putting our own people on location and working closely with local



172t Komatsu 830Es shipped by Freightplus from Central Kalimantan to Siberia.



Freightplus ships hundreds of mining trucks each year on its weekly RORO services from USA and Europe to Australia.



Experienced Freightplus loadmasters and mechanics attend the load and discharge of every charter shipment, ensuring smooth operations and averting unnecessary and costly vessel delays.

experts we have strong relationships with, gives us excellent control of each charter project.

"Unfortunately, there are some places that have quite corrupt systems and there will be incidents like machines going missing. We've never had that happen to us though."

Nature can also throw up its own unexpected problems, but according to John, the challenges are the reason the team loves to do the job.

"For example, there is one part of Indonesia where the rivers can either be so empty that the barges get stuck to the bottom and can't go anywhere," he said.

"Those same rivers can then become so full within half a day of being empty that they become too high and you can't load barges under the bridges.

"It's challenging, but working through those problems and overcoming those obstacles is what we do and can be really fun."

**A Rare Breed**

Although Freightplus has an excellent track record in shipping heavy equipment, John

said he has seen jobs go drastically wrong in the business. In one case, just over a year ago, Freightplus was called in to rescue machines that another forwarder had been attempting to transport between Latin America and Australia.

The shipment of dump trucks, expected to be delivered fully assembled and operational, didn't even get to the South American load port before things went awry and they were left at an inland yard, disassembled, damaged and in disarray.

Fortunately, Freightplus was able to act quickly and had their technical services manager on the ground within 48 hours and a full team on site only days later, getting the shipment back on track.

"There's not a lot of forwarders doing what we do, but our biggest point of difference with the competitors we do have, is that we always have our own very experienced people on the ground, with the skills, experience and empowerment to act quickly and effectively when needed," he said.

John said he had also seen a number of importers and other freight companies run into trouble with Australia's strict biosecurity rules.



Coordinating door to door delivery of 19 Unit Rig MT3300s from the Pilbara to Russia.

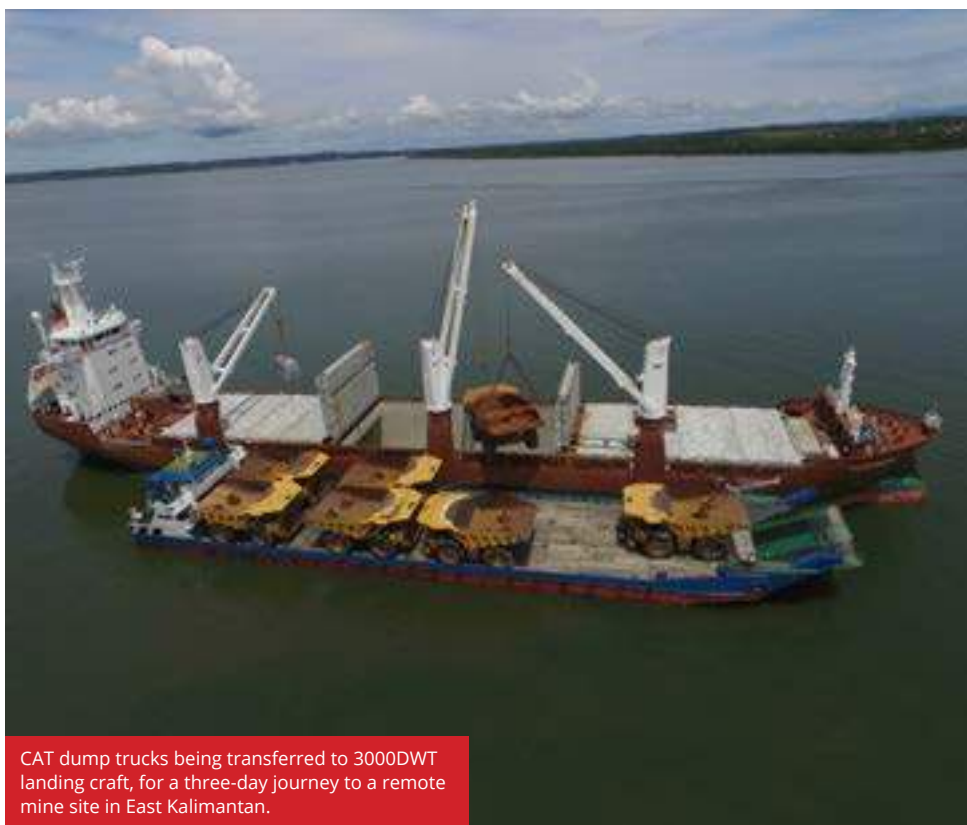
"A surprising number of people aren't aware, but bringing in used trucks to Australia is a prohibited import unless you meet certain criteria," he said.

"One of the criteria is that the truck is as clean as new, which means that if you have a truck that has done 20,000 hours in dirt and coal, we still have to deliver it as if it was a brand new truck and if it's not, it will not be accepted in Australia and might well be sent back to where it came from.

"People often either have that happen

to them or know someone who has, but we understand the requirements of each destination and we guarantee that whatever we inspect, will make its way into the country, particularly in Australia." **AMR**

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CAT dump trucks being transferred to 3000DWT landing craft, for a three-day journey to a remote mine site in East Kalimantan.



Loading a chartered heavy lift vessel at Port of Townsville (CAT789Cs from Foxleigh to Borneo).



Shipment of used Komatsu 830E chassis from Brazil to Mackay.



Preparing a consignment of CAT793s from Alberta, Canada, in -27o Celsius.

# YOUR TRUSTED INNOVATION PARTNER

Austin designs and manufactures customised off-highway truck bodies, buckets, water tanks, tyre handlers and other ancillary products. It is a **complete service provider** through the product's life cycle, offering on and off-site repair and maintenance.



design matters | [austineng.com](http://austineng.com)





# Take a Load Off Your Mind

Austin's truck bodies are designed and built for purpose.

In a complex and fast-changing space like the world mining sector, there is a single common understanding: no two mine sites or operations are the same.

The challenges, though not dissimilar, each require a tailored and bespoke solution – and no truer exemplar of this is there than the shifts underway in the development of lightweight OEM attachments.

The once heavyweight champion of this space – both literally and otherwise – was a kind of OEM standard, one-size-fits-all approach.

Now though, it's a lightweight approach to truck bodies and OEM attachments that has muscled in on a big world market.

Leading the charge is Austin Engineering.

Truck Bodies Designed and Built for Purpose Mechanical engineers like Deon Wessels

have been a part of this shift. He and Executive General Manager Paul Clarke have helped pave the way to a move away from off-the-shelf, usually heavyweight, long lifespan OEM options.

The new way, as they have seen it, is in the form of site-specific, usually lighter weight, shorter lifespan alternatives.

Greater consideration is being given to mine life and the required lifespan of equipment. This takes into account whether operations are looking to a longer lifespan, higher maintenance approach (which generally comes with the heavier body options); or a high capital, low maintenance approach offered by lightweight body options.

Essentially, this means operations can maintain and upkeep bodies which might have a lifespan of up to 60,000 hours, or they can go with a lighter option with a greater load carrying capacity, with a shorter

lifespan (say 24,000 hours) where the life of mine may be between four to eight years.

Options still exist to repair or refurbish lighter truck bodies, but often they are simply replaced at the end of their duty cycle.

There are many paths open to the mining customer in order to tailor a truck body to both their operational and financial requirements.

As with most innovations, what this gives those in the market is that most coveted of commodities: choice.

Deon has a bit of a laugh when he compares a high pay load, surface mining truck body to a good old garden wheelbarrow.

"They both carry dirt and other material from one place to another, but there is really a lot of science behind it than what

meets the eye," Deon said.

Deon is part of the large global footprint of the Austin Engineering group. Under the organisation's 'One Austin' philosophy, he is working with a single world team which is at the cutting edge; innovating world-class solutions for the biggest client share of its kind in the world.

"The market is focussed toward a lighter construction with delivery of a higher payload," Deon said.

"That means we look to carry more at the lightest possible body weight without hindering design intent."

Paul too is behind the cutting edge of the science and innovation which has underpinned the solutions-based culture of excellence that Austin Engineering – and their brands, JEC, Westech, and Ultima – adheres to.

"Austin is the global leader," Paul said.

"We have more truck bodies in the space across the world than any of our other non-OEM competitors."

## Long History

Austin Engineering might be the leader in the truck body and OEM truck space, but that's not by accident.

Starting in 1982, originally, as a family-run business in Brisbane without even a hint of involvement in the mining industry, Austin was bought in 2003 by a group of investors under the banner of Western Australia Metals and was publicly listed on the Australian Stock Exchange in 2004. Between 2006 and 2013 the business expanded throughout Australia, Asia and the North and South Americas.

In 2018, after a couple of years of business consolidation and the integration of all global operations into a single business model, Austin rebranded, and it is now the leader of manufacturing, design and solution delivery in its sector of the global mining industry.

Key to this, the group saw an opportunity to acquire JEC (Perth-based Johns Engineering and Cranes).

Already, they had experience and design in

## Video Modelling

High-end modelling software is being underpinned by good old fashioned video footage to help engineers shore up OEM solutions to meet the exact site requirements of global customers.

In developing OEM attachments to haul materials, engineers will take video footage of trucks in operation on site, under a range of conditions and within varied requirements to use in comprehensive modelling. The video is then used alongside data gathered about the site's conditions, the nature of materials, and the way loads are collected, carried, handled and offloaded.

This means the weight, fragmentation, stickiness or otherwise, fluidity, density, shale and general type of the ore/mineral or even overburden can be assessed, recorded and factored into the modelling.

This, according to Austin Engineering, means the solution is tailored to an unprecedented degree of accuracy and detail and from the original model, each iteration of a potential solution can be tested under the same controlled conditions.





Specifically tailored attachments are being procured that best suit the characteristics of a site and the material being loaded – all with the view to maximising load and minimising risks, roadblocks and blockers.

buckets and water tankers and other mining attachments, but they did not have a truck body design. The business was building to the designs of the likes of Caterpillar and Komatsu, but it was shortly after that, that Westech was acquired.

With that came the scope and capacity to develop Austin's own truck body design.

"It was quite a way-out concept at that point – very curved shaped and different – that took us down a very different path," Paul said.

The movement away from heavier to lighter truck body designs - with an eye to delivering higher performance, higher production and, therefore, higher payload for clients – was a game-changer.

"We very much led the way to converging the more conservative mining industry to going to a lighter-weight truck body," Paul said.

That innovative approach attracted the attention of large blue-chip miners and Austin would soon flush out and re-populate mining companies fleets across the Pilbara.

With new innovation comes the compulsion – and market imperative – for others to follow suit.

While others in the space have, as Paul puts it, 'been nipping at Austin's heels', the business' commitment to innovation and bespoke, tailored solutions for clients the world over has enabled their leadership to hold.

"We have seen a lot of competition in this space coming up with different designs and concepts, but we have continued to innovate along the way," he said.

"Austin still have the original Westech and JEC range of bodies within our arsenal of body options, brands that have proven the test of time and are etched forever in our company DNA, one that is valued as the cornerstone and continues to evolve."

#### Wide Range of Truck Bodies

Add to that, the innovative Ultima range and the Austin Engineering stable boasts a range of products which are designed, developed, and tailored for customers using world-standard modelling and analysis systems.

Indeed, that is one of the things which has cemented Austin's sector leadership while raising the bar industry wide.

The timing has been good as well.

Both men cite the need Austin Engineering met within the world market to respond to the individual, site-by-site requirements around mine location, ore type, load capacity, tailored design and life of mine.

Increasingly, specifically tailored attachments are being procured that best suit the characteristics of a site and the material being loaded – all with the view to maximising load and minimising risks, roadblocks and blockers.

Everything from safety to operation, payload to even dust is being factored into the development of Austin's solutions.

#### Application Specific

Such is the commitment that in 2011, Austin's Westech T282C Flow Control Body, which was manufactured for use with a Liebherr T282C Ultra Class haul truck chassis in North America, was awarded a Guinness World Record for Largest Truck Body.

The truck held 447.3t of coal and empties. At the time it was the largest body by volume – and the payload alone was close to 300t (of lightweight coal).

The Westech Flow Control Body was developed works to essentially tip and allow the coal to metre out the back without a sudden flow. This enables a gradual break away of the materials (coal versus dirt and overburden material, for example), to flow evenly – shearing away in layers rather than a single mass. This then reduces the incidence of crushers choking under a sudden flow of material – and it dramatically reduces dust creation on site.

This approach can then be further calibrated, with floor tilts, and rotations to meet the needs presented by different materials and their respective properties and characteristics.

Another example of a tailored solution occurred in the haulage of tar sands in Canada.

The inclusion of a taper in the tray body (opening to the rear) and using a patented



Austin led the way to industry using a lighter-weight truck body.

system to heat the load using the truck's own exhaust gases, allowed the oil sand (which usually resembles a loaf of bread in the freezing climate, to flow easily out of the tray without jamming.

#### 3D Modelling and Digital Twinning

Austin Engineering's commitment to innovation is even more evident through the extensive use of 3D modelling and material flow dynamic analysis software.

Packages such as EDEM and ANSYS are staples in the development of innovations and solutions – improving accuracy, saving time and money, but also enabling faster delivery of custom tray designs to the customer.

Using tools such as three-dimensional modelling to basically "build" the truck bodies virtually, means bucketloads of money and time saved in building, testing, and rebuilding scaled or in-field prototypes.

Both Deon and Paul said even in the most unique of circumstances, where there are acute and intricate factors to be accounted for, the use of this modelling can enable refined solutions which can be tested virtually, but still practically and accurately.

The modelling also means much – if not all – possible applications and conditions can be assessed and mitigated prior to final physical development.

#### Non-Linear Solutions

And as for that quip about the wheelbarrow? Deon said no solution is ever linear: there is always much that is analysed and state-of-the-art simulation and analysis tools enable the engineering of a solution.

That means finding a solution that accounts for everything from the type, flow, stickiness, range of fragmentation and the angle of repose of the material being hauled, to the way the material interacts with the tray or bucket when it is being loaded or dumped, i.e. what forces are generated when designing a truck body or bucket that must remain within the OEM's envelope and limits.

This simulations enables the team to factor in all relevant site and situational data – from material type, SG, moisture and movement characteristics to site conditions.

In many cases an actual video of a current truck body tipping an actual load on site is the perfect place to start.

From this video footage, the Austin Engineering team can create a digital twin of the truck and simulate its tipping time and the characteristics of the load as it shears and falls. With close representation of the actual conditions faced on site, the design team have an accurate benchmark to test the reactions of the simulated load in order to design the product.

