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NEWMONT ACQUIRES NEWCREST

(Image source: Newcrest Mining) Newmont has acquired Newcrest and all its assets, including Telfer (pictured).

Newmont Corporation has acquired Newcrest Mining (ASX:NCM) for \$26b (US\$17b) to create the world's leading gold company.

This expansion of Newmont's portfolio will include operations with scale, margin and mine life to generate robust and lasting returns for decades while supporting best-in-class sustainability performance.

Newmont president and chief executive

Tom Palmer said the acquisition marked a historic milestone for the company.

"This marks a historic milestone in our company and the industry with the successful completion of this transformational acquisition of Newcrest by Newmont," he said.

"Our attention now turns to safely, efficiently and responsibly integrating Newcrest's assets and people into Newmont's

proven operating model, so we can accelerate the delivery of our value-focused strategy for all our stakeholders."

The acquisition of Newcrest is expected to strengthen Newmont's position as the gold-mining leader and generate annual pre-tax synergies of \$500m within the first 24 months, together with at least \$2b in cash improvements through portfolio optimisation in the first two years.

To acquire Newcrest, Newmont needed clearance from Papua New Guinea's Independent Consumer & Competition Commission, and approvals from the Australian Competition and Consumer Commission, the Australia Foreign Investment Review Board, the Japan Fair Trade Commission, the Philippine Competition Commission and the Korea Fair Trade Commission. **AMR**

(Image source: BHP) Blackwater mine in Queensland.

BHP TO SELL QLD MINES FOR \$6.49B

BHP (ASX:BHP) and Mitsubishi Development (MDP) have agreed to sell the Blackwater and Daunia mines for up to \$6.49b (US\$4.1b).

Two wholly-owned subsidiaries of Whitehaven Coal (ASX:WHC) have agreed to acquire both mines.

The purchase price comprises of \$3.32b (US\$2.1b) cash on completion, \$1.74b (US\$1.1b) in cash over three years completion and the potential for up to \$1.42b (US\$900m) in a price-linked earnout payable over three years.

BHP president of minerals Australia

Geraldine Slattery commented on the transaction.

"Whitehaven Coal has a strong track record as a responsible and reliable operator, and we will work closely with them to achieve a smooth change of ownership focused on maintaining safe and productive operations and supporting people and communities through the transition," she said.

"In line with our long-term strategy, we will continue to develop our high-quality metallurgical coal assets in Queensland, which are sought after by global steelmakers and needed to support the energy transition."

Upon completion, Whitehaven Coal will assume economic and operating control of Daunia and Blackwater, including all current and future environmental liabilities and rehabilitation obligations.

Whitehaven Coal managing director and chief executive Paul Flynn says the transaction is compelling for the company.

"This transformational acquisition will pivot our portfolio towards metallurgical coal, which has been a core pillar of our strategy for many years making this a better-balanced business," he said.

"It strengthens our portfolio of quality,

long life assets in attractive locations providing geographic and operational diversification and scale benefits.

"Daunia and Blackwater produce much-needed metallurgical coal that is in high demand across Asia — including in India and Southeast Asia where population growth and economic development is expected to drive strong demand for steel production and metallurgical coal through to at least 2050."

The sale is subject to the satisfaction of completion and regulatory approvals; it is expected to be completed in the June 2024 quarter. **AMR**

AVENIRA TO BEGIN MINING AT WONARAH

Avenira (ASX: AEV) has received approval from the Northern Territory Government authorising 40,000t of ore extraction from the Wonarah direct shipping ore (DSO) phosphate project.

Northern Territory Deputy Chief Minister and Mining and Industry Minister Nicole Manison approved the Mine Management Plan (MMP) under the Mining Management Act 2001, enabling mining to begin at Wonarah.

Ms Manison says this is huge news for the Territory.

"In huge news for the Territory economy

and a big win for jobs in the Barkly, Avenira has met its regulatory obligations and is now authorised to commence mining," she said.

"The Wonarah phosphate project further cements the Territory's reputation as a globally significant hub for resources and critical minerals.

"We have the resources the world needs to transition to net-zero emissions and green energy and we support the projects that make this happen."

The authorisation approves an initial test pit targeting 5000t of marketable direct

shipping ore (DSO), the commencement of mining at the project to mine an estimated 35,000t of ore and surface grade control drilling to support detailed mine planning for the remaining DSO operations.

The authorisation enables staged expansion of Wonarah with customary conditions including submitting an amended MMP with findings of surface grade control drilling, pathway to development and consideration of site rehabilitation. This includes other supporting documents that demonstrate appropriate management of environmental risks.

Avenira chairman and chief executive

Brett Clark says the company is delighted with the approval.

"This [the approval] is a crucial step in delivering our mining project, which will provide feedstock for our proposed LFP cathode production plant," he said.

"Completing this project will see Darwin become a key supplier of critical materials to the global battery market.

"The signing of the MMP follows the conclusion recently of formal agreements with our technology partner Aleees, which shows this project is moving forward very positively." **AMR**



Road train towing four trailers of direct shipping ore.

(Image source: Bellevue Gold) First gold bar poured at the new Bellevue Gold mine processing circuit.



BELLEVUE GOLD POURS FIRST GOLD BAR

Bellevue Gold (ASX:BGL) has poured the first gold bar at its namesake project in WA. The gold bar weighed 8.3kg and was poured in the first smelt on October 25, 2023.

Furthermore, other project milestones have been achieved with the crushing circuit operating at 250tph at times during the six days of start-up operations to date and the ball mill has achieved a throughput of 125tph during the start-up period.

Ramp-up optimisation activities are continuing across the crushing, processing and plant services areas.

Pleasingly for Bellevue, the start of production and cashflow have been achieved on time and on budget with a significant stockpile on hand comprising 115kt of underground ore ready for processing as part of the commission phase.

A further 85kt of open pit material is also available for processing that is cur-

rently not in the early-stage processing plan.

The Bellevue project is now in the commissioning phase with plant throughput forecast to ramp up to consistent production at the nameplate processing capacity of 1mtpa.

Bellevue Gold managing director Darren Stralow commented on the milestone.

"The start of production is the culmination

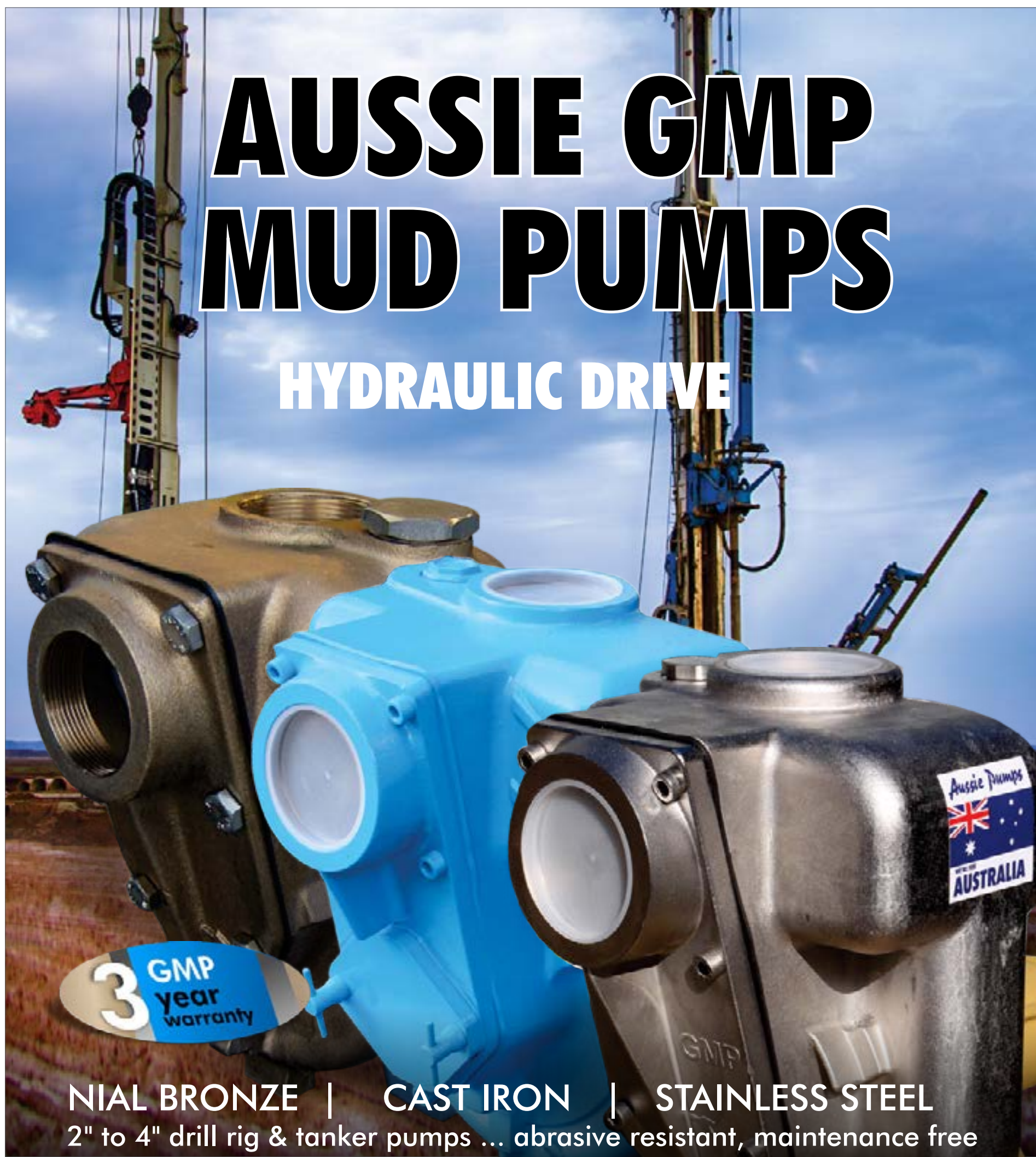
of an incredible journey which started with an exploration project," he said.

"To achieve this on time and on budget is a huge feat, particularly given the skills shortage and economic climate of recent times.

"This is a major credit to our construction and operations teams who alongside our key contractors have worked tirelessly to deliver this project." **AMR**

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WABTEC-ROY HILL PARTNER FOR FIRST FLXDRIVE BATTERY LOCOMOTIVE



The pink livery of the FLXdrive battery locomotive symbolises Roy Hill's commitment to assisting research and those suffering from breast cancer.



(L-R) Hancock Prospecting Group Operations chief executive Gerhard Veldsman and Wabtec president and chief executive Rafael Santana; both standing behind the FLXdrive battery.



A total of \$79,000 (US\$50,000) donated to Linked By Pink, a non-profit organization consisting of Erie area survivors diagnosed with breast cancer before the age of 45, by Roy Hill and Wabtec.

Wabtec and leading iron ore miner Roy Hill, majority-owned by Hancock Prospecting, have debuted the world's first 100% battery-powered, heavy-haul locomotive for mainline service.

Unveiled as the FLXdrive battery locomotive, at a ceremony at Wabtec's design and development centre in Pennsylvania, USA, the pink livery symbolises Roy Hill's commitment to assisting research and those suffering from breast cancer.

Wabtec president and chief executive Rafael Santana commented on the unveiling.

"This FLXdrive locomotive represents a major step in the journey to a low-to-zero-emission future in the rail industry," he said.

"The FLXdrive is driven from within by our battery technology and the innovative spirit of our employees.

"Roy Hill is an ideal customer to partner

with given their leadership and excellent operational record."

Roy Hill's FLXdrive battery-electric locomotive will feature an energy capacity of 7MWh.

Based on the route and company's rail operations, the FLXdrive is anticipated to provide a double-digit percentage reduction in fuel costs and emissions per train.

Once Wabtec completes the final battery installations and track testing, the locomotive will begin its 17,000km (10,500 mile) journey in 2024 for delivery to its new home in the Pilbara region of WA.

Hancock Prospecting Group operations chief executive Gerhard Veldsman commented on the debut.

"The foresight of our Executive Chairman, Mrs Gina Rinehart AO, has been instrumental in establishing an environment in which we can successfully leverage the in-

genuity of our people alongside key partners like Wabtec to transform our rail and mining operations through next-generation technologies," he said.

"The FLXdrive locomotive represents not only a first for the Pilbara, but a first for the mining industry.

"The technological smarts that have gone into the development of the loco makes it well suited for our rail network.

"By using regenerative braking, it will charge its battery on the 344km (214 miles) downhill run from our mine to port facility and use that stored energy to return to the mine, starting the cycle all over again.

"This will not only enable us to realise energy efficiencies but also lower operating costs."

Roy Hill currently uses four Wabtec ES44ACi "Evolution Series" diesel-electric locomotives in a consist to pull trains that are typ-

ically 2,700m (2.7km or 1.6 miles) in length carrying more than 33,000t of iron ore.

The addition of the FLXdrive will form a hybrid locomotive consist with Wabtec diesel-electric locomotives, and recharge during the trip through regenerative braking.

The FLXdrive manages the overall train energy flow and distribution through its state-of-the-art energy management software.

It is also designed with a unique battery thermal management system using liquid cooling to withstand the Pilbara heat, where ambient temperatures can exceed 55°C (131°F).

To commemorate the FLXdrive's premiere, Roy Hill, and Breast Cancer Awareness Month, Wabtec donated \$79,000 (US\$50,000) to Linked By Pink, a non-profit organization consisting of Erie area survivors diagnosed with breast cancer before the age of 45. **AMR**

AUSTRALIA'S \$2B CRITICAL MINERALS BOOST



Prime Minister Anthony Albanese.

The Federal Government has announced a \$2b expansion in critical minerals financing, solidifying Australia's position as a world leading provider and helping the transition to net zero.

Critical minerals, including rare earths, are the building-blocks for a clean energy future and are essential to achieving Australia's energy transition.

This expansion will double the capacity of the critical minerals facility to finance Australian critical minerals mining and processing projects.

Further, the expansion takes the Federal Government's investments in Australian resources to \$6b.

Prime Minister Anthony Albanese says Australians will benefit from this investment.

"Australians will benefit through this investment in critical minerals, through technology, skills, jobs and economic gains," he said.

"Australia is committed to building sustainable and secure critical minerals supply chains with the United States.

"This is central to building a clean energy future and delivering economic growth.

"The expansion of the critical minerals facility will help build supply chains with the US and support our shared clean energy, manufacturing and defence ambitions."

Mr Albanese and Federal Resources Minister Madeleine King announced the \$2b expansion surrounded by Australian and US industry leaders after the inaugural meeting of the Australia-United States Taskforce on Critical Minerals.

The taskforce is an important component of building the alliance with the US and delivers on commitments made by US President Joe Biden and Mr Albanese at Hiroshima earlier in the year.

Cooperation with the United States on critical minerals is central to the Climate, Critical Minerals and Clean Energy Transformation Compact.

The Compact affirms the position of cli-

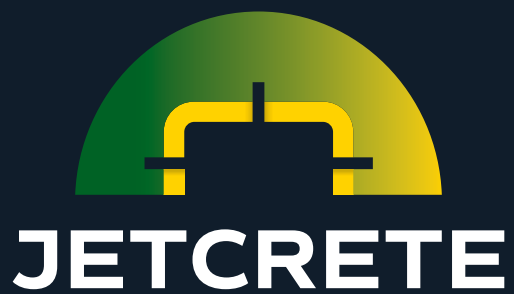
mate and clean energy as the third pillar of Australia's alliance with the United States.

Minister King commented on the expansion.

"The Australian-United States Taskforce on Critical Minerals will be a key part of progressing our work under the Compact," she said.

"This week we agreed on priority areas of work and immediate actions such as joint supply chain mapping and deeper cooperation between our science agencies on critical minerals.

"The road to net zero runs through Australia's resources sector." **AMR**



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DECARBONISING PILBARA SHIPPING WITH CLEAN AMMONIA

The potential for using clean ammonia to refuel ships, especially iron ore carriers visiting the Pilbara region of WA, is one step closer with key results from a groundbreaking feasibility study showing that safe ammonia bunkering is both economically and operationally viable.

Results also show the demand for ammonia as a fuel to decarbonise the international iron ore trade could reach a volume of 1-1.5mt in 2035.

The study, commissioned by Yara Clean Ammonia (Yara) and Pilbara Ports, was undertaken by Lloyds Register, and looked at key areas including the estimated demand and likely availability of ammonia as a replacement shipping fuel, including the potential risks and regulatory requirements for ammonia bunkering (refueling) at the ports.

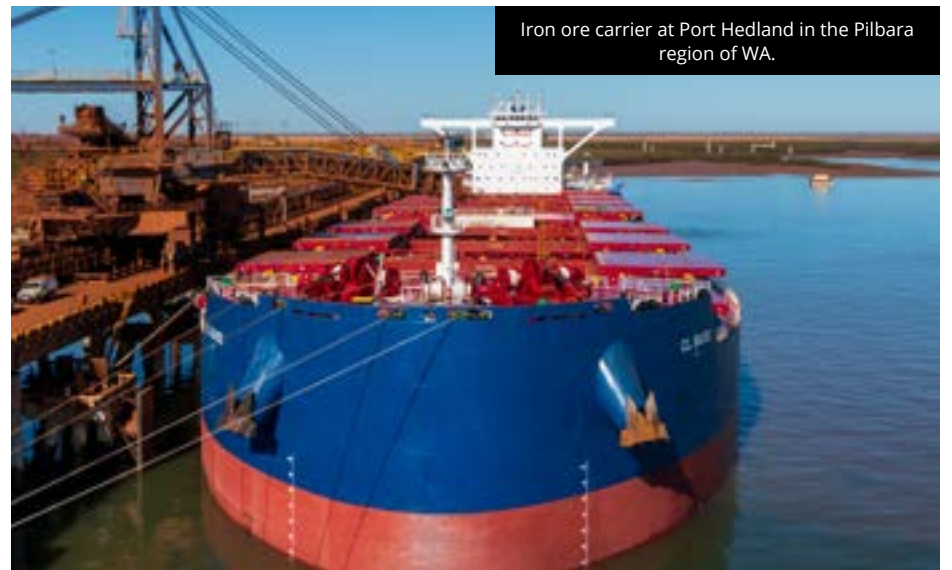
Yara Clean Ammonia senior vice president commercial Murali Srinivasan says the level of demand reflects the push by iron ore miners and the steel industry to decarbonise.