In this way, they can be confident that the design will be accurate in the real world when being translated into steel.

"We use world class software to carefully analyse the original situation and from that we can develop the exact solutions, taking in each of these variables, for our customers," Deon said.

"More and more competitors are coming into the business now with new designs – but they don't have the miles on those designs," Paul added.

"We continue to innovate to stay ahead of the curve.

"We are a solutions provider and not just a manufacturer."

Both men agree it is years of experience, an investment in innovation, and the organisation's One Austin approach, which sees them invested in the contribution of the entire Austin team, that enables Austin Engineering to maintain its world leading status.

And clearly, it is a design – and a philosophy – that is engineered to work in a changing and dynamic world market.

While Austin is at the forefront, with the largest world market share, there are organisations the world over working to uncover, develop and then market similar solutions – across the entire spectrum of innovation in mining and resources. Like anything in mining, the possibilities are rich and run deep. **AMR**

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# Proven Underground Experts

The Epiroc mine truck **MT65** is an underground truck providing the highest payload in the mining industry at 65t.



**P**roductivity, efficiency and safety in haulage is paramount to any underground operation.

The underground environment is vastly different from surface operations. Travelling up and down declines inadvertently affect the performance of equipment and machines, in terms of load, gear ratios and braking capabilities.

Larger underground operations require higher-capacity equipment that work can seamlessly with existing mine design, haulage ways, different applications and varying product quality.

With loading and haulage being large contributors to cost per tonne, the smallest change by way of operator efficiency, cycle times and nominal payload can add up to big benefits in challenging and demanding conditions.

The Australian Mining Review spoke with Epiroc underground product manager Nick Iser about the MT65 mine truck, an underground truck providing the highest payload in the mining industry at 65t, but also engineered with safety first in mind, integrated functions for automation as well as being maintenance-friendly.

## Epiroc Underground Mine Trucks

With payloads ranging from 20t to 65t, Epiroc has a wide range of mining trucks to fit all haulage applications in underground mining and tunnelling applications.

Making the most out of the underground equipment – from large scale development to narrow vein mining – Epiroc can boost operations' productivity with specially selected mine trucks based on material density, mining techniques, payload targets, blasting, speed, haul road design and maintenance requirements.

The Epiroc articulated underground load-haul-dump (LHD) trucks have a high power-to-weight ratio for good speed on steep grades.

"We know the best way to continuously improve our MT range of trucks is to listen to our customers on any areas they want us to focus on," Nick said.

"This allows us to engage our engineers in Sweden to implement product changes and/or our engineers in Australia to carry out data analysis or field trials."

The MT65 is powered by a Cummins QSK19 EPA Tier 2 engine running at 760hp. It is a powerhouse designed for fast, productive haulage with a proven combination of drivetrain components. Maximum torque is 3084Nm at 1500rpm and the automatic six-speed transmission, powered by Allison 6625, is a standard in the MT65.

Dumping motions average an efficient 13 seconds from its 65t load capacity robust

dump box, while the integrated load-weighting system monitors the loading process.

With an 844l diesel fuel tank capacity and its high-performing engine, the MT65 can travel longer distance with higher ramp speeds while carrying a higher nominal payload capacity.

In addition to the traditional dump box, the MT range also includes options for ejector style dumping where the ore is pushed out, rather than the need to raise the tub. This is a big advantage when the dumping point is underground where there are restrictions in height.

Evolved from the earlier generation and very successful MT6020 that ran in Programmable Logic Controller (PLC) software, the new-generation MT65 continues the renowned features of its predecessor – compact design, powertrain, haulage capacity, power in tight spaces, front axle suspension system, fast dump cycles – and now runs on the computerised drive system, Rig Control System (RCS).

The RCS is used across all of Epiroc's range of products and, in the case of the MT65, provides service information with diagnostics logged and displayed on the screen inside the cab. The system prolongs the life of the truck fleet and enables the driver to control the operation.

With Epiroc's Certiq telematics solution, this underground mine truck is ready for automation using machine data that can be used to optimise production, maintenance and fleet.

Operators work in comfort with operational air conditioning, great steering sensation, front axle suspension system, comfortable seat with ergonomic controls and low noise levels reducing fatigue and enabling operations for longer periods.

All service points are easily accessible, including cabin electrics, air filters, jump start connector and batteries. The cabin is tiltable for easy service and the grill doors covering the engine open wide for easy cleaning.

One level down from the MT65 is the MT54 underground mine truck with a 54t capacity and a compact design. Next one down from the MT54 is the MT42, which comes as a 42t load capacity and has an innovative tailgate designed to make loading easier while minimising spillage and speeding up dump cycles.

The MT42s also come as battery-powered mine trucks for electric drive and zero emission, with no impact on ramp speed, accelerated dump cycles and increased overall productivity.

There are plans to upgrade the MT65 and MT54 to battery configuration in the next

two to three years with a potential hybrid solution for recharging.

These easy-to-operate mining trucks are built with reliable systems and components that have been trialled and tested during years of real-world experience.

Proactive with forecasting future trends, Epiroc conducts regular product testing and system upgrades to existing clients prior to permanent improvements across its range of products.

"Recent projects have included improvements to the driveline such as improved Upbox/Dropbox oil monitoring, options for the driveline gear ratio dependent on site requirements and reconfiguring the cooler packs for more efficient operation," Nick said.

Valuable add-ons are available, from modular equipment to automated functions, and machine design can be customised to fit specific needs. One thing is certain with Epiroc's mine trucks – their performance is reliable and robust in challenging conditions, with innovation driving the integration of smart technology into the existing range.

## MT65 Safety

The MT65 driver cabin is ISO ROPS and FOPS certified with three-point contact for entry and exit, spring-applied hydraulically released (SAHR) brakes and automatic brake-test with logging.

With open-door brake-apply function, the brake applies after three seconds in neutral mode or if the door opens at low speeds. Exterior beacon lights show current status of the machine with rear and right-hand side cameras for increased visibility in underground areas.

The MT65 also comes with a box-up stand, articulation lock and cabin tilt stand, while guard rails are also standard when accessing the engine covers.

## MT65 Comfort

The heavy-duty Kessler D111 front axle suspension system provides the operator superior comfort along with the ergonomically designed cabin which minimises operator fatigue.

Drivers sit on a forward directed, air suspended seat with two or three-point seat belt and a tilt-telescopic steering wheel, while the trainer's seat has a two-point seat belt. Sound level in the cab is below 80 dB(A) and there is an automatic climate control unit.

## MT65 Productivity

A 65t capacity with high speed in ramp and a load weighing system maximises filling and reduces overload. Smart functions on board can be activated through the Rig Control System (RCS) to protect components and systems.

The truck comes with a hydraulic operated fan and load sensing pumps for increased energy efficiency, including smooth and precise shifting with automatic lock up and built-in retarder.

## MT65 Serviceability

The maintenance-friendly design enables service work to be done safely, quickly and easily. Hoods and hatches open wide for easy reach with gauges onboard to effectively check pressures.

A tiltable cabin allows easy access to the engine compartment and onboard diagnostics continuously feed the operator with key data and machine status, while vital diagnostics are logged.

There is filter monitoring on a majority of filters and warning for low-levels on automatic central lubrication. **AMR**

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One level down from the **MT65** is the **MT54** underground mine truck with a 54t capacity and a compact design.



The 42t capacity underground mine truck **MT42** comes as either diesel fuel-powered or battery-powered for electric drive and zero emission.





**United. Inspired.**

## **Minetruck MT65**

Engineered with safety, productivity and operator comfort in mind for decline haulage in Australian underground mining operations. The built in reliability combined with higher capacity and high ramp speed leads to dramatically increased productivity.



[epiroc.com/en-au](https://epiroc.com/en-au)

# Going the Extra Mile

With more than 30 years of in-house experience on drilling techniques, maintenance and training, Ausmain has fast become renowned for its teams of drill specialists who are highly motivated, well-equipped and eager to share their technical expertise.

But just as important as the ability to deliver the highest level of maintenance, the privately-owned WA company prides itself on training and mentoring its clients, both domestically and internationally.

The company's trained technicians and specialists are led by General Manager Jonathan O'Reilly and Operations Manager Daniel McLeod.

Both men boast highly experienced mining industry tenures in their resumes.

Jonathan is a manager with a demonstrated history of working in the equipment, servicing and training industry, skilled in developing people and identifying high potential employees and actively training, coaching and mentoring them to develop their skills and capabilities to achieve high level results. His experience is in open pit quarries and underground mining industries.

Daniel is a maintenance industry professional who has held positions both in Australia and internationally as an expatriate. These roles have included placements in Saudi Arabia, various Central Asian countries and South America, where he was involved with technical training roles and supervisory positions. In Australia, Daniel has held positions ranging from drilling product specialist to management roles within marketing.

#### Training And Mentoring

Ausmain offers reputable and successful training and mentoring programs to

its customers, helping to boost safety, confidence and productivity as employees improve their skills and become more efficient as a result.

"We're starting to see a real shift in how quickly people are moving up into drilling rigs, for example," Daniel said. "We can assist in training them to become competent in their field."

"We are seeing many new starters coming into the industry. At one time it was common for people to have to spend three to four years on a truck before progressing, but these days they are moving more quickly through the different aspects of mining, even up to G2 level, a competency needed for statutory mining positions."

"We live in a society where speed is of the essence and companies want things to happen quickly; previously it was expected for employees to take a while to earn their stripes before moving to a more advanced role, but they are now doing this within 12 to 24 months."

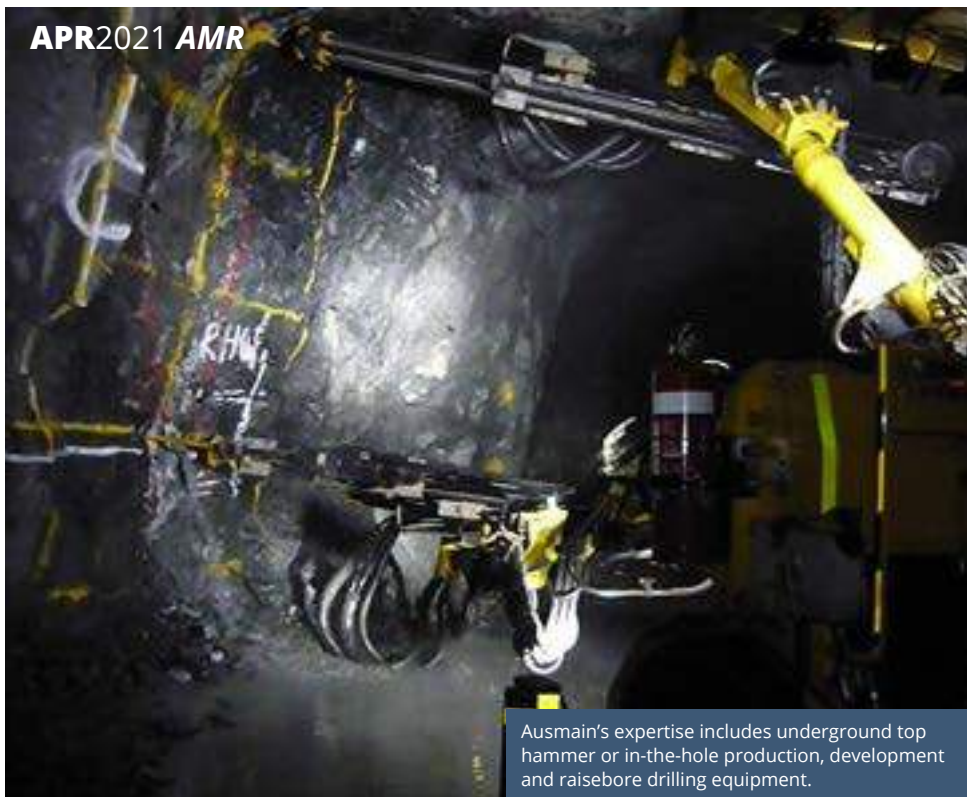
"So there are a lot of green starters and COVID has definitely had a lot to do with that. The number of FIFO workers from the eastern states has dropped off, companies have had to transition people quite quickly into roles they didn't necessarily have them earmarked for initially."

"Handling the COVID situation and navigating this has been a challenge for all companies," Jonathan said.

"It has meant putting processes in place to protect people in the industry and the community as a whole. As a service provider we have worked closely with our customers and our staff to ensure, first and foremost, their health and wellbeing is protected through this time, whilst also continuing to provide our services onsite."



Ausmain is currently operating on a full time support basis with several customers in the Goldfields region of WA.



Ausmain's expertise includes underground top hammer or in-the-hole production, development and raisebore drilling equipment.



Ausmain strives to provide a high level of service by engaging the best talent, and going above and beyond what our customers expect from a maintenance and training partner.



Jonathan and Daniel focus on working together with their clients to satisfy their requirements.

"We look to work with customers on their specific requirements, and customise training packages to suit, rather than supplying generic training packages," Daniel said.

"These packages are then sent to the customer for review and approval prior to undertaking the project.

"We believe this to be a positive approach as we aim to give customers value for money, rather than training for the sake of training.

"For example, if customers are looking for machine-specific training – whether that be machine familiarisation, or basic servicing through to in-depth training on a specific function – we look to provide a tailored package to suit that requirement."

All training is delivered by Cert 4 trainers and assessors and, where required, the use of a subject matter expert, to ensure the highest quality of training is delivered.

An example of this is the use of drill plan handling, auto boom positioning and navigation methods used on Epiroc production drills.

"This is something that is provided to already experienced drillers as an addition to their current skills set," Daniel said.

"We start off by understanding the workers' basic knowledge of the machines, understanding what they know, and their skillsets," Daniel said.

"Once we know that, we know where we can focus on to upskill them.

"We train about machines' control systems (eg (Can Bus) or Direct Control Systems) as well as the actual mechanics.

"We always get a big kick out of guys analysing a machine and diagnosing something correctly."

Training is carried both internally for Ausmain's own work force and also externally, when sought out by other mining companies to mentor their staff.

"It's not entirely out of the question for individuals to come in and ask about helping to upskill themselves," Daniel said.

Much of the onsite training is a one-on-one or with small groups.

"We can transition into classroom type teaching, depending on the customers' requirements and with our RTO (registered training organisation) partnership, we can provide nationally accredited certifications," Daniel said.

"Trainees can also acquire a VOC (verification of competence), which lets employers know they have a basic knowledge of practical/theoretical mechanics in production or development drills."

Development drills include mining jumbos and rigs for applications ranging from face drilling for small-scale mine development to large-scale tunnelling, while production drills are units used for long hole directional drilling.