"The study has shown that a key enabler for meeting this demand is Yara's existing assets including the world-scale Yara Pilbara Fertilisers ammonia plant near Karratha," he said.

"Furthermore, the current development of Yuri renewable hydrogen project on the Yara Pilbara site will be the first in Australia to inject green molecules into an existing ammonia plant, and Yara is vigorously exploring options to ramp up volumes of clean and low carbon ammonia to lay the foundation for a reliable supply chain to serve the emerging shipping fuel market."

While the feasibility study indicates that ship-to-ship bunkering operations can be performed within acceptable risk levels at anchorages in Dampier and Port Hedland, it also confirms that existing ammonia production and export infrastructure within the Pilbara, such as Yara's Karratha plant and Pilbara Ports' Bulk Liquids Berth at Dampier, can be leveraged to initiate bunkering operations in the near-term.

Pilbara Ports chief executive Samuel McSkimming says that bulk carriers are a nat-



Iron ore carrier at Port Hedland in the Pilbara region of WA.

ural starting point for the early adoption of alternative marine fuels with the carbon reduction efforts in the steel industry supply chain.

"The Pilbara contains the world's largest bulk export ports," he said.

"Last year we achieved 752.4mt of trade with more than 6,829 vessel visits.

"This scale of operations cannot be found anywhere else in the world, and it makes the Pilbara's ports the natural beachhead from which the global bulk carrier fleet will decarbonise.

"The study is an important step towards implementing safe ship to ship ammonia bunkering at our anchorages in Dampier and Port Hedland.

"Ammonia is already widely produced, used, and shipped in industrial quantities around the world.

"To be able to expand its application as a green shipping fuel would greatly reduce shipping emissions."

Mr McSkimming also says a domestic bunkering industry in the Pilbara will create new industry and job opportunities for WA and the Pilbara community.

"We are proud to contribute to a green transition in the Pilbara region and more broadly in the global shipping industry," he said.

"Pilbara Ports is progressing on several strategically significant projects, including major port infrastructure upgrades at Dampier and Port Hedland, to support the production of clean fuels in the Pilbara.

Pilbara Ports and Yara will continue to work together as first movers to enable safe ammonia bunkering in the Pilbara as the switch to zero-carbon shipping materialises. **AMR**



Bags of money being handed to a person.

BATTERY MINERALS STRONG AMONGST SUCCESSFUL EIS APPLICANTS

WA Mines and Petroleum Minister Bill Johnston has announced the successful applicants for round 28 of the Exploration Incentive Scheme's (EIS) co-funded drilling program and series 6 of the energy analysis program.

Round 28 will offer grants worth more than \$6m to 33 general applicants and three prospectors for projects to be drilled between December 2023 and November 2024.

More than half of the successful applicants are searching for battery minerals, including five projects exploring for lithium, six for rare earth elements and 13 for nickel.

Series 6 of the energy analysis program will offer \$120k to three successful applications who are undertaking analysis and reprocessing projects in the Canning Basin and Officer Basin.

Minister Johnston commented on the program.

"The ongoing interest in the Exploration Incentive Scheme reflects the strength of WA's exploration sector and industry's confidence in our State's economic future," he said.

Western Mines Group (ASX:WMG) was awarded \$220k under round 28 of the

EIS to fund deep drilling at the Mulga Tank project.

The company plans to use this money to drill a 1500m-deep diamond hole to follow-up the diamond drilling program undertaken last year.

The hole will look to test the deepest part of the Mulga Tank ultramafic complex and target a significant gravity high, magnetic high and MobileMT anomaly.

Western Mines chairman Rex Turkington further elaborated on what the funding will be used for.

"The maximum \$220k award will be used to drill another exciting deep hole aimed at testing some significant targets at the base of the Mulga Tank complex following our outstanding results from the project during this year," he said.

The EIS will expand next year to include a co-funded geophysics program that will offer \$2m per year to co-fund greenfields exploration geophysics data acquisition.

Applications for this program will open in February 2024 along with round 29 of the EIS and series 7 of the energy analysis program. **AMR**

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QUEENSLAND'S

\$116.8B BENEFIT AMIDST COAL ROYALTY TAX WARNING

Queensland's resources sector has delivered a record \$116.8b in economic benefits in FY23 and supported over half a million jobs in the State, according to the Queensland Resources Council's (QRC) annual Economic Contribution Report released today.

This is \$22.2b more than FY22, representing one in four dollars spent in Queensland, with QRC chief executive Ian Macfarlane saying that this shows what is at risk from the State Government's introduction of the world's highest coal royalty taxes on the sector.

"Queensland's current prosperity is the result of decades of past investment by mining and energy companies from all around the world as well as by companies based right here," he said.

"Unless that level of large-scale, long-term investment continues, Queensland's economy is going to look very different in the future.

"We shouldn't be giving companies a reason not to invest here.

"To put it this perspective, coal companies accounted for 72%, or \$83.7b, of our sec-

tor's total contribution to Queensland's Gross Regional Product (GRP) in the past financial year and they continue to be our industry's largest employer of Queenslanders."

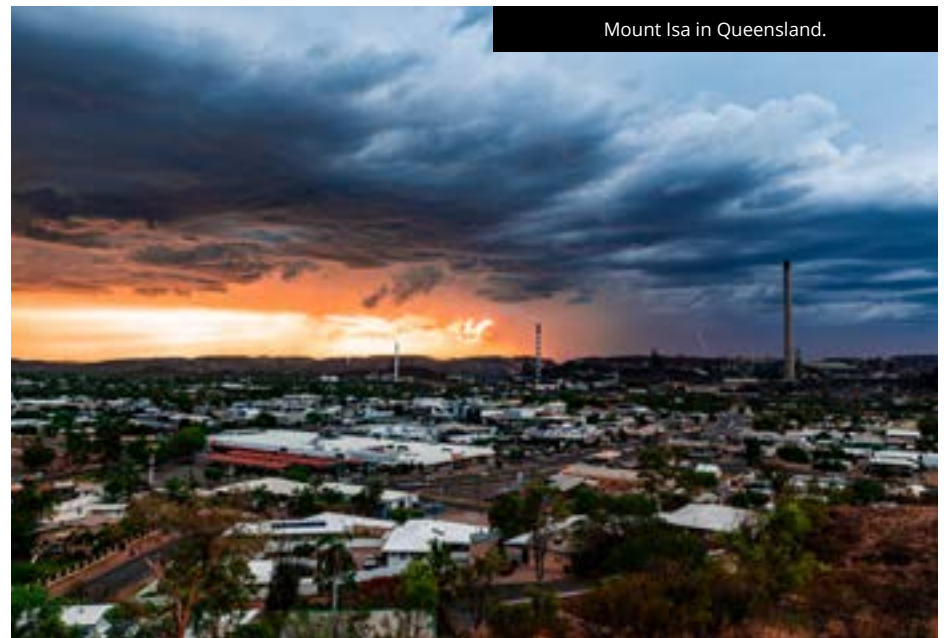
Mr Macfarlane says the 2022-23 Economic Contribution report shows an increase in the resources sector's contribution to Queensland across every key indicator.

"The total number of direct and indirect jobs supported by the resources sector jumped from 450,000 to more than 532,000 over this 12-month period, accounting for one in every six Queensland jobs," he said.

"Mining and energy companies spent a total of \$33b buying goods and services from nearly 16,000 Queensland businesses and supporting over 1,400 local charities and sports clubs.

"The direct spend by the metals mining industry on local businesses and charities rose by 41% and the number of jobs supported by gas producers increased by 18%."

Mr Macfarlane says a strong resources sector is crucial to Queensland's continu-



Mount Isa in Queensland.

ing prosperity and to funding government services and infrastructure such as roads, police, hospitals and schools.

BHP recently announced it was not going to invest in any new growth projects in Queensland while the current royalty regime was in place.

"Queensland's excessive tax on coal producers is out of step with the rest of the world and has given companies a reason not to invest in new projects here," Mr Macfarlane said.

"Coal royalty tax revenue exceeded \$15b last financial year, and the Queensland Government estimates conservatively indicate it will be at least \$5b this year, but it is likely to be much higher.

"Payments by resources sector companies to the Queensland Government more than

doubled last financial year.

"Royalties alone jumped from \$8.9b to \$18.1b and that's before you add land and payroll taxes, transfer duties and other regulatory costs imposed by the State Government.

Mr Macfarlane adds that, under the former tax regime, coal producers would have paid about \$14b in royalties over this period.

"So it's about an extra \$6.5b impost on the sector in just two years," he said.

"If the government wants the resources sector to continue to support economic growth and jobs, it needs policies that encourage new investment and stimulate a pipeline of new projects in the years and decades to come." **AMR**



Aerial view of Townsville coastline.

TOWNSVILLE

HOME OF AUSTRALIA'S 1ST CRITICAL MINERALS FACILITY

Mineral processing and infrastructure solutions company Sedgman has been appointed managing contractor for the delivery of a critical minerals processing facility in Queensland.

Queensland has access to some of the world's richest critical mineral-producing areas, with the North West Minerals Province assessed to hold deposits worth \$500b.

Sedgeman will work closely with the Queensland Government to develop the design and construction program for the Queensland Resources Common User Facility (QRCUF).

The QRCUF will accelerate the development of commercial mining projects in the

State, promote investment in advanced mineral manufacturing opportunities and support supply chain and industry development.

Mining companies will be able to trial mining processing techniques, demonstrate project feasibility at scale and provide product samples to accelerate commercial development opportunities.

Queensland Treasurer and Trade and Investment Minister Cameron Dick says the common user facility will ensure the state has a strong mineral future.

"This facility will prepare Queensland for the future of clean energy production through the critical minerals the world needs," he said.

"This facility will enable smaller mining companies to prove up their product and develop new opportunities for vanadium mining in Queensland.

"As the only facility of its kind in the Asia Pacific, the facility will also position Queensland at the forefront of innovation and commercialisation to drive advancements in manufacturing, defence and scientific research."

Located at the Cleveland Bay Industrial Park in Townsville, the facility will support the growth of the State's emerging critical minerals sector.

It's expected to be operational for vanadium processing in 2025, with capacity to expand over time to incorporate other crit-

ical minerals such as cobalt and rare earth elements.

Sedgeman managing director Grant Fraser commented on the facility.

"We see the Queensland Government's initiative to develop a critical minerals common user facility as a vital step in ensuring Queensland and Queensland companies stay at the forefront of the technology development essential to develop new resources driven industries required for our energy transition," he said.

"We will now begin to engage other Queensland companies to bring this state-of-the-art facility to life." **AMR**

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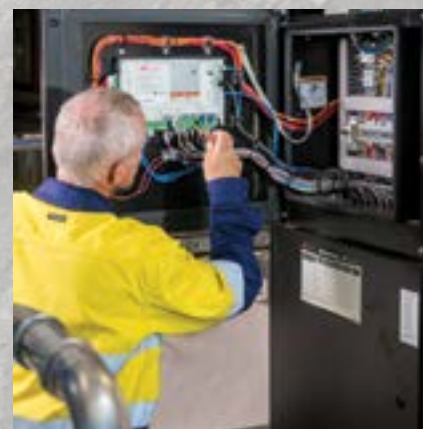
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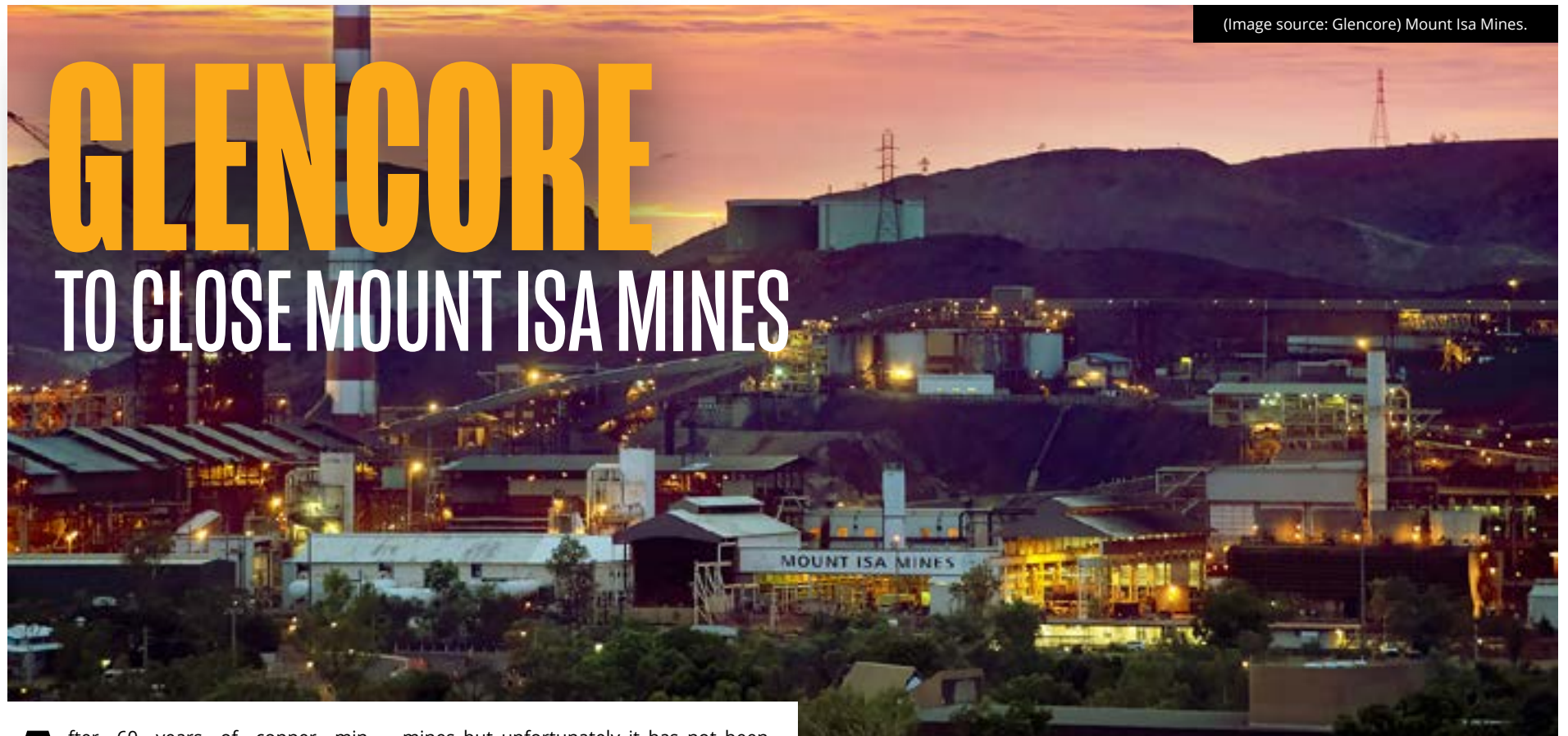


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(Image source: Glencore) Mount Isa Mines.

GLENCORE TO CLOSE MOUNT ISA MINES

After 60 years of copper mining, Glencore is set to close the Mount Isa Mines underground copper operations (Enterprise, X41 and Black Rock) and copper concentrator in H2 2025.

Mount Isa Mines' other metals assets including the copper smelter, George Fisher mine, zinc-lead concentrator and lead smelter in Mount Isa, plus the copper refinery in Townsville, will continue operating.

Glencore conducted a range of studies and reviews to further extend the life of the

mines but unfortunately it has not been possible, and they have reached the end of mine life.

These studies also revealed that the remaining mineral resources aren't economically viable due to low ore grades, there are areas where safe extraction can't be achieved and ageing infrastructure.

Glencore's Lady Loretta zinc mine, a finite orebody with a seven-year mine life, will also close in 2025.

Glencore's zinc assets chief operating

officer Sam Strohmayr says this decision will be disappointing for staff and suppliers.

"The reality of mining is that mines have a beginning, middle and end. And unfortunately, after 60 years of operation, Mount Isa's underground copper operations have now reached that end," he said.

"Our focus over the coming months will be to work closely with our people and contractors, our suppliers and the

Mount Isa community to provide support as we move towards closure of these assets.

"Glencore will continue to invest in the long-term future of Mount Isa Mines, including the George Fisher mine with a current life of mine to 2036, and our zinc-lead concentrator and lead smelter. We also expect the copper smelter and refinery to continue operating to 2030, subject to approval of additional capital investment." **AMR**



(Image source: Thies) Drill rig at Olive Downs.

Thies has made history at Pembroke Resources' Olive Downs Complex, making it the world's first mining operation to deploy Cat MineStar Command.

Recently, Thies began fully autonomous hauling and drilling operations at Olive Downs from a purpose-built facility on site.

This includes deploying 21 haul trucks and three drills fitted with autonomous technology.

Additionally, Thies established a private LTE network in Pembroke's onsite communication infrastructure, enabling the safe opera-

tion of more than 85 connected assets within the autonomous operating zone.

Thies head of autonomy and operations technology Trent Smith says the company is pleased to achieve this milestone.

"We're pleased to achieve this milestone in collaboration with Pembroke Resources, Hastings Deering and Caterpillar and remain committed to operating the Olive Downs Complex to a global standard," he said.

"This achievement also highlights Thies' ability to safely and efficiently transition

THIESS DEPLOYS AUTONOMOUS MINING AT PEMBROKE'S OLIVE DOWNS

from a greenfield site to a fully autonomous operation within 18 months, including exceeding our target of 6500 annualised hours within two months of kicking off autonomous hauling operations."