Ausmain's overseas training programs have been affected by bans on travel due to COVID, but the company hopes to return to, and expand on them once countries get the virus under control.

"The focus is heavily on Australia at the moment, but we are definitely looking to overseas in a few years' time," Daniel said.

"For example, the Middle East is aiming for a 2030 target, so it is heavily focused on upskilling its own workforce and not bringing the high number of expat labour in, like it currently does. We plan on helping those countries and companies based there to do that."

Currently Ausmain also carries out remote work for overseas customers, involving diagnosing procedures for clients who can't fly in workers.

**The Maintenance Motto**

Ausmain began as a maintenance company, aiming to become one of the most respected suppliers in the global mining industry.

Its expertise includes underground top hammer or in-the-hole production, development and raisebore drilling equipment.

Backed by the solid background in the drill and blast sector and in all underground mobile equipment, as well as focus on quality assurance, Ausmain provides personnel for positions such as:

- Maintenance Supervisors and Trainers
- Heavy Diesel Fitters
- Automotive (light vehicle) Fitters
- Auto Electricians
- High Voltage Electricians
- Machine Operator Trainers

The company's philosophy is based on partnering with a select number of clients and aiming to offer a better service than its competitors.

"The key focus for us as a maintenance

provider is not just to be another contractor on site," Daniel said.

"The company sets itself apart by ensuring our personnel are continuously trained and upskilled.

"We strive to provide a high level of service by engaging the best talent, and going above and beyond what our customers expect from a maintenance and training partner.

"We continuously monitor our staff to ensure they perform their duties safely, to competent levels for the equipment they are maintaining, and liaise with customers.

"This shows customers that they are valued, that our staff are valued and are also accountable for the service they provide.

"We make sure they are mentored well and communicate with the client all the time."

Ausmain also visits customers often, keeping them apprised of work being carried out, and also updating on requirements and improvements if needed.

"We have several strings to the bow," Daniel said.

"We are looking to become a one-stop shop focusing heavily on new technology and the bare bones of hydraulics.

"While we are mechanics at heart, we aim to to evolve and move into different areas of industry, and become more than just a provider." **AMR**



# Best-Practice Water Management Plan

Simmonds & Bristow is the regional and remote water specialist.

It is vital to have a best-practice water management plan in place to protect public health as well as the environment.

The consequences of failing to provide safe drinking water can range from tummy bugs to long-term chronic disease and serious illnesses affecting a significant portion of the population.

The potential ramifications can end up being much worse than a few hours of downtime at a mine site.

It could easily force the closure of a mining camp for a couple of weeks, not to mention the onerous task of urgently seeking drinking water from elsewhere, especially given the remoteness of many projects.

A mining company or workers' camps may also face hefty penalties for failing to comply with regulatory requirements.

Simmonds & Bristow has been providing water management services in regional and remote communities for more than 55 years.

The company was formed in 1965 in South East Queensland but now has an Australia-wide footprint.

It has three arms that enable it to provide integrated water solutions: engineering and scientific services, operations and

maintenance team and a training arm.

### Holistic Approach

Senior Scientist and Trainer Travis Robinson said the close working relationships between these different departments enabled a collaborative and holistic approach to water management.

"It means we can leverage off the different specialists in these areas to discuss different options and provide support to the other units," Dr Robinson said.

As an example, originally Simmonds & Bristow were engaged to provide training to a Tier 1 mining company in WA but ended up developing a water quality management and risk assessment plan for the site as well.

"While on site, we recognised there were some real needs to improve management aspects of the water supply scheme and we were able to provide assistance with those requirements," Dr Robinson said.

"We also provide training under the national water package to those who are operating the treatment plants and the reticulation, and often it is the case that as we are delivering training, we talk about best practice and compliance with Australian drinking water guidelines.

"Frequently, we realise as a group that there may be some improvements for the

water supply scheme and we are able to offer that because of our consultancy arm, and our trainers are experienced with the operational and management side of things."

### No Job Too Remote

It is Simmonds & Bristow's willingness to provide services on the ground, no matter how remote the site is, which sets it apart from competitors.

"Due to our background and extensive experience and our willingness to go out to site, we are able to emphasise and understand the issues that regional and remote operators are experiencing," Dr Robinson said.

Regional and remote suppliers, including some mining organisations, do not always meet the best practice water management requirements.

"A lot of the time, it is not necessarily the mine's core business," Dr Robinson said.

"For the people handling water treatment, it might not be their only role so they might not have a full understanding of what the requirements are.

"A good example is for filtration when that is used for the control of pathogens, the set points for the filters have become a lot tighter over the past five or ten years."

A set point, or critical control point, on the outlet of the filter measures turbidity, which gives the water a cloudy appearance or shows up as a dirty sediment.

"This is an indicator of whether some of the worst pathogens can get through so if it exceeds that set point, it means water is potentially no longer safe to drink," Dr Robinson said.

"Sometimes operators rely on luck a bit for water provision and when that luck runs out, it can have a significant impact."

Dr Robinson said this was why it was important to engage a water treatment specialist that is up to date with evolving water management requirements.

"The management itself should be dynamic and part of a process that is reviewed and up-to-date with the latest best practice in water and waste management," he said.

### Staying On Top Of Legislative Changes

Simmonds & Bristow has the latest testing equipment to confirm filters are keeping pace with the tightening of requirements around critical control points, to ensure they are acting as an effective barrier against harmful pathogens, chemicals, dirt or other hazardous particles.

"This also assists adherence to the requirement to ensure there is adequate



The company's team of engineers and environmental scientists are ready to help clients get the most out of their water assets.



The company helps the regional, remote and small communities across the Pacific make good clean water.



The focus is proactive and preventative to ensure continual improvement to the maintenance and treatment systems at various sites.

chlorine or disinfection while maintaining adequate contact time for deactivation of pathogenic microorganisms (viruses and bacteria)," Dr Robinson said.

He said it was important to stay abreast of changes in legislation, such as in WA where instructions are being drafted for new regulations around drinking water, which will be provided to Parliament.

The regulations are based on a discussion paper, which reviewed the most effective options for managing public health risks associated with drinking water across the state.

Dr Robinson said the regulations were a work in progress but "are definitely a step in the right direction".

"There are mines which provide drinking water, especially in remote areas, who may not be aware of what the new requirements are going to be," he said.

"The requirements will be more prescriptive." In the past, the legislation has simply stated mining companies must minimise harm but part of the new requirements will place the onus on them to ensure the drinking water supply scheme complies with the requirements contained in the Australian drinking water guidelines.

Normally that will include the development

of a water quality management plan and also having procedures for reporting when water is not safe to drink."

WA Health is accepting submissions until May 21 on a different discussion paper on the management of public health risks from wastewater conveyance, treatment and disposal.

**Maintain On-site Training**

Simmonds & Bristow is the leading Australian Registered Training Organisation (RTO1735) providing specialty water industry training courses since 1991.

The company provides training to anyone involved in the operation or management of water or wastewater schemes including in network (reticulation or sewer), treatment and wastewater disposal.

"We are also able to provide training under the national water package to upskill water industry operators so they know how to operate supply schemes," Dr Robinson said.

"As far as the training arm, we are expanding and currently have five trainers and a range of different skills developed in the water industry over a long period of time.

"We can provide a range of different training programs schemes and we specialise in regional and remote areas, but we also do capital cities as well.

"We can do face-to-face training on site, we can do online virtual delivery and also by electronic correspondence.

"We have two offices in Australia but most of the time, particularly our trainers, work remotely.

"A real benefit is we are able to visit a plant or network and tailor training and management plans specifically to the needs of those being trained."

Dr Robinson said safeguarding public health is at the core of what S&B does.

"The implications, if something goes wrong, will not always be the worst extreme but when it does happen, it can affect extensive proportions of the population who can come down with an illness."

Simmonds & Bristow offers a range of services including the management of drinking water supply and wastewater disposal from a risk management perspective.

The company has the expertise to incorporate the principles of the Australian Drinking Water Guidelines (ADWG) and Australian Recycling Water Guidelines into water management plans.

It has been involved in the development of plans for a number of different organisations

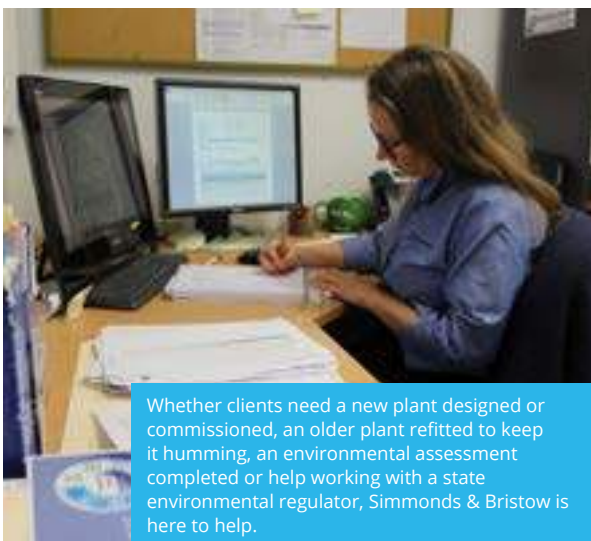
including water service providers such as councils.

It has extensive experience in different types of treatment technology and schemes while offering the full gamut of services including:

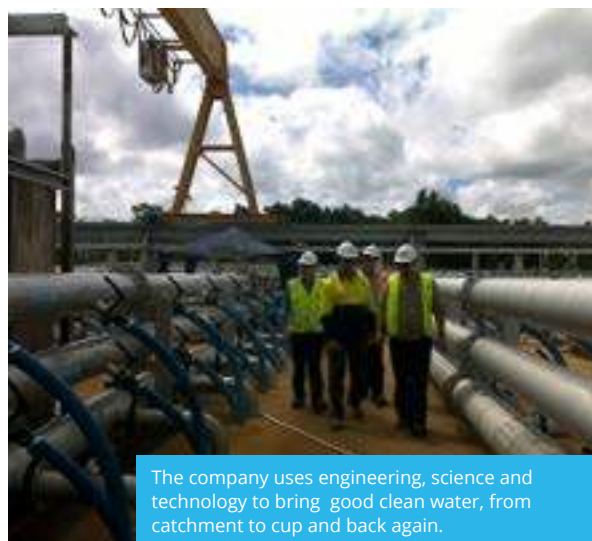
- Water sampling, testing and environmental monitoring
- Water and wastewater treatment design solutions
- Operation and maintenance of water and wastewater treatment plants
- Water quality sampling, testing and development support
- Treatment scheme repairs, optimisation and refits
- Water Industry Operator Training

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Whether clients need a new plant designed or commissioned, an older plant refitted to keep it humming, an environmental assessment completed or help working with a state environmental regulator, Simmonds & Bristow is here to help.



The company uses engineering, science and technology to bring good clean water, from catchment to cup and back again.



Let Simmonds & Bristow handle your water industry training needs



As a modular, adaptable unit, the Blivet is fully portable, fully package and completely contained to suit a variety of applications.

# Priming the Pumps

**P**umps play an integral role across the mining sector, essential in moving material from one point to another.

As a specialist Australian pump supplier, Kelair Pumps Australia has provided pumping solutions to many major mining organisations.

A host of factors determine pump requirements and system design at a mine site, including client preferences, site applications, nature of solids and fluids, distance, height and gradient, to name a few.

In this edition of Australian Mining Review, Kelair Pumps break down just how vital pumps are in a few key areas of mining operations.

## Key Applications And Types Of Pumps

Pumps work in a range of mining applications from water supply and boosting, wastewater and tailings transfer to abrasive sludge dewatering, mineral processing, slurry transfer and reagent (acid and chemical) dosing to name a few.

Some of the pumps used for these processes include centrifugal pumps, slurry pumps, submersible pumps, magnetic drive pumps and diaphragm pumps.

Although a range of pumps may form a part of the overall mining operation, we look at three significant areas of application within the sector.

## Dewatering

Dewatering is the process of removing groundwater or surface water from a site, generally construction or mine, to lower the water table.

While some industries only require dewatering at the start of a project, in the mining sector, dewatering is generally an ongoing activity and is critical to the safe and efficient mining process.

There are a range of pumps suitable for dewatering applications including self-priming pump sets, borehole pump sets and line shaft vertical turbine pumps.

According to Kelair Pumps Australia General Manager Myro Bratkovic, the ideal pump for harsh underground mine dewatering applications would be one that is lightweight, resistant to corrosion, easy to maintain and able to pass large solids through the system.

Myro said the Sandpiper HD20F is the next generation in mine dewatering as it has the advantage of being both a flap-check valve pump as well as having a non-metallic body.

"This design combination is quite unique and has all of the advantages of a Sandpiper metallic flap valve pump, while being free from corrosion," he said.

The Sandpiper HD20F has a range of features making it a standout choice.

Features include flap-check valves allowing access to the pump without dismantling it

allowing for easier and quicker maintenance, unique side access ports not found on any other dewatering pump, and significant energy saving due to the very low air consumption in comparison to other major brand 2-inch plastic pumps.

According to Myro, the Sandpiper HD20F was designed around the existing metallic Sandpiper Heavy Duty HDF2 which has been around for several years suggesting the new design will have longevity and stand the test of time.

## Wastewater Systems

Mine sites that have any amount of workers on-site need efficient, safe and straight forward sewage treatment systems.

Kelair Pumps is revolutionising sewerage treatment with the Kelair-Blivet, a system that has a simple efficient.

The Kelair-Blivet is a stand-alone packaged sewage treatment plant is a low energy, high performance system that is installed easily, straightforward to run and quickly turns effluent into usable irrigation water.

Suitable for mining operations, the modular unit features a completely adaptable design to suit a variety of applications and has a footprint of only 10.9m x 2.27m.

Myro said the Blivet is fully portable, fully packaged, and completely contained.

The compact pre-fabricated and portable package makes the unit suitable for temporary or permanent installation on existing or greenfield sites and easily removable for re-siting.

Multiple units can be installed in a staged manner to cater for increased demand, such as the arrival of construction crew as a project expands, maintenance shutdowns,

or the discovery of a new ore body.

This unique system comprises primary settlement sludge storage, aeration via the aerotor drum system, an aerobic zone, and final settlement (humus tank).

"The simplicity of the system is the key to its success," Myro said.

"Low power use and simple installation makes this an attractive system, especially for remote locations."

## Fire Safety Pumps

Fire pumping systems come high on the list when considering essential equipment for a mine site.

Although mining operations across the sector can vary greatly with each operation having individual requirements, all sites generally have a large workforce and costly operation critical equipment in harsh conditions that are in vast or difficult to access environments.