Cat MineStar Command, which is available for both construction and mining applications, enable remote-controlled operations through to full automation, providing customers with multiple operational benefits.

The start of autonomous operations is expected to enhance sustainability efforts for Thies and Pembroke Resources through skill development, lowered diesel consumption and prolonged life and consumable components.

At full capacity, 15 autonomous Cat 764 AC trucks, six autonomous Cat 793F trucks and three autonomous Cat MD6310 drills will be in operation.

Pembroke Resources chief executive Barry Tudor commented on the milestone.

"With a dedication to achieving cleaner, more energy-efficient operations, Thies, in collaboration with Hastings Deering and Caterpillar, is an ideal partner for Pembroke Resources as we seek to lower emissions," he said.

"This achievement is a major step towards the goals of a sustainable autonomous mining solution and builds on our already strong environmental practices." **AMR**

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ACDC METALS RELEASES MAIDEN MINERAL RESOURCE FOR GOSCHEN CENTRAL



Blue sky over ACDC Metals' Goschen Project.

A CDC Metals (ASX:ADC) has released a maiden JORC compliant mineral resource for the Goschen Central project in Victoria.

Goschen Central lies in the Murray Basin, Victoria, which is a globally significant province for the production of heavy mineral sands and an emerging province for the production of critical rare earth elements needed for the required global decarbonisation.

The mineral resource reads 122mt at 3.4% total heavy mineral (THM) and 1013 parts per million (ppm) total rare earth oxide (TREO).

Furthermore, it shows a very-high value mineral suite with up to 25% zircon, 9.2%

rutile, 3.8% monazite, 0.43% xenotime, 12% leucoxene and 24% ilmenite.

This is the first resource calculated for Goschen Central and it sets the stage for resource growth and economic studies at the project.

ACDC Metals chief executive Tom Davidson says the maiden mineral resource marks a key milestone for ACDC.

"The estimate shows a significant and large deposit with a high value mineral assemblage, in particular the zircon, monazite and TREO grades," he said.

"The Goschen Central project has potential to support a multi-decade operation and be a significant project for the domestic

supply of critical minerals.

"The project aligns well with peer projects in the region and shows the value in Murray Basin.

"We look forward to getting underway with the next round of drilling, and our team on the ground are preparing to further extend grade and confidence.

"We remain confident that we can build on this maiden resource."

The mineral resource remains open to the north, south and west with additional aircore drilling planned to begin in 2024 for resource extension.

To support the development of the project,

ACDC Metals has begun a scoping study with Mineral Technologies.

Further metallurgical testwork is also underway to support the next stage of development and this will provide valuable product quality information for marketing. **AMR**



A new dawn at ACDC Metals Goschen project drill rig.

GOLD AND BASE METAL MINERALISATION CONFIRMED AT EARAHEEDY



Miner holding gold nugget.

Gold and base metal mineralisation has been confirmed at Lodestar Minerals' (ASX:LSR) Earahedy project in WA.

Recently, 22 reverse circulation holes, for 3900m, were drilled to follow up significant gold and copper intersections encountered in previous first pass aircore drilling programs.

Significant gold intersections were returned in three of the four target areas as well as significant copper and zinc mineralisation. Notably, mineralisation was encountered in all four of the targets.

Overall, up to 1.73g/t gold, 0.16% copper and 0.29% zinc was intersected in this drilling program. These results are highly encouraging and support Lodestar's geological model and the strong potential for multiple mineralised systems and economic discoveries.

Lodestar has begun a downhole electromagnetic survey to detect conductors that may indicate nearby massive copper sulphide mineralisation.

A follow-up 1000m diamond core drilling program is also being planned for mid-November to better test the orientation and structural controls of the gold and copper mineralisation as well as any DHEM conductors to better understand the stratigraphy of the area.

Lodestar Minerals managing director Ed Turner says the results confirm the prospectivity of Earahedy.

"The significant gold, copper and zinc intersection justify diamond core drilling which will commence in mid-November," he said.

"Whilst these composite samples are encouraging, we are expecting the single metre intervals will likely display even higher grades.

"Our initial drilling campaigns have clearly shown the project has the potential to host multiple mineralised systems, namely a high-grade volcanic massive sulphide copper-gold DeGrussa style deposit as well as stand-alone gold deposits."

Infill soil sampling programs are also underway between the drilled areas to test for standalone gold, copper and zinc targets. **AMR**



The Junction Dam tenement is strategically situated immediately adjacent to the Boss Energy Honeymoon uranium tenement and mine – one of just four permitted uranium mines in Australia (three of which are in South Australia).

MARMOTA

TO GROW JUNCTION DAM URANIUM RESOURCE

Marmota Ltd (ASX: MEU) will recommence exploration at its Junction Dam uranium project, which was stopped in 2014 due to halted market conditions from the Fukushima aftermath.

At the same time, the company has engaged uranium expert Mark Couzens from Indepth Geological Services for a full technical analysis of the stratigraphy and mineralisation of Junction Dam and to design the first drill program for the restart.

Due to the dramatic upturn on both uranium prices and sentiment, Marmota aims to substantially grow its uranium resource within a short time frame.

Marmota executive chairman Dr Colin Rose commented on this.

"The Junction Dam uranium resource is one of the most exciting uranium deposits in South Australia," he said.

"The future for Marmota looks very promising with both Aurora Tank gold and Junction Dam uranium showing the potential to be outstanding deposits.

"The timing is also perfect for Marmota, with Aurora Tank gold reaching an advanced stage and focus there shifting from exploration to the production pathway – notably carrying out metallurgical testwork to optimise low-cost heap leach production – and with the uranium market fundamentals and sentiment dramatically increasing."

The company's Junction Dam project has a current uranium resource of 5.4mlb @ 557

ppm U3O8 and an exploration target of 22-33mlb @ 400-700 ppm U3O8.

Mr Couzens says this is one of the most exciting uranium projects he has worked on in Australia.

"There are nearly 200 holes drilled by Marmota to date which enables a very detailed

stratigraphic review to be carried out on the project," he said.

"Work will be commencing on the identification of high-grade uranium bearing palaeochannels through the existing deposits, and also identifying high potential targets for high-grade extensions where very little drilling has been completed to date."

The Junction Dam uranium resource is located within the same Yarramba Palaeochannel as the Boss Energy (ASX:BOE) Honeymoon uranium mine (36mlb @ 660 ppm U3O8).

The market capitalisation of Boss Energy currently exceeds \$1.5b.

Marmota's Junction Dam tenement EL 6530 bookends both sides of the palaeochannel of the Boss Honeymoon plant.

The company says uranium mineralisation is open at all prospects and Marmota's two adjoining uranium prospects, Bridget and Yolanda, are not yet included in the current Junction Dam uranium resource. **AMR**

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DEC2023 AMR



Exterior of TAFE NSW building.

NSW TAFE has launched eight new renewables courses, supporting the NSW Government's commitment to rebuild TAFE and training in the state.

In September, the NSW Government released its strategy to secure the reliable supply of clean and affordable renewable energy for the state.

With up to \$3.8b under the five-year National Skills Agreement (NSA), NSW now has the funding security to boost skills training in the renewable energy and technology sectors.

These eight new microskills are short self-directed online courses aimed at developing a specific skill.

Courses will be rolled out over the next six months and include:

- Emergency responder electric vehicle incident and emergency response
- Introduction to fuel-cell electric vehicles
- Contextualised fuel-cell electric vehicles
- Hydrogen energy fundamentals
- Electric vehicle charging station baseline knowledge
- Refuelling fuel-cell electric vehicles
- Prepare to work in the renewable energy sector
- Introduction to wind farms

NSW Premier Chris Minns says the agreement will support residents of the State.

"The National Skills Agreement will pave the way in supporting the people of NSW to gain the skills they require for emerging industries," he said.

"These courses are an example of where funding from the NSA can be utilised to ensure TAFE NSW accelerates skills training in renewable energy through collaboration with industry and government."

The courses will ensure more consumers purchase electric vehicles and the electric bus fleet expands, while existing workers in the automotive industry will be equipped with the required skills in the maintenance, repair and charging of the vehicles.

Additionally, the courses will ensure emergency responders such as police, paramedics, firefighters and rescue workers can be trained to manage the unique challenges of electric vehicle accidents.

NSW TAFE

LAUNCHES EIGHT NEW RENEWABLES COURSES

NSW Skills, TAFE and Tertiary Education Minister Steve Whan says the funding will accelerate skills training across the State.

"The National Skills Agreement means vital funding is secured to accelerate skills training in NSW, keeping TAFE NSW at the forefront of the sector," he said.

"These eight new microskills are just the first step.

"I'm particularly excited about how these microskills will benefit our regional areas, school leavers and existing tradespeople by introducing them to skills and opportunities in wind and solar power generation particularly those within renewable energy zones." **AMR**

BARMINCO

DONATES SANDVIK UG TRUCK TO PERTH TAFE STUDENTS

Barminco has donated a Sandvik underground truck to South Metropolitan TAFE in Perth, WA, to help train the next generation of skilled mining and heavy automotive workers.