A fire on site not only puts people's safety at risk but may have significant financial ramifications across the entire mining operation, hence the importance of a site-specific, complaint fire safety system.

With a dedicated Building and Fire Division, Kelair Pumps understands the importance of understanding the individual mining operation and safety on site.

The extensive range includes diesel and electric pump sets for fire hydrant, sprinkler, combined hydrant/sprinkler, deluge, foam, water mist and hose reel applications in end suction, horizontal split case, multi-stage, multi-outlet, vertical turbine and gear pump configurations.

Kelair Pumps Australia Regional Sales



The Sandpiper range of plastic-bodies (non-metallic) flap-check valve pumps are ideal pumps for mine dewatering applications: one that is lightweight, resistant to corrosion, easy to maintain and able to pass large solids through the system.



Kelair's fully packaged fire pumpsets are factory tested as a complete assembly to the requirements of ISO9906 Grade 1U and AS2941.



Kelair Pumps fully support customers from initial project conception consultation to installation and beyond.

Manager Michael Charnley highlighted Kelair Pumps' containerised units as a key fire safety choice for mining operation.

"Some of these fire pumps are placed into containers, including sea containers, which require a high level of engineering to do based on what has to be built; it's robustness and durability; and the delivery over long distance to, say, the Pilbara, which required a fairly high-spec unit," he said.

Offering a compact, pre-fabricated and complete packaged solution, these containerised pump sets are simple to mobilise and transport. All packaged units are delivered to site and Kelair offer on-site commissioning and testing together with on-going field support and maintenance for the life of the product.

Kelair Pumps' fire safety pump sets are fully-compliant with each mine site's requirements and are used across the country by major mining companies including Rio Tinto, BHP, Forescue Metals and Glencore.

**Selecting The Correct Pump**

Understanding the area of application will assist in ensuring the correct pump is selected for the operation.

"An in-depth look at the application of the pump and its uses requires careful consideration of the following: what does the pump have to do, where will the pump spend its time, how will we manage the external factors and environment," Michael said.

In general, the correct pump will be one that is reliable, efficient and durable – all factors paramount to the smooth running of multiple, interconnected systems of a mining operation.

"The more we can spend talking to our clients about what exactly their pumps are

going to do, the more likely we are going to get an efficient solution. It's really about sizing the pumps properly for the job. That's what makes the difference to efficiency," Michael said.

Efficiency is simply about getting the most work done for the least possible power and maintaining a reliable pump.

When pumps are running at a point where most of the energy is spent as either heat or mechanical stress, and where only about 30-40% of the energy goes into what it is supposed to be doing properly, the rest of the energy goes somewhere else in the unit or system, leading to breakage or failure.

"When a pump runs efficiently, you have a system that is running the right way with everything balanced, so almost by default, you'll have a more reliable system. Reliability in many ways is more important than efficiency. Usually when you achieve efficiency, you achieve reliability," Michael said.

Why is selecting the correct pump is so important? Unreliable pumps are expensive. Breakdowns and repair time will impact operational performance, operational time and costs. Correct selection of pumps for the application is vital.

**Kelair Pumps**

Since 1975, Kelair Pumps has specialised in providing pumps and pump packages to the mining operations across Australia.

While the mining sector has diverse needs, Kelair Pumps Australia has the diverse range, first class service and expert knowledge to meet any mine sites pumping requirements.

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# Reliable, Responsive Recruitment

**BeSafe:** Protech's highest priority is ensuring a safe work environment for its employees and clients.

Traditional recruitment is typically associated with high quality people at higher costs, while labour hire is associated with flexibility and responsiveness but can be hit-and-miss.

Protech has taken the best-of-both-worlds approach to provide a flexible and responsive solution for mining companies and mining services businesses.

The Australian Mining Review spoke to Protech managing director Marc Meili about how the company uses the Co-Creation methodology to maintain a consistent high standard of people while providing clients additional value.

**Co-Create**

With calls for increased diversity in the workforce, alongside building a pool of skilled workforce for the future, businesses require a labour hire partner that not only recruits but also works with them to plan their specific workforce requirements.

Workforce planning is not a one-size-fits-all process. Each business or project requires a different scope, plan and solution.

Whether it is attracting and retaining the right fit for blue- or white-collar roles, or increasing female, Indigenous, apprenticeship or traineeship participation in a client's workforce, Protech will take the time upfront to understand a client's needs, objectives and challenges and create a detailed scope.

Marc said the company understands the mining industry is unique and that there are vast differences across the different subsets within the industry.

"This means that specialised skills, systems and services are required to provide the high level of service demanded," he said.

"As a proudly Australian-owned business, with a true national footprint, Protech is able to hold the specialised regional understanding of the subsets within the mining sector.

"This makes an enormous difference when working closely with our clients, to understand the regional market and requirements and be there, on the ground, with the clients."

Once the plan is implemented with the client, Protech will manage the solution and

review the performance against key project metrics.

No role or outcome is too challenging: from diesel mechanics to dump truck operators, from fabricators and boilermakers to mobile plant technicians and welders, from contract-based administrators to long-term project managers, Protech works with clients in scaling up or down their requirements.

The team applies its expertise to specific situations, including reaching diversity targets and provides a superior solution which leads to a more effective outcome.

"Protech sees the need to put people first in the mining sector and with Protech's purpose: be a positive influence in people's lives it means there is strong alignment," Marc said.

"To us, this means working very closely with our field employees and clients in every aspect of the engagement. "Safety and communication is at the core of every interaction.

"We are large enough to engage the specialised skills in-house required to attract and work with quality people and we are agile enough to be able to embrace developments in technology and workforce solutions models in conjunction with our clients.

"Having flexibility in our delivery model is key when working in a mature and savvy market which is embracing technology, we are able to work with our clients to assist in reaching targets in safety, diversity, productivity, efficiency and evolution of the workforce."

**Protech Certified**

Quality people are the key to the success of a project or business.

Finding quality people is a profession. An experienced labour hire partner understands the industry you are working in and will consistently deliver high-quality people.

Protech Certified, a mark of quality, is a stringent methodology created and developed over the past decade to find and qualify the best people in the industry.

When businesses see the Protech Certified badge, they can be sure they are getting the best person for their project.

Not only does the badge mean that Protech employees have passed the rigorous 10-step Protech Certification process, which is an extensive selection process ensuring only the best applicants make it through to client projects, but that they have also been identified as a perfect fit for the project.

**BeSafe**

Protech's highest priority is ensuring a safe work environment for its employees and clients. The safety management approach consists of three pillars: proactive safety processes, safety management processes and ongoing safety checks.

**Proactive Safety Processes**

The proactive approach to safety begins at the project level. Working with clients, Protech determines management commitments and the KPIs for each project to ensure a set safety standard is maintained.

All Protech Certified staff assigned to the project are trained and tested on safety procedures prior to commencing work. These tests allow Protech to determine a candidate's physical abilities and constraints as well as their attitude towards safety.

Before commencing a project, employees are provided with an induction covering the client's project-specific on-site safety induction.

**Employee Safety Testing**

Physical Agility Testing

To determine an applicant's ability to fulfil the physical requirements of the job for which they are applying for, Protech uses leading safety technologies including musculoskeletal testing, known as Protech Screen-SAFE® and Protech Medequest®.

Innovative Safety Technology

Protech is always on the lookout for innovative ways to improve its services, especially around safety.

Working with Cernova, Protech is testing technology which can assess an employee's mental resilience and provide insights into behaviour patterns in high pressure work environments. This will allow Protech to better manage risks and improve the safety, support, and wellbeing of employees.

**Indigenous Employment and Business Procurement**

Partnering with Dreampath to provide Indigenous employment opportunities,

Protech helps to achieve a diverse and inclusive workforce.

With the continued underrepresentation of Indigenous men and women within the national workforce, Protech's goal is to help close the gap by providing employment opportunities and assisting clients in meeting their Indigenous employment targets.

Dreampath employs Indigenous men and women with a 90% retention rate. Protech's six-stage employment process focuses on every stage of the employment lifecycle; from recruitment and training through to placement and mentoring. This ensures the highest quality people every time.

Meeting minimum spend requirements for Indigenous businesses on projects can be challenging when businesses are also trying to satisfy their project needs.

Dreampath is a national Supply Nation-Certified Indigenous labour hire and workforce solutions provider. Formed as a partnership between Protech and the 100% Indigenous-owned Blackrock Industries, Dreampath utilises the Co-Create approach to establish employment opportunities that support the career aspirations of First Nations People across a broad range of industries throughout Australia.

**Women In Non-Traditional Roles**

Working towards gender diversity across all industries, Protech can create a program to increase women participation in the mining and construction industry.

Protech designs a plan in conjunction with businesses to attract, train and develop women in the industry, therefore diversifying the client's workforce.

As an example, a pre-employment program that is run in partnership with RoadTek provides women with an overview of the industry and the career paths available to them. Women are given the opportunity to acquire the skill-set to become operational effective immediately in the industry through the completion of the Cert II Civil Construction - Resources and Work Infrastructure.

Once employed, female applicants have access to ongoing mentoring programs through Protech's partners, some of which include the National Association of Women in Construction.







**Co-Create:** Protech take the time upfront to understand a client's needs, objectives and challenges.

This program has been successfully run annually since 2017 with 90% of applicants continuing to work for RoadTek and/or with other companies.

**Group Training Organisation (GTO)**

Protech is a Group Training Organisation (GTO) and provides apprentices and trainees, including ongoing support with administrative, mentoring, and safety management.

**The GTO Model**

As a GTO, Protech is the legal employer of apprentices and trainees. Its team is responsible for carefully selecting the apprentice or trainee through the Protech Certified Process, managing all training activity, completing the relevant paperwork for wages, allowances, superannuation, workers compensation and employee benefits, and rotating the apprentice between different businesses (when

required), to ensure that there is a broad range of training and experience.

A GTO is a corporation established predominately to provide training and employment opportunities. GTOs employ apprentices and trainees and are responsible for ensuring that those employees receive suitable training and experience.

To achieve this aim, the GTO will find a suitable 'host' employer for each apprentice or trainee to work with daily.

**Why Choose Protech for Trainees and Apprentices?**

Offering the same quality that people expect from Protech, apprentices and trainees are all Protech-Certified, ensuring clients receive the same quality of people solutions at all levels. The company provides ongoing support and mentoring. Ongoing support is provided throughout the

placement, including mentoring and safety management.

Protech offers this pastoral care with the aim of guiding trainees and apprentices through important educational milestones, as well as facilitating higher learning in the form of dual trades/qualifications and additional certifications.

In doing so, its trainees and apprentices are equipped with the support they need to succeed in their business and throughout the remainder of their working career.

Leave the administration work to Protech. As the primary employer, it handles all of the administration, so clients do not need to worry about the paperwork, workers compensation, or superannuation.

**About Protech**

Protech is proudly Australian-owned and

has been operating for over 15 years.

It is an AusOwned-certified business (AO#05032). With Protech's national footprint and presence, each client receives a personalised solution no matter where their business or project is based around the country.

There are more than 20 corporate offices and satellite locations, covering all metropolitan, remote, rural, and regional locations across Australia.

The same level of service nationally is guaranteed as Protech does not use third parties or subcontractor organisations to deliver core recruitment services. **AMR**

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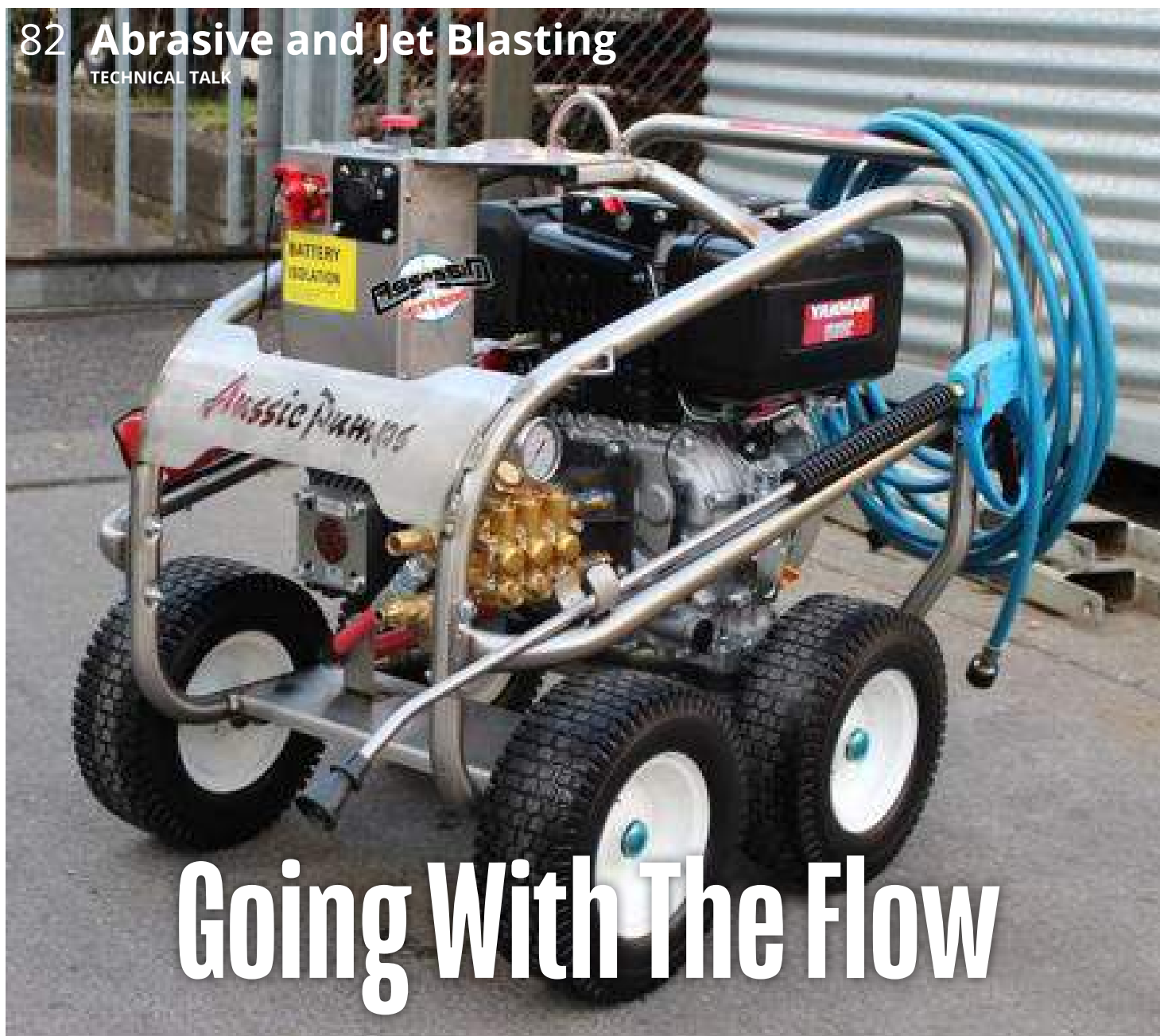
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# Going With The Flow

The most popular wheeled model in the range is the Yanmar Scud unit, delivering 4000psi pump pressure with an output flow rate of 13l per minute for fast and effective general cleaning on mine sites. This unit comes complete in full stainless steel frame and anti-vibe mounts, steel wheels with flat free tyres. Gearbox driven and with all the mine spec features, the Scud is a workhorse.