The refurbished truck, worth about \$1.8m new, has lived out its full mine life and will now serve as a training resource for plant mechanic apprentices, trainees and students at the Heavy Vehicle Mechanical Training Centre at the Thornlie campus.

WA Training Minister Simone McGurk thanks Barminco for its generous donation, which will help train up the mining and heavy automotive workforce of the future.

"Providing students with contemporary machinery ensures when they land jobs they're already equipped with the skills demanded by industry – so they can hit the ground running," she said.

"The Sandvik underground truck is a welcome addition to South Metropolitan TAFE and complements the State Government's \$25m investment in modern equipment for WA TAFE colleges.

"The mining and resources sector is a vital component of the State's economy, and this is a fantastic example of how WA TAFE colleges work closely with the mining industry to provide training that leads to real jobs."



Instructor teaching apprentice about heavy vehicles.

The Heavy Vehicle Mechanical Training Centre is home to current industry equipment that mirrors real-life working environments to equip students with job-ready skills.

The donated underground truck will enable students to learn how to diagnose and repair a full range of mining and civil construction equipment including dump trucks, bulldozers, loaders, graders, drill rigs and heavy plant machinery.

The underground truck will join Barminco's previous donation of a refurbished 'Jumbo' development drill for the Heavy Vehicle Mechanical Training Centre.

In its lifetime, the donated underground truck has carried 29,325 loads, totalling more than 1.4mt while supporting development at Barminco's Sunrise Dam and Savannah mining operations in WA and its Dugald River site in Queensland.

Barminco is a Perenti Group company – one of South Metropolitan TAFE's largest employers of apprentices.

More than 90 of the company's active apprentices include 70 heavy duty mechanical apprentices training in the TAFE's Certificate III in Mobile Plant Technology and Certificate III in Engineering – Mechanical Trade (Plant Mechanic) qualifications. **AMR**

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POSITIVE DUTY DEMANDS CHANGE IN SEXUAL HARASSMENT RESPONSE

The Australian Human Rights Commission will have new powers from 12 December 2023 to investigate and enforce an employer's positive duty under the *Sex Discrimination Act 1985*.

Positive duty, introduced in December 2022, was a key recommendation of the Commission's *Respect@Work* Report, led by former Sex Discrimination Commissioner Kate Jenkins AO and published in March 2020.

It imposes a legal obligation on organisations and businesses to take proactive and meaningful action to prevent certain unlawful conduct from occurring and to create safe, respectful and inclusive workplaces for everyone.

Trauma Informed Practice Training (TIPT) founder Tanya Hallett says that while individual states offer objective tools and resources for addressing sexual harassment

and assault in the mining industry, more needs to be done.

"Some resources and training exist for prevention of sexual harassment but there is limited-to-no training available on how to respond appropriately to disclosures of sexual harassment or assault as the supervisor or manager on site," she said.

"There is a definite knowledge gap in responding to reports of harassment and assault in a trauma-informed way which mitigates psychosocial risk.

"Employers must be proactive about preventing and responding to sexual harassment to meet new requirements for positive duty."

Safe Work Australia defines psychological risks as anything that could cause psychological and physical harm.



Sexual harassment complaint form.

TIPT aims to fill that gap for companies by teaching workplaces how to respond to internal reports of assault and harassment in a victim-focused way, as well as have that process transparent to all staff members.

"Managers, supervisors, even other employees need to remember that responding sensitively is absolutely critical in ensuring that the victim of harassment and assault is no further traumatised and damaged psychologically through the reporting process," Ms Hallett said.

"If the response of the employer is invalidating or implies that the harassment or assault should not be taken seriously, then the victim ends up with more psychological trauma and the workplace has failed to in their legal requirement to mitigate psychosocial risk."

According to the *Report for the Sexual Harassment National Enquiry 2018*, the economic cost of sexual harassment claims on the Australian economy is \$2.6b in lost productivity, along with \$900m in other costs.

"There needs to be much more training done for managers and employees in trauma response if companies are to meet legal requirements for minimising psychological risk in a reasonable and practical way," Ms Hallett said.

"This means in-depth, practical training which teaches proper, emotionally intelligent responses."

Ms Hallett has worked within the complex trauma space for more than a decade, as a teacher and trainer.

She has a Cert IV in work health and safety and is a board member of Complex Trauma WA. **AMR**

WA GOVERNMENT LAUNCHES MARS PHD SCHOLARSHIPS

WA Mines and Petroleum Minister Bill Johnston has launched the new Mental Awareness, Respect and Safety (MARS) Program PhD Scholarships hosted by the Minerals Research Institute of WA (MRIWA).

These scholarships will further support a growing hub of leading-edge research in WA to improve the health, safety and well-being of workers in the mining industry.

At least four MARS Program PhD Scholarships will be available to study at any university in the State.

The MARS Program PhD Scholars will have access to the MRIWA Education Program to further support their development as future thought leaders with the skills and passion to tackle safety and wellbeing issues for mine site workers.

Mr Johnston says there needs to be a better understanding of how to prepare people in the mining industry.

ple in the mining industry.

"Scholars of the Mental Awareness, Respect and Safety PhD Scholarships will play an important part in the research ecosystem we are developing in Western Australia," he said.

"They'll be working on producing innovative solutions based on scientific perspectives to improve the health, safety and well-being of workers and others in the mining industry.

"Increasing the number of MRIWA PhDs will advance the understanding of health and well-being issues in the mining industry and provide a mechanism to monitor progress in these very important areas."

The initiative complements the recently announced Professional Chair in Mining Work Health and Safety awarded to Edith Cowan University.

Applications close on December 8, 2023. **AMR**



University students in lecture.



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ply capability of 430,000 Litres in coolants alone and more with notice.

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Major benefits of Envirolife Platinum include:

- **Longer life** — TG Coolants' technology more than doubles the life of conventional coolants
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- **Non-toxic** — Products are classified as non-toxic according to the criteria of NOHSC, making them safe for any person coming in contact with the product

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These coolant products come in sizes ranging from 10 litres, 20 litres, 200 litres and 1000 litres.

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IRON BRIDGE

TAKING FMG ON A NEW MINING DIRECTION

Located in Western Australia's world class Pilbara mining region, the Iron Bridge Project is a joint venture between Fortescue Metals Group (ASX: FMG) subsidiary FMG Magnetite and Formosa Steel IB, that will deliver high grade 67% Fe magnetite concentrate product.

Iron Bridge signifies Fortescue's entry into the high-grade segment of the iron ore market, providing an enhanced product range while also increasing annual production and shipping capacity.

In May, Fortescue successfully made its first magnetite product, remarkably at first run grade of greater than 68% Fe.

The *Australian Mining Review* recently caught up with Fortescue Metals chief executive Dino Otranto for his first-hand view of the project and the achievements obtained at the project to date.

"Iron Bridge builds on Fortescue's strong track record of safely and successfully developing and operating iron ore projects in the Pilbara and will lead the way for magnetite operations in Western Australia," he said.

"Iron Bridge is Fortescue's most complex iron ore project and once connected to the Pilbara Energy Connect program, will be Australia's first magnetite project to operate using renewable energy by 2030."

AMR: How are activities progressing at Iron Bridge? Iron Bridge transitioned to operational production in August. What is the next step in ramping up activities there?

DO: We have successfully completed technical commissioning, from the proof of concept to first production and shipment of high-grade magnetite.

We are now working to bring all the equipment up to capacity with staged mechanical commissioning.

We are on track to ramp up to capacity by August 2025, which will mark 24 months since we transitioned to operational production.

Our focus now is on completing the dry plant line B and the remainder of the wet plant.

AMR: This is Fortescue's first magnetite operation. Is there much difference between commissioning and running a magnetite mine compared to your other iron ore projects?

DO: The Iron Bridge value chain is unique compared to our hematite operations and has a processing design that is different to every other magnetite producer.

The process, which is the subject of several patents, is designed to reduce energy consumption and water use.

It is primarily separate from existing Fortescue infrastructure but does interact at two key locations, receiving energy supply from the Solomon power station and loading product at Port Hedland by our Hedland operations team.

It also has dedicated water and energy requirements supplied from locations remote from the main mine site.

It's important for the entire value chain to operate in harmony as there is a limited buffer or allowable separation of value chain steps.

The supply and management of water to our operations is a crucial element in the success of Iron Bridge as there is a complex water network that needs to be balanced.

Iron Bridge processing requires approximately 25GL per annum of fresh water when operating at full production with water being sourced from the Canning Basin, near mine borefields, recycled water from our concentrate handling facility (CHF) delivered through our return water pipeline

as well as water extracted from the tailing storage facility.

Processing magnetite is significantly more intense than hematite which is why our processing plant design is a patented process and has been specifically designed to cost-effectively achieve high iron ore recovery while minimising energy and water usage.

The Iron Bridge ore processing facility (OPF) is physically larger and uses more plant and equipment than any of our hematite processing plants.

The most notable aspect of this design is the use of dry processing to achieve a very fine sized material.

To achieve 67% Fe product concentrate, the iron ore must be reduced from 400mm to 28 micron (0.028mm).

Unlike Fortescue's haematite operations, Iron Bridge produces a wet concentrate product that is transported to Port Hedland through a 135km underground specialist slurry pipeline where dewatering and materials handling occurs at our CHF.

Magnetite concentrate also has a strict maximum transportable moisture limit to allow safe shipping of 9.5% which we achieve through dewatering the magnetite slurry at our CHF, creating very strict processing quality requirements on the CHF.

Fortescue's Iron Bridge mine. Image courtesy of Fortescue.



AMR: Have you incorporated any new technologies into developing and now operating Iron Bridge?

DO: A few of our most impressive technologies at Iron Bridge include: 12 high pressure grinding rolls with a total installed power of 93MW which reduce the 62.5 mtpa of OPF feed down to 80 micron; the high pressure grinding rolls operate in closed circuit with 12 massive air classifiers, which enable this classification down to 80 micron without introducing any water; and 10 high intensity grinding (HIG) mills, with a total installed power of 50MW.

These vertical stirred mills provide size reduction down to 35 micron in open circuit with high efficiency.

AMR: Fortescue has a strong push towards shrinking its environmental footprint. Is there anything we can highlight in that regard?

DO: Iron Bridge will be among our first fossil fuel-free sites once we connect it up to Pilbara renewable energy through our Pilbara Energy Connect program.

Additionally, the process flow has unique design elements throughout it to reduce electrical power and water usage.

Electrical power is reduced by the extensive use of dry grinding using high pressure grinding rolls.

We reduce the product size down to 80 micron while it remains dry by using two stages of high pressure grinding rolls and air classification.

This uses less power than traditional comminution pathways such as SAG and Ball Milling as well as reducing water usage.

Water usage is further reduced due to the 10 Lyons Flow Control Unit (LFCU's) utilised to deslime the concentrate in the wet processing plant.

FACTS AND FIGURES

Iron Bridge is expected to produce 22mtpa of high-grade magnetite concentrate over its lifetime.

More than 20,000 jobs have been created through the Iron Bridge project with the site workforce peaking at 4,000 jobs during construction.

Another 900 full time jobs will be created with the project moving into operations.

A total of A\$3.6b in goods and services have been sourced within WA for the Iron Bridge project and operations, including over \$331m awarded directly to local Traditional Custodian Nyamal businesses since 2020. **AMR**



Fortescue's Iron Bridge mine. Image courtesy of Fortescue.



Fortescue's Iron Bridge mine. Image courtesy of Fortescue.

AWARD-WINNING MODULAR BUILDERS

Northern Transportables specialises in the design, manufacture, delivery and installation of turnkey transportable modular building solutions.

Locally established, owned and operated in the Northern Territory, Northern Transportables is an award-winning transportable building manufacturer, servicing mining, oil and gas industries as well as for the construction, education and government sectors.

From its head office, fabrication and manufacturing facility base at East Arm and its Hire Asset Facility at Pinelands, the company's modular building solutions are all completely customisable to suit the unique needs of its clients.

Northern Transportables supplies portable sheds for mining camps, control rooms, site huts, kitchen and crib facilities, laundries, and office spaces.

From single and multi-level modules to complete mining camps, Northern Transportables' professional team works closely with clients to develop building solutions that meet their needs, ensuring that clients get the right transportable the first time.

Northern Transportables' fabrication and manufacturing facility is fully equipped, with more than 3000m² under roof, allowing all construction to be completed on site and in a short time frame.

The highly skilled and experienced team are committed to providing the best service possible to all clients.

Its Northern Transportables team consists of skilled tradesmen, apprentices and trainees, transport and logistics staff, a professional design team including qualified structural drafters and building information modellers (BIM), and qualified professionals in areas such as accounting and finance, contract and project management, human resources, work health and safety, governance and risk management.

Northern Transportables offers a creative and innovative design experience through interactive 3D modelling, involving the customer in the design process every step of the way to capture their vision and will then tailor plans to the client's exact requirements.

All designs are rated for cyclonic conditions, employ all-steel construction and are designed and certified in accordance with Northern Transportables standard drawings.

The next step is installation of the building to onsite services, connections and supply of goods including office desks,

chairs, whiteboards, gas ovens, beds and fridges to accommodation buildings, all completed by the Northern Transportables team.

The company works closely with Project Building Certifiers who certify the building and provide a permit to occupy.

Prefabricated and manufactured on-site from the ground up, its products are delivered Australia-wide using its own fleet of NHVAS and WAHVA prime movers and trailers.

The company has a sound reputation for successfully delivering quality transportable building solutions with its quality products and services used by major resource companies across WA and the Northern Territory, including Ichthys LNG, Rio Tinto, BHP Billiton, Fortescue Metals Group (FMG) and Xstra Zinc.

Recent projects include the construction and maintenance of a 1000-man camp at FMG Eliwana Rail Camp 95, mining, offices and site facilities for South 32's Groote Eylandt Mining Company (GEMCO) and accommodation for Jemena and McConnell Dowell on the Northern Gas Pipeline.

As a registered building contractor at the forefront of the Northern Territory's transportable manufacturing industry, Northern Transportables designs and manufactures

transportable modular buildings for both sale and hire, Australia-wide.

In addition, it offers raw construction materials for sale and road train fleet services for wet or dry hire.

Northern Transportables is accredited under both the National Heavy Vehicle Accreditation Scheme (NHVAS) and the Western Australian Heavy Vehicle Accreditation (WAHVA) Scheme, which allows it to repair and maintain its accredited heavy vehicles and trailers in-house, ensuring compliance with safety standards.

As a leading transportable manufacturing industry, the company supports the Northern Territory economy and industries, 'Buying Local' policy to support local businesses, local suppliers and employing local labour where possible.

Operating under a triple Certex Quality, Safety and Environment Integrated Management System and Contractor Accreditation Limited (CAL) accreditation, Northern Transportables' success is supported by a values-based working environment with a strong focus on quality, safety and reliability. **AMR**

For further information, Northern Transportables can be contacted on **(08) 8995 6500** or visit its website at **www.northerntransportables.com.au**

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- Toilets, ablutions and laundries
- Health care and first aid facilities
- Domestic housing and granny flats
- Emergency housing solutions

Lyons Technology brings advanced beneficiation processes to Fortescue's Iron Bridge

As Australia's iron ore landscape continues to evolve and new steelmaking technologies require higher grades and lower gangue, the stage is being set for more advanced beneficiation processes.

Gravity separation of fine iron ore from gangue, particularly for particles smaller than 45 μm , has historically posed challenges. Hindered bed type hydraulic separators have emerged as the heroes in the fines beneficiation flow sheet. Among them, Mineral Technologies' Lyons Units stand tall, due to their ability to upgrade iron ores in fine and ultrafine size ranges.

Proven technology

Developed in the early 2000's, Lyons technology is well proven for the mineral sands industry, where Lyons Units deslime feed to the gravity separation equipment whilst providing surge capacity. Today, the Lyons technology is also used for dewatering mineral sands tailings and heavy mineral concentrates. The technology is now in use in multiple applications across Africa, North America and Australia.

Innovation

The Lyons technology is named after Mineral Technologies Principal Design Specialist, John Lyons, who has been developing the Lyons Units at Mineral Technologies for the past 20 years.

John's innovative design of the Lyons technology was achieved by applying the fundamental engineering principles associated with material flow combined with his hands-on operational knowledge that the bulk density of a process slurry feed becomes constant as major consolidation stress increases.

The lightbulb moment for John came when he recognised that conventional thinking of a water and sand slurry mixture as a viscous fluid was incorrect, and that the material was better described as a bulk solid under saturated conditions. John understood that this gave the potential to create a piece of equipment (the Lyons Unit) which could provide a constant density feed to the downstream process plant and that the addition of an inner cone piece had the potential to eliminate funnel flow (colloquially known as "rat-holing") and promote mass flow product discharge from the bin. See below diagram.

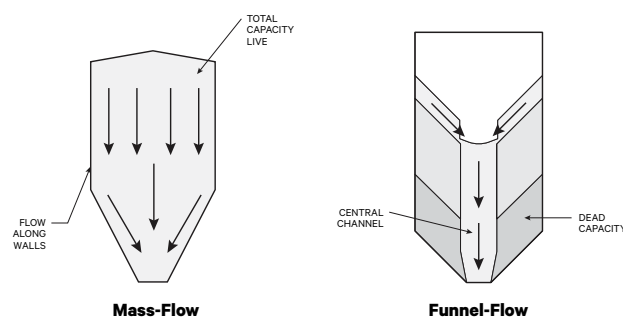


Figure 1: Mass flow vs funnel flow

Collaboration

Throughout the research and development process, John worked with several specialists including The University of Newcastle Research Associates (TUNRA), leading mechanical engineering experts Arnold McLean and later Steve Wiche and Isabelle Lecreps, as well as metallurgists and engineers from within Mineral Technologies to bring his vision to reality.