Trailers are always popular and easy to use, with plenty of storage: great for moving around sites when needed. Heavy duty gal trailers (both hot and cold water) can be designed in any way that is required.

If there are any lessons to be learnt from the coronavirus pandemic, it's the importance of adapting no matter what the circumstance.

It is this belief in the need to move with the times that has underpinned Jettors Assassin's new range of diesel powered hot and cold-water high-pressure cleaners.

The new range of machines, called mine spec blasters, are available with pressure up to 7300psi and flow rates up to 31l per minute to suit a wide variety of cleaning applications.

Applications include general cleaning on mine sites, and cleaning on machinery wash downs, service stations, concrete, heavy industrial, graffiti removal and even hydro demolition.

According to Assassin Jettors manager Gee Taylor, the heart of the range is the pump and engine package.

"We only use Bertolini heavy duty piston pumps and Yanmar water cooled diesel engines, which are perfectly matched," she said.

The combination means the machines are of a superior quality making them ideal for long, trouble free working lives in the harshest of conditions.

It also comes direct from Aussie Pumps, which has long played a prominent role in Assassin Jettors' rigs.

According to Gee, Aussie Pumps continues to be the first option due to their high-quality and the good relationship between the two companies.

The ubiquity of Aussie Pumps across Australia also means that it is a simple task to obtain spare parts or undertake repairs.

"If an Aussie Pump is the one that fits we would use it, depending on what the requirement is, and 99% of the time, we do use different products from Aussie Pumps," Gee said.



The Assassin Extreme has a heavy duty gal frame skid bas with multiple fork lifting points and integrated bunding, a super reliable water cooled Yanmar engine 3 TNV88, 50lt fuel tank, and 60lt stainless steel break tank with low water cut out. The full mine spec features deliver 4000psi pump pressure with an output flow rate of 13l per minute for fast and effective general cleaning on mine sites. The unit comes complete in full stainless steel frame and anti vibe mounts, steel wheels with flat free tyres. Gearbox-driven and with all the mine spec features, it can be supplied at 5000psi @ 25lpm or 4300psi @ 31lpm.



The heavy duty gal frame **Assassin Cube** has multiple fork tyne slots, suitable for a Cat loader, and it's easy to move on site and can be stacked too (dry only). It features a large 1000lt water tank with float, drain and low-level water sensor-, high- and low-pressure hose reels and again full mine spec features. It comes with a 4000psi Yanmar 10hp engine at 13lpm.

"We like them because we can back them with spare parts and it's just easier to use Aussie Pumps than 27 different brands for the parts we need.

"Aussie pumps are also reliable; they're the best of the best."

Each unit is overpowered to ensure long life with the three-cylinder diesel engines only running at 2200rpm under full load, which is where the Yanmar diesel motors are most efficient and where they produce maximum torque.

Assassin Jetters mine spec blasters come standard in full mine compliant specification, so they can include an emergency E stop, dual pole lockable battery isolators, double insulated wiring, a flashing safety beacon, and a bunded pump or engine set.

Other features include a 2kg fire extinguisher, Hi-Viz class 1 reflective tape that is fitted to the frame, a bunded drip tray, a dry cell battery and a spark arrestor.

#### Introducing The New Range

According to Assassin Jetters sales and customer service manager Bruce Hulm, the most popular wheeled model in the new range is the Yanmar Scud unit.

The Yanmar Scud unit delivers 4000psi pump pressure with an output flow rate of 13l per minute for fast and effective general cleaning on mine sites.

The unit comes complete in full stainless-steel frame and anti-vibration mounts and steel wheel with flat tyres.

"It's also gearbox driven and is up to mine specifications, meaning this diesel mine spec scud is an absolute workhorse and it's clear why it has proven to be so popular across mine sites around Australia," he said.

The next level up is the Assassin Extreme skid, which is a heavy duty gal frame skid bas with multiple fork lifting points and integrated bunding.

It has a super reliable water cooled Yanmar engine 3 TNV88, featuring a 50l fuel tank

and a 60l stainless steel break tank.

The Extreme skid model features full mine specifications and delivers 4000psi pump pressure with an output flow rate of 13l per minute for fast and effective general cleaning on mine sites.

Additionally, the Assassin Extreme skid comes complete in a full stainless steel frame, anti-vibration mounts and steel wheels with flat free tyres.

On top of being gearbox driven and including all the mine specification features, the company can work to suit different needs by supplying a 5000psi at 25l per minute or 4300psi at 31l per minute, depending on individual requirements.

According to Bruce, Assassin Jetters is also ready when it comes to cubes.

"If we jump to the Assassin Cube, we've got a heavy duty gal frame cube with multiple fork tyne slots, which is suitable for a CAT loader," he said.

"It's easy to move on site and when it's dry, it can be easily stacked."

The Assassin Jetters features a large 1000l water tank with float, drain and low-level water sensor with high and low pressure hose reels.

This too features the full mine specifications and has a 4000psi Yanmar 10hp engine at 13 litres per minute.

#### Custom Designs For Every Requirement

Although the team at Assassin Jetters consistently maintains a high-quality approach, that does not mean a cookie-cutter approach.

Bruce said every product is custom designed based on client requirements.

"Here at Assassin Jetters we listen to customers needs, then go about designing a unit just for them," Bruce said.

"We custom build everything to order so you get exactly what you want and need in

every build.

"Trailers are always popular, easy to use, plenty of storage great for moving around sites when needed."

Heavy duty gal trailers, with both hot and cold water, could be designed in any way that was required.

"We have been building a beautiful diesel hot water trailer with 1000l tank and it has a recovery unit to recover and reuse the water," Bruce said.

"It's an awesome design for cleaning when water flow can be an issue.

"We can basically do anything a mine requires down to parts, a video on how to repair the parts, down to actually building the thing and getting it on to site. We can do it all.

#### Service Beyond Sales

Bruce said the team at Jetters Assassins were always proud of the units they delivered, but their services never stopped at the point of sale.

"After sales service is where Assassin Jetters stands out," Bruce said.

"Not only do we have more than 30 years' experience in high-pressure water blasting behind us, but as a result of our dedication, we have developed and implemented new age technologies."

While innovation had always been important to the team at Assassins Jetters, the coronavirus pandemic had highlighted how important it was to continue developing.

According to Bruce, if COVID-19 has taught the team at Assassin Jetters anything, it has been how necessary it is to move with the times.

"Just because mine sites are usually not within reach doesn't mean we can't help out when it comes to running issues, repairs and servicing," he said.

"Full-service kits can be sent out and then

we can use technologies such as zoom, WhatsApp or facetime with mechanics to go through any issues or areas of concern with them in real time."

Bruce often spends time working remotely with mechanics onsite to ensure the best outcomes.

This new style of customer support allows Bruce to see and diagnose any problems, and guide repairs while maintaining a strong customer relationship.

"When we work in this manner it becomes the same as if we were there; it's just like the machine is here with us, but it could be in the top end of Western Australia, down in Tasmania, in the coal fields, or anywhere else across the country," he said.

"The best part about this approach is that regardless of the pandemic or its impact, we can still be working with our customers to ensure they get the best out of their units."

#### Assassin Jetters' History

Assassin Jetters has developed from early beginnings to its current position as a leading supplier of all types of high pressure drain clearing water jetters, jetting hose, jetting nozzles and more.

During this time, Assassin Jetters has designed and manufactured a wide range of vehicles and companies whatever the situation.

Assassin Jetters is owned and managed by former plumbers who had extensive practical experience in using high pressure water jetters, cameras and location equipment in the blocked drain industry.

The team prides themselves on their ability to manufacture and distribute only the highest quality water jetters, jetting nozzles and jetting hose in the country. **AMR**

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# Downtime Reduction Enters the Ice Age

**A**brasive blasting is frequently used to clean or decontaminate equipment and assets, usually carried out by propelling a stream of abrasive material at high speed against a surface using compressed air, liquid, steam, centrifugal wheels or paddles. And on many occasions, caustic, solvents and other harmful chemicals are used.

But now an Australian-owned, Perth-based company is revolutionising the procedure by using a recycled by-product of industry, incorporating dry ice in the process. It is essentially an environmentally responsible offering.

Vortex Dry Ice Blasting is a dedicated surface preparation company specialising in dry ice blasting (Cryogenic Surface Preparation), with more than 10 years' experience in decontamination work, industrial cleaning, surface preparation, restoration and disaster remediation work.

Vortex technical manager Richard Mallett spoke to *Australian Mining Review* about their dry ice method.

## Aeronautical Origins

Dry ice blasting depending on the requirement is both a low and high pressure cleaning method where small dry ice (pure carbon dioxide, or CO<sub>2</sub>) pellets are accelerated in a pressure air stream and directed at a surface in order to clean it.

The procedure is an alternative method of surface preparation developed in the aerospace industry.

"Back in 1950s, the process was developed by an engineer from Lockheed, who was involved with coating developments and integrity of aircraft airframes," Richard said.

"Traditional abrasive and solvent was causing a number of issues, such as corrosion and warping and stretching of panels, not to mention large amounts of waste to clean up and dispose of safely.

"He devised a system that, at the time, was a size of a semi-truck (today our machines are 70kg and stand waist high) that produced CO<sub>2</sub> pellets, or dry ice."

CO<sub>2</sub> liquid is converted into a snow and this process causes the temperature to drop to -79.4°C. At this time the snow is extruded through a die plate compressing it into an extremely dense solid pellet.

"The kinetic energy of the pellets is created by introducing the pellets into a stream of compressed air," Richard said.

"Then sublimation of the pellets occurs when they impact a surface."

The term **SUBLIMATION** refers to the way dry ice turns directly into gas rather than a liquid as it breaks down. In other words, there is no mess and zero secondary waste to clean up.

"You have the cryogenic effect when the pellets act on the coating of a substrate that it hits, it works to superchill the surface as fast as it can," Richard said.

"When you freeze something that quickly it shrinks, which then affects the molecular integrity of the coating.



Vortex Dry Ice Blasting specialises in dry ice blasting.



"The bond between the coating and the substrate is also affected, and after shrinkage, the adhesion between the two weakens."

Each of the pellets is about 3mm in diameter and approximately 5mm long (about 700 times smaller than the volume of gas they contain) and fired in streams of air, creating little grains of stored high energy.

"The sublimation rate is huge so we have a massive CO<sub>2</sub> expansion," Richard said.

"It creates a powerful action weakening the contaminant or coating, and unlike abrasive blasting which pits or damages the substrate, dry ice is non-abrasive, it will not damage or change the surface. It supercools it, and as the gas expands behind the coating by a factor of 700, it essentially pushes it off from behind.

"Essentially dry ice blasting is using CO<sub>2</sub> pellets to blast surfaces to remove coatings or contamination ready for NDT non-destructive testing, or recoating, or simply to clean products covered in unwanted contaminants."

It delivers safe and effective solutions to problems that cannot be addressed by traditional abrasive blasting methods, hydro blasting or chemical applications.

## Clean and Green

Dry ice cleaning is a veritable green process that uses small pellets of recycled CO<sub>2</sub> solids to clean a surface.

The pellets sublimate into CO<sub>2</sub> gas, which is absorbed by trees and plants and converted into carbon (plant growth) and oxygen.

"We don't 'make' the CO<sub>2</sub>. It is a waste product and we typically capture it from chemical production industries," Richard said.

"In effect we give CO<sub>2</sub> another life before it goes into the atmosphere; so rather than

using a caustic solvent or a media that itself will become a waste contaminant, we use something already created and then it turns back into CO<sub>2</sub> and dissipates into the atmosphere to feed new growth."

## Less Downtime - Vortex Can Help

The term downtime is used to refer to periods when a system is unavailable.

Downtime or outage duration refers to a period of time that a system fails to provide or perform its primary function. Reliability, availability, recovery, and unavailability are related concepts. The unavailability is the proportion of a time-span that a system is unavailable or offline.

This is usually a result of the system failing to function because of an unplanned event, or because of routine maintenance (a planned event).

With the dry ice method, companies can clean their plant and equipment in situ, and often on-line as well!

"There is no longer any need to disassemble, mask, and then reassemble your assets," Richard said.

"Downtime is dramatically reduced, labour costs are reduced and productivity increased.

"For example, the cleaning can be done during daily maintenance schedules, such as during refueling when a machine is sitting there for 45 mins.

"During this time, the dry ice procedure can be done, with the downtime already catered for.

"This is a big benefit: the fact that you can restore or clean something or remove a coating without taking it to pieces, without having to remove it and take it to another place, which could involve transport damage or loss, and of course the time involved. It will result in a significant saving for many."

In other words, Vortex can reduce risks of downtime by introducing affordable ongoing maintenance cleans.

This will reduce build-up of contaminants that are known to cause many wear and tear issues with critical parts such as bearings, or loss of power generation through carbon build-up.

And it's not just bigger equipment. The Vortex dry ice system can be used to clean electronic componentry, such as motherboards and computers involved in controlling trucks and other machines.

"The red dust at the mines can contaminate electronic circuits," Richard said.

"Typically they are hand cleaned with solvents, which can cause damage and is often time consuming.

"With our Dry Ice Dusting method, we fracture the ice before it leaves the gun into sugar granule sizes and very gently apply across the surface."

And because the ice sublimates immediately upon contact, the process is dry, non-conductive and safe for electrical applications.

All wiring and sensors remain in place and do not need to be covered or removed.

"We have been seen to clean in 15 seconds a process that could take up to 35 minutes manually!" Richard said.

He cited an example of a fire event at a mining company a few years ago, which resulted from a lack of budgetary priorities towards equipment cleaning.

"There was a thin layer of dust on the insulators. The fire led to a loss of \$1.8m a day at the site, and a recommissioning of a whole new bank of switch breakers. Over the period of about six to eight weeks, the incident cost up to \$140m," he said.



CO<sub>2</sub> liquid is converted into a snow and this process causes the temperature to drop to -79.4°C. At this time the snow is extruded through a die plate compressing it into an extremely dense solid pellets.



With the dry ice method, companies can clean their plant and equipment in situ, and often on-line as well.

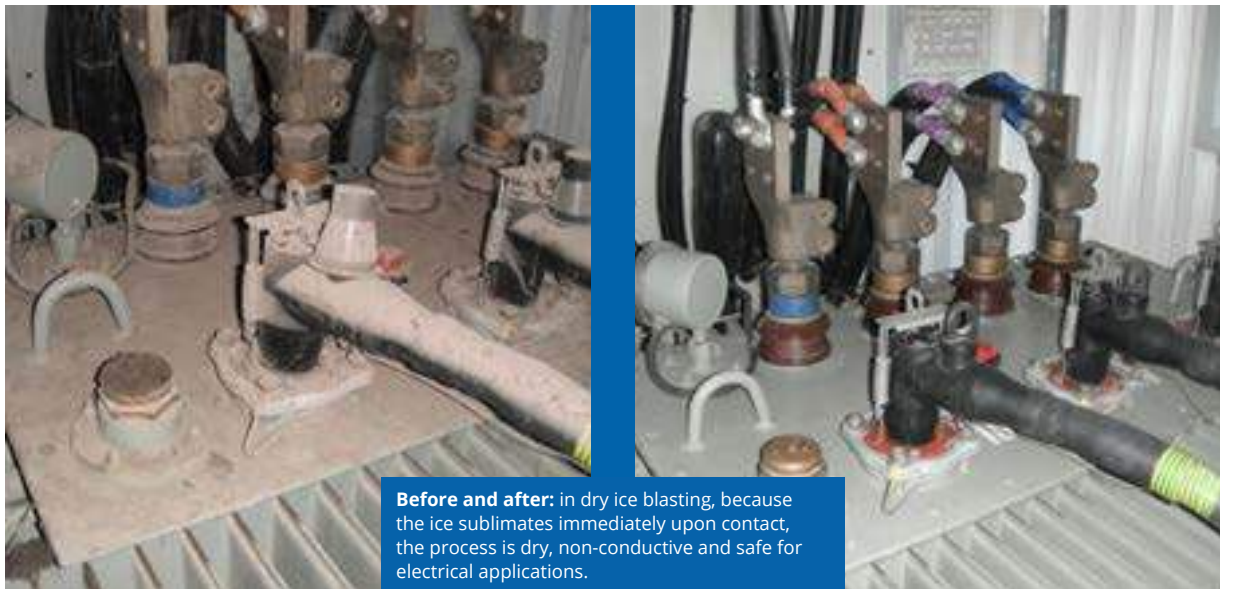
## Testimonials

"You gave us excellent service, were very accommodating when it came to mobilising to our site offshore in an emergency situation and every stage of job execution was risk assessed very thoroughly and performed very safely. We simply could not have re-commissioned and energised our previously damaged switchboards without the level of cleaning work you performed that was required for us to gain satisfactory insulation resistance results across our distribution system. It was worth every dollar when we compare the decrease in production downtime by using your services compared to other cleaning methods. Many thanks for your help."

**Vaughn Bell E&I Engineer**  
Triangle Energy

"Planning for all tasks was very good. JSEA's and very easy communication prior to attending site removed many obstacles. Whilst on site, Vortex displayed excellent adherence to site and their own HS requirements. All work was barriered off and signage displayed providing clear warnings for other contractors. The quality of the service delivered was of a high standard and provided good results over many applications. Vortex significantly reduced the overall workload through their specialist service of dry ice blasting."

**Ken Ferguson**  
HSEQ Compliance, ENGIE



**Before and after:** in dry ice blasting, because the ice sublimates immediately upon contact, the process is dry, non-conductive and safe for electrical applications.

On the mines, dust will always collect in equipment.

"The dry ice essentially goes in and as it expands and helps to dislodge and evacuate dirt from affected areas and gives machinery a longer life span," Richard said.

"Decision-makers who understand that regular cleaning is a worthwhile investment are the people we would love to talk to.

"It's like an insurance policy against unexpected stoppages or costly downtime events because of contamination or structural weaknesses they haven't identified."

### No Waste, No Wear

Frequently the "clean-up" from traditional methods is worse than the cleaning itself. Dry ice solves that problem by eliminating secondary waste, as the pellets simply disappear as a small amount of gas with no secondary waste to remove.

Unlike abrasive blasting which can be aggressive and will abrade and change the substrate, dry ice is non-abrasive, lifts contaminants and or coatings away and does not change the substrate structure or finish.

This means that dry ice will not wear or damage parts, plant or equipment, extending the useful life of equipment and minimising the chances of defective products.

### Mixed Media

"Our machines can also mix other media such as super fine glass beads with the dry ice pellets to give a diverse range of finishes and profiles, providing a white metal finish ready for NDT or coatings where necessary," Richard said.

"The process is also effective in removing carbon deposits from electrical cabinets and other surfaces, removing most of the carbon and odour.

"The effectiveness and speed of removal is determined on how porous the substrate is.

"We are also able to remove lead paint, asbestos and mould spores. In conjunction with our licensed partners, we can encapsulate work areas and remove toxic waste on completion."

### Commitment to Quality

Vortex's fully trained specialist mobile crews undertake scheduled maintenance programs and are also able to deliver around the clock, anywhere across the country both on and offshore.

It provides the ability to customise and engineer equipment and attachments to meet the specific requirements of clients.

"An example would be if you had an asset with difficult access, we can produce custom-sized and shaped applicator nozzles to deliver the required result," Richard said.

"We can even blast around corners! We are also able to increase our reach with extended blasting rods, custom 3D printed nozzles and we are highly experienced in operating in confined spaces.

"We aim for sustainable growth through superior customer service, innovation, quality and commitment to the provision of customised dry ice blasting solutions whilst continuing to explore new opportunities.

"Our dedicated team of business developers and technicians will hone our product to suit the market requirements of Australian industry.

"We listen to clients in developing solutions designed to overcome their problems, by developing smart and specific processes to suit."

### Dry Ice Supplies

Vortex uses only the best quality dry ice available to achieve the highest results possible with this revolutionary,

environmentally-friendly, high pressure cleaning method.

Dry Ice WA, based at Myaree in WA, specialises in the production of high density 3mm dry ice pellets specifically designed to provide the best performance for dry ice blasting.

These thin straw-like pellets are also widely used in food production and transportation.

Dry Ice WA is also well established in the WA marketplace as a trusted supplier of high density, food grade dry ice as well as nugget form dry ice for a variety of mining and industrial and commercial applications.

The company also produces 10mm pellets, which are larger nugget styles used often for special effects, transportation, cooling and shrink fitting.

The company's customers include:

- Large mining and industrial companies
- Dry ice blasting contractors
- The food production and transport industry
- Hospitality and entertainment sectors

### Health and Safety

Dry ice is safe to use if correctly handled. It's important not to let skin come into contact with dry ice – always use a scoop, heavy duty gloves or tongs.

While CO<sub>2</sub> gas is always present in the atmosphere, it is important to ensure good ventilation around dry ice transport and storage so that as the gas escapes, it is kept at safe levels around users.

As dry ice specialists, Vortex is committed to achieving the highest performance in Occupational Safety and Health with the aim of creating and maintaining a safe, healthy and productive working environment throughout its business activities.

Vortex Dry Ice Blasting:

- Provides a safe and healthy workplace

and working conditions for all including employees, contractors and third party stakeholders.

- Provides training to enable all employees to work safely.
- Complies with all relevant legislation, laws, codes and standards and other requirements with regard to health and safety.
- Ensures all personnel understand their obligation to "Stop the Job" if they believe, in good faith, the task to be undertaken may compromise the health and safety of themselves or co-workers.
- Provides support and assistance to employees and ensure that all employees, contractors and visitors comply with and understand their obligations in respect to this policy.
- Encourages open communications and consult with staff and contractors, where relevant, to continually improve the effectiveness of the management system.
- When introducing a new activity into the business, ensures the workplace health and safety requirements are risk assessed and are integrated into the management system.
- When designing, acquiring, constructing or modifying equipment or facilities, ensures the workplace health and safety requirements and procedures are risk assessed and integrated into the business activities.

AMR



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# Engineered for Performance



In today's fast pace environment, it's critical to maximise asset utilisation by reducing asset downtime and increasing uptime.

GMA Garnet™ products offer clients maximum productivity and efficiency, save up to 15-30% in project costs and can cut the time it takes to complete a blasting job by up to 50%. That's why maintenance teams around the globe are choosing GMA Garnet™ — the world's most advanced garnet abrasive.

By exploring GMA's abrasive products, clients can tackle a cause of downtime hiding in plain sight and reap the benefits of garnet.

The Australian Mining Review spoke with GMA's Global Marketing Support Manager, Anthony Burns, to learn more.

GMA Garnet Group pioneered the use of garnet in abrasive blasting operations more than 35 years ago and is now the trusted global leader in industrial garnet.

It has been providing the highest quality garnet abrasive to the protective coating and waterjet cutting industries.

GMA owns mines and processing plants in Australia, the Middle East and USA, and has invested significantly to expand their sources of supply and production capacity to incorporate alluvial, crushed, and recycled garnet.

**The GMA Garnet™ advantage**

GMA Garnet™ is a uniquely strong natural mineral that effortlessly outperforms other abrasives due to three key physical characteristics: hardness (7.5-8 Mohs),

density (2.3 T/m<sup>3</sup>) and specific gravity (4.1).

This enables GMA Garnet™ to easily remove existing coatings, resulting in an exceptionally clean surface and uniform anchor profile, with higher productivity and lower consumption rates than other garnets and mineral abrasives.

Furthermore, these superior properties as well as GMA Garnet™ high toughness (low friability) ensures it is more resistant to fracturing on impact, resulting in lower dust, increased visibility, and improved recyclability than other abrasives.

Garnet™ products reduce work site contamination and enhance operator visibility, they are the closest thing to dustless blasting.

**Improve Productivity And Reduce Total Project Costs**

The tougher and heavier GMA garnet particles produce the required finish through impacting the surface at a higher velocity rather than using larger particle sizes.

This means there are more particles impacting the surface per second, thus increasing the cleaning rate and production rates while also consuming less abrasives per square meter blasted.

It is important to keep this in mind when selecting the right product for the job, as choosing products based on input price alone can have a detrimental impact to the operations ability to complete the job on time and within budget.



GMA's a high-quality deposit with exceptional physical properties, combined with years of product expertise to formulate its superior product blend, giving GMA's customers the benefits of both a higher cleaning rate and lower consumption rate.



The key factors that impact the total project cost are listed below:

- The consumption rate of the abrasive material (kg/hr)
- The cost of the abrasive material (\$/tonne)
- The cost of cleaning up and disposal of the abrasive material (\$/tonne)
- The cost of labour to perform the job (\$/hr)
- The cost of equipment to perform the job (\$/hr)
- The cleaning rate of the abrasive material (m<sup>2</sup>/hr)

The above factors can be used to determine the total cost to blast a defined area of material.

GMA's a high-quality deposit with exceptional physical properties, combined with years of

product expertise to formulate its superior product blend, giving GMA's customers the benefits of both a higher cleaning rate and lower consumption rate.

Gathering the data above and analysing the total costs of a project can result in a total cost saving of up to 30% versus other garnets and mineral abrasives, as a direct result of doing the job fast and using lower quantities, thus saving on product, labour, equipment and clean up and disposal costs.

This enables GMA's customers to be more competitive when quoting projects, while also improving turnaround times and achieving project deadlines.

GMA's expertise in product application and development has enabled it to become the preferred choice for major mining, oil and

gas companies, shipyards, international fabricators, manufacturing and metal working operations on a global scale.

**GMA Offers Products To Suit A Wide Variety Of Applications**

Selecting the right abrasive sizing is key to achieving project specifications and improving productivity. If too coarse of a product is selected, it can create a deeper profile which results in either protruding peaks that enable spot corrosion or increases coatings used thus increasing cost.

Abrasives with larger particle sizes also consume more product per square meter blasted. Conversely if too fine a particle is used it could not achieve the profile required to meet the coating specifications or take longer to remove a thick coating.

GMA's PremiumBlast™ is the coarsest abrasive with the largest sized particles typically used to remove existing coatings or heavy rust. GMA's NewSteel™ has the finer particle sizing and can be used in various applications such as fabrication, mill scale removal, cleaning limestone and architectural restoration.

Furthermore due to Almandine garnet's toughness and low friability, GMA Garnet™ abrasive can be recycled up to five times without compromising its reliable, high quality performance.

**In A Nutshell**

In today's market, it's more critical than ever to identify every opportunity for enhanced productivity, performance and safety.

Selecting the right abrasive is just as critical as selecting the coating itself. That's why maintenance teams around the globe are choosing GMA Garnet™ — the world's most advanced garnet abrasive. **AMR**

source  
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W www.gmagarnet.com



GMA's Technical Experts can help reduce overall project costs by 15-30%. Its dedicated sales, technical and application specialists provide expertise in selecting the best products, industry know-how and resources to help solve coating removal and surface preparation problems.

GMA has recognised there is no one-size fits all and through years of product application knowledge and has developed three primary products, GMA PremiumBlast™, GMA SpeedBlast™ and GMA NewSteel™, for the abrasive blasting industry, to ensure products are available dependent on the application.

**1 Hardness**

GMA Garnet™ has a higher relative resistance to abrade a surface compared to other abrasives.

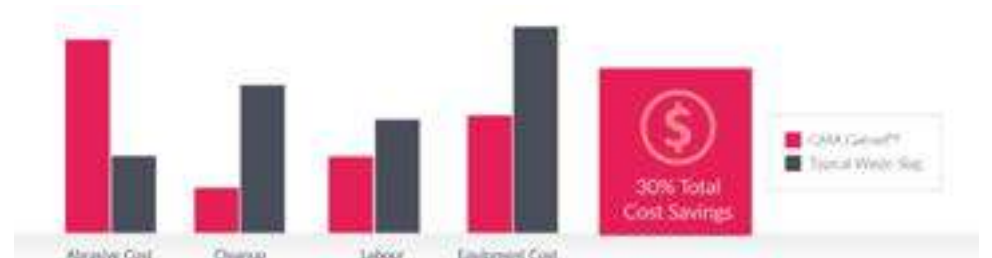
**2 Toughness**

To remove surface coatings effectively, an abrasive must be tough enough to resist fracturing on impact.



**3 Density**

A heavier, denser abrasive (garnet) outperforms a less dense abrasive. GMA Garnet™ gains create a deeper, consistent anchor profile when blasted at the same pressure.



RTO 91255

# Award Winning Workplace Safety Training



Asset Training is a Registered Training Organisation (RTO) dedicated to providing safe work training. Asset Training specialises in wastewater management and industrial maintenance service training throughout Australia and New Zealand and was the 2019 winner of the Hunter Safety Award for "Best WHS Training Course" for our HPWJ training.

Operate a High Pressure Water Jetting System (2 days)

**MSMSS00004**

Use High Pressure Water Jetting Equipment (1 day)

**MSMSS00003**

Supervise & Report on Conduit Inspections (1 day)

**NWPNET017**

CCTV perator/Supervisor Combined (4 days)

**NWPNET037 / NWPNET017**

Inspect Sewer or Stormwater Line (3 days)

**NWPNET037**

Operate Drain Cleaning System (2 days)

**MSMSS00005**

HPWJ Operator Refresher ONLINE (1 day)

**MSMSS00004**

Operate a Vacuum Loading System (2 days)

**MSMSS00006**



**AQUA 2020 ASSETS**



**Aqua Assets is the parent company of Asset Training and has over 40 years' business experience in**

- Pipeline Rehabilitation
- Non-destructive Digging
- Combination Jet and Vacuum
- CCTV Inspections and Reporting
- High Pressure Water Blasting up to 30,000PSI
- Vacuum Loading
- Drain and Pipe Cleaning
- Emergency Spill Response
- Waste Removal and Disposal
- Environmental Project Management



/aquaassets





# Fluid Industry Intelligence

Aqua Assets workers completing pipeline remediation works.

Asset Training is a subsidiary of Aqua Assets and has been a registered training organisation (RTO) since 2006.

Specialising in wastewater management and industrial maintenance service training throughout Australia, Asset Training is based out of a Newcastle training centre, but its trainers will travel all throughout Australia.

The training centre is fully equipped to provide training in CCTV pipeline inspection, work safely at heights, high pressure water jetting (ultra-high), vacuum loading, drain cleaning, first aid, CPR, confined space and much more.

Asset Training recently added Australia's first online high-pressure water jetting refresher course, which provides an overall refresher and verification of competency for a qualified high-pressure water jetting operator.

With the inclusion of new courses to its scope, the company is focusing on the industry with a goal of becoming Australia's primary RTO in the areas of wastewater management, industrial maintenance and cleaning.

Asset Training's staff are all experienced and passionate about their work, bringing a wealth of industry knowledge and enthusiasm to every level of training they provide.

Both this competency and passion have not gone unnoticed, with the company winning the Hunter Safety Award for 'Best WHS Training Course' for its high pressure water jetting training.

Asset Training has also developed bridging courses for the holders of the high pressure water jetting skill sets to acquire drain cleaning and vacuum loading skill sets in one day.

### About Aqua Assets

Aqua Assets has established itself as a major contracting and training organisation with a proven ability to meet strict schedules, quality standards and budget considerations when delivering a wide range of industrial services, including high pressure water jet cleaning, vacuum loading, CCTV conduit inspection, pipeline repair and trenchless rehabilitation technology.

Established by industry experts with

decades of experience across a full spectrum of commercial, mechanical services and industrial projects, Aqua Assets is often sought after for its wastewater management expertise.

Aqua Assets provides an Australia-wide service delivering to clients wherever and whenever there is a need. With its growing workforce, adequate financial resources and quality equipment, the company presents itself as an extremely competitive contractor to the wastewater industry.

The company employs more than 80 onsite personnel, all of whom are trained in all facets of the organisation and pride themselves on providing a professional service.

Aqua Assets' staff are able to complete the works in accordance with client requirements and timeframes, while ensuring all workplace health, safety and environmental regulations are strictly adhered to.

The company has a large fleet of units that include ultra high pressure water jetting, vacuum loading, dual purpose combination

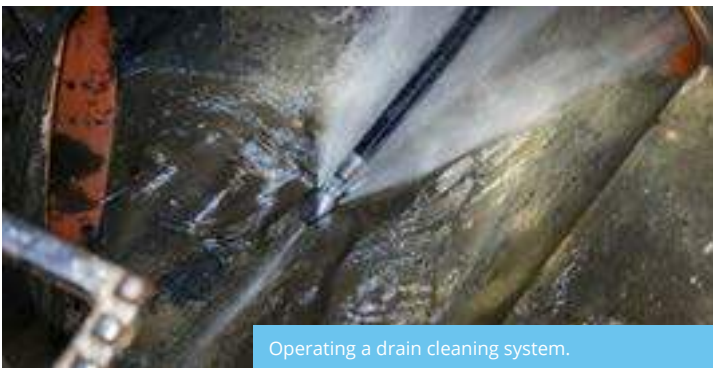
jet/vacuum trucks, a range of CCTV units capable of surveying from 50mm, to culvert and pipeline repair vehicles.

Aqua Assets provides pipeline repair and lining services as a post inspection service repairing structural breaches that have been identified by its CCTV service.

The company also offers a non-destructive digging capability to protect essential services during excavation.

Proving its versatility within the industry, Aqua Assets also provides services relating to cured-in-place pipe (CIPP) lining, pipe bursting, directional drilling, manhole rehabilitation, wastewater plant cleaning, process and disposal and more – all while maintaining an intense focus on having personnel that are well trained and aware of their safety and health obligations toward their work and the surrounding public. **AMR**

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Operating a drain cleaning system.



CCTV pipeline inspection training taking place in NSW.



Participants in an Asset Training confined spaces course.



High pressure training for industrial maintenance and cleaning.



Mainline System CCTV inspection unit.

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# Engineered Project Solutions

COERCO is widely known for manufacturing industry-leading poly tanks and for its strong foundations in the agricultural industry.

However, the company has significantly expanded its scope over the last three decades to provide holistic project delivery services to the mining industry, from expert consulting, system design and engineering, right through to the manufacture and delivery of specialised equipment.

The West Australian company, formerly called Rapid Plastics, has come a long way since 1994 when it largely supplied to the animal and stock markets.

It was not long before COERCO was fielding enquiries from mining clients who had heard about its commitment to a high level of quality and the niche it had carved itself as a result of its comprehensive customer service.

Over the last 27 years, the company has built up the widest range of liquid management products in Australasia.

But it is not just COERCO's vast product range that has made it invaluable to mining, civil and heavy industry clients.

Australian Mining Review General Manager, Trevor Pickett, spoke to COERCO's Industrial Sales Manager, Gareth Wallis and Business Development Manager, Daniel Rignall about how the company has also spent the last three decades developing an unmatched understanding of all aspects of liquid management and storage.

Whether it be storage or supporting infrastructure for liquid transfer or pumping operations, Gareth explains how this solid understanding has paved the way for COERCO to provide holistic project solutions from small custom-made products to complete turnkey packages.

## Diverse Product Range

COERCO is a derivative of a Latin word, which means to surround, encompass or control.

The company can take care of all aspects of liquid management and storage – covering prefabricated and customised solutions for process water, potable water, chemicals and waste systems.

Its broad range of solutions can be divided into three main divisions: water and chemical processing; dewatering; and civil construction.

It can provide specialised pump support systems for tailings, decant and process water operations—including but not limited to—pontoons, strainers and intakes, pipe/cable float systems, floating walkways, and access gangways.

Areas of specialisation also include oil, sludge and fuel storage, specialist transport equipment for mining operations and plants, as well dust suppression systems, water delivery and trailer mounted units for civil construction.

Mining clients work in high pressure, time poor, highly dynamic environments with multiple suppliers, competing internal demands and deadlines. COERCO can assist in both initial project construction and mine maintenance by simplifying the demands of finding reliable, engineered liquid management solutions.

With its unique project delivery pathway,

COERCO works closely with clients to understand the project environment and de-risk projects of safety concerns, product failure and downtime.

“Our large product base allows us to quickly turn around solutions as required,” Daniel said.

“If something does not fit the requirement as our standard offering, we have the ability to customise and engineer a solution.

“We are agile throughout the process from start to finish and this allows us to offer the client shorter lead times because what we’re supplying is within specifications, in a very dynamic environment.

“When the goal posts of a project move, as they inevitably do in mining, we have the ability to move with them.

“Although we have direct competition in the different facets of what we do, we are the only ones to bring it all together and offer the complete service.”

For example, a mining camp may need industrial process tanks, fuel transport, a sewage and wastewater management solution and a pontoon pump system. COERCO can provide a single point of contact for all of these requirements to save the client from engaging with multiple suppliers.

“Our vertical integration model for project delivery including in-house design and engineering, raw polyethylene processing, moulding and steel fabrication, allows us to pass on cost savings otherwise sapped up in middlemen processes,” Gareth said.

“We alleviate the friction in the project delivery phase by managing sections of the overall scope that are often left unattended until they are time critical.”

COERCO has the expertise to navigate complex regulations and compliance requirements such as those that exist around the installation of septic systems.

“Septic tank regulations, such as those that deal with environmental assessments, can actually impede overall project delivery times. Because it's what we do, we are able to satisfy the requirements quickly because we don't need to go away and work it out. Project engineers might be doing this sort of work intermittently whereas we are doing it every day, so we have the ability to get the client what they need, when they want it.”

## In-house Capability

COERCO has predominantly been a poly-based product manufacturer, most commonly known for manufacturing poly tanks.

But it has widened its scope over the years to service the mining and heavy industrial markets and has also moved into steel fabrication to support the poly product range.

It has three factories in WA with its main poly manufacturing facility and head office in Dalwallinu, which is about 250km north of Perth and ideally situated to service the mines in the Pilbara and northern areas.

The two other factories in Northam and Bunbury are predominantly for steel fabrication.



COERCO has a vast range of water and chemical process solutions.



Dewatering solutions include pontoons, access walkways, hose and cable floats and industrial pump accessories.



Civil construction services include liquid transportation and water delivery equipment.



It also has an office in Malaga, to better service the needs of mining companies, many of which are headquartered in Perth.

Polyethylene inherently has a longer service life than alternative materials and is still predominant in COERCO's product offering.

"We continually invest in finding solutions to project requirements and our capacity in hybrid manufacturing processes (PE and steel) allows us to customise to greater extents than a traditional supplier," Daniel said.

"A manufacturer who is just doing poly would then have to look for someone to align themselves with, or the reverse.

"We can integrate and customize a lot of what we do to greater extents than others might be able to."

### The Team

COERCO employs a diverse team of 110 full-time staff at multiple locations throughout Australia.

As well as an operations team in its poly manufacturing and steel fabrication facilities, COERCO has its own in-house modifications team including a team of ten qualified polyethylene welders who focus on customising products based on clients' requirements.

A highly skilled design and engineering team, including chartered engineers and draftsmen backed by a team of project managers, allows COERCO to meet the ever-changing requirements of resource and mining projects.

Its technical expertise in Finite Element Analysis (FEA) and Computational Fluid Dynamics (CFD) allows the team to address complex engineering design problems and de-risk project delivery.

The sales team come from a variety of backgrounds including specialist supply to the oil and gas industry and the mining resource sectors, which brings a wealth of relevant experience to tackle challenges faced by clients.

An in-house team of 16 logistics management and transport operators manages COERCO's specialised transport fleet, so it does not rely on third parties.

Last but not least, management is the same as it was 27 years ago, therefore the company has a great deal of combined experience, stability and longevity.

"Key stakeholders of the company are still involved on a day-to-day basis," Daniel said. "We are still a family-run WA business that has been around for 30 years and it is a very close-knit team with a great culture.

"This allows us to be flexible and responsive to change."

### A Total Solution

COERCO's diverse team and the wealth of experience and knowledge it is able to draw on means the company is much more than solely a tank manufacturer.

It can offer a complete service, from the feasibility stage right up to and including the delivery of specialised equipment that has been custom designed and

manufactured in-house.

COERCO is in its element when it is assisting EPC companies to complete turnkey projects by simplifying the demands of finding reliable, engineered liquid management solutions.

COERCO can prepare budget estimates, data, engineering and 3D drawings to prepare feasibility studies and a scope of works.

"We have fully chartered engineers and draftsmen who have the skills needed to keep the entire package managed in-house," Daniel said.

"We can also assist the client's designers and help them with writing specifications and support their teams to support sections of the scope of works.

"We can provide the scope within the specifications required, adhering to all the regulations and standards.

"We often do jobs for clients that they need doing at the last minute when they're scrambling to piece a project together.

"Their resources are much better applied to what they are good at to ensure the deliverables for the client are met or exceeded.

"No two projects are the same so there is a lot of customisation required and design and engineering work behind that.

"So the client can literally hand us a section of the project and say: 'We want something that suits XYZ parameters' and we will go away and provide them a complete package based on that."

The in-house management of the total solution in house—consultation, design, engineering, fabrication, compliance and even delivery to the most remote mine sites means far better control over project timelines and costs.

"We manage the whole scope and we have our own transport fleet so we can deliver the products to site and manage all the logistics."

"Since we have total control over every stage of development from design and engineering through to manufacture and delivery, we use a range of specialised equipment."

This includes:

- Polymer processing and moulding machinery
- Steel fabrication workshops
- Polyethylene welding machines
- Ultrasonic thickness and static hydro testing equipment
- Specialised transport fleet

### Projects

COERCO has vast experience with multiple resource companies, having completed more than 2000 projects in multiple countries across the globe.

### Wheatstone Accommodation Village Expansion

**Location:** Onslow, WA  
**Scope of work:** Design, Manufacture, Deliver

Chevron's \$34 billion Wheatstone Project is one of Australia's largest resource developments and the nation's first liquified natural gas (LNG) hub.

The foundation project consisted of two LNG trains with a combined capacity of 8.9 million tonnes per annum and a domestic gas plant.

The project was sanctioned in late 2011, with first shipment of LNG announced in October 2017.

Atco Structures & Logistics were awarded the project to design, manufacture, transport and install hundreds of modular buildings for the Accommodation Village Expansion.

Working in conjunction with Total Plumbing & Excavation, the company approached COERCO for the supply of the underground



COERCO was contacted to design, engineer and deliver a turnkey package including a compliant pontoon and floating walkway at the Grootte Eylandt manganese mine off the NT coast.

### The COERCO Advantage

- Widest range of liquid management products in Australasia means clients have less suppliers to deal with.
- Reducing time spent in design, engineering and sourcing processes of projects by up to 70% for clients, through in-house solutions.
- Maintaining end to end control of processes, starting with polymer compounding through to delivery vastly reduces risk of delay and cost blowouts.
- Some of the fastest lead times in industry due to modern efficiencies, decades of experience and large capacity.
- Manufacturing capabilities including steel fabrication, polymer compounding, rotational moulding and poly fabrication.
- Diverse workforce and capabilities brings flexibility to clients' projects with the ability to design and engineer a solution from the ground up and accommodate changes if needed.



COERCO supplied underground waste water storage tanks and other solutions for fire protection and water storage at Chevron's Wheatstone project.

waste water storage tanks, above ground fire protection system storage tanks, ablation building waste tanks and potable water storage tanks.

The challenges with this project were:

- Very acidic soil conditions limiting the materials that could be used
- Extreme weather conditions – Cyclonic Region
- Remote location
- Strict time schedules
- COERCO supplied a large range of products for this project including:
- **39 x 23,000 litre and 11 x 7,000 litre underground waste water storage tanks**
- **12 x 8,000 litre and 2 x 6,000 litre waste tanks** were custom built to suit the ablation buildings
- **528 x custom designed concrete containment bunds** to contain the concrete from being exposed to the acidic soil condition.
- **10 x 32,000 litre above ground storage tanks** for the fire protection system
- **34 x 9,000 litre water storage tanks** including pumps and UV filters potable water

Solution:

The inventory was delivered directly to the site to eliminate the client having to deal with any logistical issues and was performed **within two weeks of site requests**, which was well within required delivery time frames.

Since this successful project, the COERCO team has worked alongside Atco and Total Plumbing on several different projects to supply similar custom built, engineered products.

**Groote Eyelandt Manganese Mine**

**Location:** Gulf of Carpentaria off NT coast  
**Scope of work:** Design, Engineer, Manufacture, Deliver

Groote Eyelandt open cut manganese mine, which is situated on an island about 50km from the Northern Territory mainland, was commissioned in 1965 and now produces over 15% of the world's total

manganese production.

Darwin company Mawpump, which has been supplying to the island mine for nearly three decades with pumps, ancillary water and waste products were approached by Gemco to supply and install a pontoon mounted pump set and a floating walkway.

The challenges with this project were:

- Remote location
- Working offsite relying on information provided from personnel onsite
- Extreme conditions – limited access, high salinity

Solution:

Mawpump engaged COERCO to design, engineer and deliver a turnkey package including a compliant pontoon and floating walkway to complement their pump set and pipe work.

The project consisted of a pontoon capable of carrying a 12-tonne live load, a 33m of walkway and a 12m gangway.

All products were commissioned in Darwin and then sent on the five-day trip to site.

Since this project, Mawpump have continued to procure similar products from the COERCO team. With our in-house design and engineering team at the forefront of each of these projects, COERCO can ensure the entire package is not only compliant but also provides quick installation and a long-term solution which is commercially attractive.

**MMG Sepon**

**Location:** Southern Laos, South East Asia  
**Scope of work:** Design, manufacture, deliver

MMG Sepon is an open-pit copper mine located in the Savannakhet Province in Southern Laos.

COERCO was approached by international mining company MMG Limited for the supply of hundreds of 315mm Pipe Floats for the mine.

The challenges with this project were:

- Very tight lead times present



COERCO's specialised delivery capabilities.

a challenge especially with intercontinental deliveries and transactions.

- The aspect of organising sea and road freight from one continent to a very remote location in another country added an extra layer to an already big challenge.
- With quality concerns around poor products that MMG had experienced in the past, COERCO knew it needed to go the extra mile to prove it was, and continues to be, a standout company with the unique capability to blend manufacturing quality products with quality service.

Solution:

Not one to back out from a challenge, COERCO worked 24 hours a day.

In order to complete the project within the required timeframe, new moulds were constructed to manufacture the requested amount of pipe floats.

Splitting the orders into container loads, COERCO consistently and regularly delivered products fresh out of the mould as soon as they were completed.

All pipe floats were carefully packed for export. Specialized fixings made to suit the client's requirements were also supplied and were given as much careful assessment as the pipe floats.

Within the span of eight weeks, a total of **992 pipe floats** made their way towards their intended destination in Southern Laos – all **strong, intact, and ready** to last a long time.

**Core Focus**

Whatever the project, large or small, there are three pillars that support COERCO's core focus—accessibility, accountability, and accuracy.

**"Accessibility** in the sense of product

availability and our ability to meet project demands, demonstrating how capable and flexible the company is at making solutions accessible to our clients," Daniel said.

**"Accountability** with our commitment to invest in refining our solutions and services to achieve safe, on-time, in-full project delivery consistently.

And lastly, **accuracy** of our designs against project specifications and budgets to safeguard our clients against hidden costs and delays."

These pillars enable COERCO to deliver **reliable solutions** for remarkable **project outcomes**. COERCO helps its clients—EPC and mining companies—to find answers to these questions:

Accessibility

- Can you increase turnaround speed?
- Can you make changes easily and quickly and if so how?

Accountability

- How can you minimise risks?
- Am I covered?
- Do you have one key point of contact?

Accuracy

- How do you deal with/avoid delays?
- How can I ensure I get exactly what I order?
- Can you ensure against hidden costs?

Addressing these pertinent questions enables clients to satisfy project requirements by expediting their schedule to deliver a project ahead of time.

"When you engage COERCO to assist with your projects, you can be sure our solutions are engineered and validated for best overall performance, cost effectiveness and reliability," Daniel said.

"We are looking forward to the future, given the positive outlook for Australia's mining sector, which makes up more than half of the country's total export, which is very buoyant and is forecasted at \$256b in 2020-2021 and \$252b in 2021-2022."

"We remain committed to continual product and capital development to better service our clients.

"For example, we have recently invested in CNC machinery, allowing us to further develop and improve on our product offering, particularly around the area of custom HDPE solutions."

"One of our engineers has achieved chartered status, further strengthening our design and engineering team.

"Our product range has been time-tested over 27 years and has been engineered to last and comes with warranties and a proven track record." **AMR**

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COERCO was approached by international mining company MMG Limited for the supply of hundreds of 315mm Pipe Floats for the mine.

# John Tivey | Partner, White & Case

The global COVID-19 pandemic dominated every aspect of business, politics and economics in 2020, and it was no different for the mining and metals sector.

Yet what started as being seen as an existential threat, with stock prices collapsing to the lowest since the commodity crisis in 2015, soon morphed into a resilience story for the industry.

The majors proved incredibly robust, being able to keep the world's biggest mines operating and in most cases their staff safe. Global supply chains held up (mostly) and China managed to keep its industrial engine humming, driving demand for metals and commodities.

What should we expect in 2021? To get an idea, White & Case has conducted its fifth annual survey of industry participants, with 68 senior decision makers sharing their thoughts for the year ahead.

## Overcoming A Global Pandemic

Coronavirus dominated the actions and thoughts of all stakeholders in the mining and metals space last year, and this theme is expected to continue into 2021.

However, our respondents expect that the sector will be able to continue to navigate the ongoing crisis.

In the spring, concerns grew that major mines would have to be shut down, especially in crucial jurisdictions like South Africa and Chile. Yet despite government policies limiting the number of people that could work underground, the miners were able to keep operations running. As restrictions were lifted, the industry surprised many with the speed at which production was able to come back on line, with most of the big companies returning to full production schedules by the third quarter.

Concerns about widespread demand destruction also went unrealised. Chinese demand for many commodities, including copper, rose to record highs through the summer and autumn as the biggest consumer of metals recovered from a slowdown earlier in the crisis.

Responses from our survey indicate that this is set to continue. Just 7.5% said that COVID-19-led demand destruction would be the biggest threat to the sector this year, while only 13.6% saw its impact on supply chains being the biggest risk. ESG was by far the most frequent selection, taking 45.4% of the vote.

As COVID-19 restrictions were eased in late spring/early summer 2020, the industry surprised many with the speed at which production was able to come back online, with most of the big companies returning to full production schedules by the third quarter.

## Copper Remains Top Pick

Nothing demonstrated mining and metals' renewed fortunes more than copper last year, as predicted in our January 2020 survey.

The metal, crucial in everything from electric cables to water pipes, jumped to the highest price in seven years after going on a nine-month winning streak prompted by increasing investor concern that the metal would enter a deficit in the coming years, as constrained supply met soaring demand from new industries such as electric vehicles and green infrastructure and technology.

The market's enthusiasm for copper is again

reflected in our survey. The metal was the most favoured to outperform this year, with 36% picking it to be the standout metal of 2021, matching last year's prediction and double the number that picked gold, the second-most favoured metal in our survey.

For the miners, copper's rally was especially good news. As prices surged, input costs fell, creating the biggest margins for miners in years.

Currencies in major producing countries, such as Chile, weakened against the US dollar, while oil prices, a key cost input, also fell steeply, making the metal highly profitable for the producers. This was reflected in share prices, especially pure-play producers like Antofagasta and Freeport-McMoRan, which both jumped to multi-year highs.

A further boost for copper may come from US President Biden's victory, especially now his party controls the Senate, paving the way for a sizeable stimulus package with a decarbonisation agenda. Copper, nickel, cobalt and lithium—all critical commodities needed for the increased electrification of cities and batteries for electric vehicles—stand to benefit from an acceleration of the energy transition.

## Iron Ore An Unexpected Bright Spot

The other big success story for the miners was iron ore.

Despite many industry participants and investors continuing to view the steelmaking ingredient bearishly, it jumped to the highest levels in seven years. Our respondents also underestimated its strength, with just 3% picking the commodity last year as the most likely to outperform and 4% picking it to do well in 2021.

Yet despite the consistent gloom, the material continues to rally. Vale, the world's biggest producer of iron ore and pellets, has seen very strong demand from China while at the same time reducing its production target for 2020. BHP Group and Rio Tinto are also facing potential restrictions after the fallout from the Aboriginal cave destruction, stoking fears of a shortage of iron ore.

The commodity has also benefited from the continued focus on anti-pollution policies in China—reinforced in its latest Five-Year Plan—which has stoked demand for higher-quality iron ore and coking coal.

Political tensions between China and Australia also need to be monitored, as noted by one of our respondents; for the time being, iron ore exports may well remain unaffected given their importance to both nations, but it's certainly a risk factor in the event of a significant rise in regional tensions.

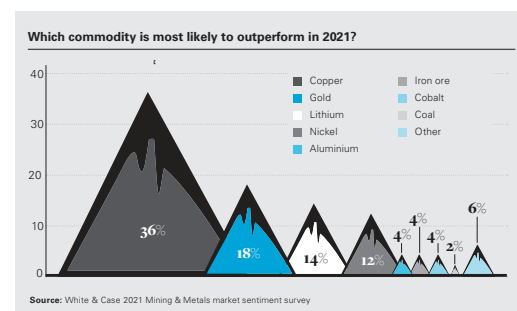
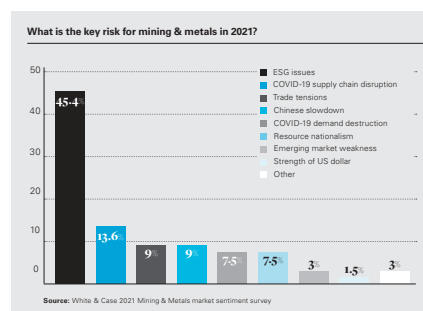
The combination of supply worries and record Chinese demand has created a boon for the biggest miners who were already delivering record shareholder returns through dividends and buybacks. That theme is set to continue when full-year results are posted in February, as investors reap the rewards of the sector's continued discipline on deals and capital expenditure.

## ESG Dominates The Agenda

ESG matters are not new to the mining sector. While essential to our modern world, the mining space by its very nature is always going to face very intense scrutiny on this front. But even by recent standards, 2020 set a new bar for what is expected and, perhaps most importantly, for what is not acceptable.



John Tivey.



Perhaps the biggest story in the industry last year—aside from the pandemic—was the departure from Rio Tinto of three key executives following accusations of failing to act on information that the two heritage sites had greater significance than initially realised. CEO Jean-Sebastien Jacques and two key deputies were forced to step down in September after a furious backlash from investors that criticised the company's initial response to the blasts and tame penalties.

The departure of a CEO who had delivered record shareholder returns and overseen the company's share price hit multi-year highs added further evidence of the increasing importance investors, communities, regulators and other stakeholders place on ESG matters.

Our survey last year flagged this risk, with almost half of respondents choosing local community impact as the biggest area of mining and metals that would face the most scrutiny from both investors and regulators.

This year, some 78.8% expect ESG issues to play a greater part in investors' decision-making, while ESG performance is also seen as the industry's second-most important priority for this year, after ensuring production can be maintained in the face of the pandemic.

## The Journey Towards Carbon Neutrality

Our survey highlights emissions and pollution as the most important ESG issues, but respondents were split on where the most focus will be: Scope 1 and Scope 2—when pollution is created by the miners' operations, and Scope 3—the pollution created when the materials they mine are used by their customers.

Scope 1 and Scope 2 emissions are relatively small for the mining sector compared to Scope 3, and also easier to address, as highlighted by our survey.

BHP, Rio Tinto and Anglo American have all set out targets to become carbon neutral by between 2040 and 2050 at their own operations, yet the three miners have yet to find a solution for their Scope 3 emissions, the majority of which come from their highly

profitable iron ore divisions.

So far, Glencore is the only major to have found a pathway to being carbon neutral by 2050 that includes Scope 3 emissions. This is because it mines no iron ore and plans to be mostly thermal coal-free in 30 years.

Still, its giant thermal coal operations remain a concern for many investors, despite the commodity trader providing a roadmap to eventually transitioning away from the dirtiest fuel.

## Gold Surges in Mixed Outlook

Gold's rally to more than US\$2000/oz in August, fuelled by investors looking for a safe haven from the economic fallout of the pandemic, was a major boost for the industry.

The gold sector has transformed itself in recent years, following Barrick Gold and Newmont Gold's transformational transactions. Many smaller producers have responded with a wave of mergers as they attempt to stay relevant to investors who have preferred the scale offered by the dominant new producers.

Our survey shows that this surge in gold deals is expected to continue. More than 40% said they expected precious metals to be the sector most likely to see consolidation this year, almost double the number of votes for base metals, which came in second in the poll.

Still, while our respondents expect deals, they are split on the outlook for bullion this year. While it was the second-most favoured commodity to outperform this year, receiving 18% of the ballot, it was also the second-most favoured to underperform, with only coal seen as more likely to fall this year in our survey.

Last year was also notably strong for platinum group metals, especially palladium and rhodium, as fears of supply deficits grew. This was compounded by some mine shutdowns in South Africa, and it was one of the few commodities that suffered significant production impacts from COVID-19. **AMR**

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