Application for Iron Bridge

Working together with the team at Iron Bridge, Mineral Technologies has transferred the Lyons technology from mineral sands applications to iron ore, with the installation of 10 Lyons Units at the Iron Bridge Ore Processing Facility (OPF) in Western Australia. In the OPF flow sheet, the Lyons Units are beneficiating the magnetite by elutriating finer, lower-density gangue particles from the denser magnetite particles.



Birds-eye view of Fortescue's Iron Bridge operation. Photo courtesy of Fortescue.



LYONS

TECHNOLOGY

Designed and built by **Mineral Technologies**

Autogenous classification delivering water savings

In a beneficiation flow sheet, Lyons Units operate on the principle of 'Autogenous Classification,' to classify feed by particle density. The Lyons Unit performance depends on various factors, including feed characteristics, operational parameters, and retention time.

Magnetite processing is power and water intensive, due to the need to crush and grind the ore, and the multiple processing stages required to increase the Fe grade to a saleable level.

Iron Bridge sought a partnership with Mineral Technologies to design Lyons Units specifically for the Iron Bridge OPF.

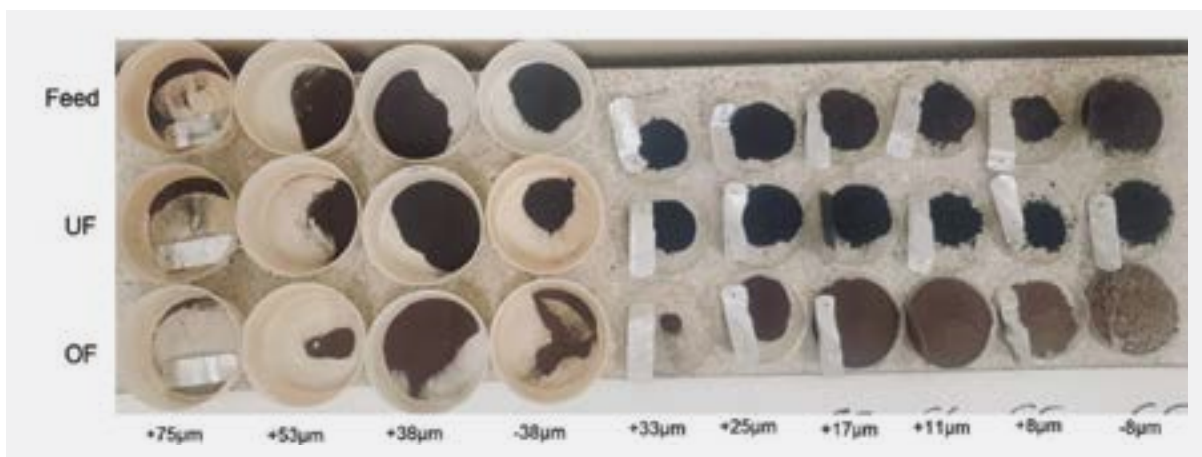


Figure 2: Feed, underflow and overflow by size fraction

Exceptional iron recovery

The light minerals are carried upwards by the water released from the slurry due to the consolidation that takes place inside the Lyons Units. The high level of consolidation achieved means less water is added to the process.

This allows downstream equipment to continue to operate for several hours even when upstream feed is under maintenance, and similarly, the upstream equipment can operate even if downstream processes are offline for maintenance.

Reshaping beneficiation

As the iron ore industry charts a new course towards sustainability and resource efficiency, the story of the Lyons Unit serves as a testament to the power of innovation in reshaping the mining landscape. It's a journey where the low-grade fines are no longer wasted – they are transformed into valuable resources, driving the industry forward into a more sustainable future.



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AEROBELT, SUPPLYING ITS SERVICES TO THE IRON BRIDGE MAGNETITE PROJECT

Aerobelt's air supported conveyors can be supplied in a range of sizes and capacities to transport a wide range of common and specialised products. Many different products are transported on Aerobelt conveyors across a range of industries including mining, food and industrial products.

Aerobelt's engineers have extensive experience across design, maintenance and installation plus extensive backgrounds in mining, design and industrial engineering.

There are many variations to the standard Aerobelt conveyors and rest assured if a project requires an unusual configuration, Aerobelt will give a rapid assessment of options.

Conveyor construction options include stainless steel construction, specialised bearings, hazardous and DIP construction, and the incorporation of inline weighers. Chutes and inlet options include stainless steel construction, high wear resistance chutes and inlet doors, shuttle feeder conveyor and reversing conveyor.

Aerobelt offers a range of services from ex works supply only to supply, delivery, steelwork fabrication, electrical system

design and supply, and installation and commissioning.

During their non-conventional construction, there are many advantages when using an Aerobelt conveyor, including:

- Lower power consumption results in smaller drives, reduced power requirements and overall lighter weight conveyor construction
- An ability to convey product at steeper inclines due to the low product agitation on a continuously supported air belt
- Fewer moving parts result in less noise and maintenance requirements
- The enclosed design reduces dust, noise and improves safety by providing a physical barrier between personnel and the loaded belt

Aerobelt has supplied almost 400 conveyors across all Australian States and in several overseas locations, and currently, Aerobelt is supplying its conveyors to the Iron Bridge Magnetite Project in WA.

IRON BRIDGE MAGNETITE PROJECT

The Iron Bridge Magnetite Project enters the high-grade segment of the iron ore market, the project provides an enhanced product range while also increasing annual production and shipping capacity.

The project includes the construction of a process plant, non-process infrastructure, slurry and return water pipelines, a raw water pipeline and port infrastructure to support production of 22wmtpa.

In July of 2016 Aerobelt was invited to give a presentation about Aerobelt conveyors and their benefits. In February 2020 Aerobelt received a tender for the supply of the Baghouse conveyors for their new plant at Iron Bridge Magnetite Project and then in May 2020 Aerobelt was awarded the contract.

The Iron Bridge Magnetite Project required the supply of 24 Baghouse Conveyors in total for their process lines "A" and "B", each line has 3 Baghouses. Aerobelt supplied 3 Conveyors with 800mm wide belts and 1 conveyor with

1200mm wide belts to carry fines from each Baghouse discharge to their coarse slurry tanks.

The 800mm wide conveyors have capacity of between 487 to 567 tonnes per hour and belt velocity of up to 2.9 metres per second requiring only 10.2 kilowatts of calculated power.

The 1200mm wide conveyors have capacity of between 1145 to 1260 tonnes per hour and belt velocity of up to 3.1 metres per second requiring only 15.4 kilowatts of calculated power.

Aerobelt worked with their team to refine the designs that they required and the conveyors were issued for manufacture in March 2021.

Aerobelt fabricated the conveyors in Perth during the COVID lockdowns which was another hurdle their engineers had to overcome as they are based in Sydney. The conveyors were completed, packed and shipped to site on time and budget. The Baghouse "A" conveyors were installed and Aerobelt commissioned them in June 2023 which helped the Iron Bridge Magnetite Project to achieve its first ore on ship by July 2023. **AMR**

For more information, visit aerobelt.com.au, call 02 4631 2919 or email info@aerobelt.com.au.



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(Image source: Ramelius Resources)
Aerial view of the Penny gold mine.

Australia has a long history of gold mining which has helped shaped the country and economy in many ways, with gold exports generating revenue of \$25.8b in FY22.

Gold not only led Australia's first mining boom, but it also triggered the 19th century gold rush with people travelling from all over the world to the goldfields of Kalgoorlie, Ballarat, Bendigo and Bathurst.

As the country with the largest known gold resources in the world, Australia has a significant opportunity to supply the world's gold demand.

ASX200-listed company Ramelius Resources (ASX:RMS) has taken advantage of Australia's gold resources, owning six gold mines, all of which are located in WA.

Ramelius owns and operates the Mt Magnet, Penny, Marda, Tampia, Symes and Edna May gold mines, while the company-making mine — Wattle Dam — was at one stage the highest-grade gold mine in Australia, operating from 2006 to 2013.

Ramelius boosted its portfolio in January 2022 when it completed the takeover of Apollo Consolidated and acquired the Rebecca gold project and, in June 2023, Ramelius completed the takeover of Breaker Resources to acquire the Lake Roe gold project, which is within 50km of Rebecca.

A month later in July, Ramelius moved to acquire Musgrave Minerals and later took full ownership of the Cue gold project.



(Image source: Ramelius Resources) Ramelius Resources managing director Mark Zeptner.

Ramelius managing director Mark Zeptner spoke about the acquisition of Roe.

"Roe is part of our long-term strategy to increase shareholder value through both organic, which is more exploration, and inorganic, which is more your acquisition or your merger and acquisition piece," he told The Australian Mining Review.

"The acquisition of Breaker Resources was in line with the idea of growing inorganically and the Roe project came through the acquisition of Breaker Resources which is complementary to our nearby project called Rebecca that we acquired through the acquisition of Apollo Consolidated in early 2022.

"They [Roe and Rebecca] are both advanced exploration projects, there's no processing facility or no mine yet.

"There's a total of over 3moz of mineral resources between the two projects."

Since Ramelius began production in 2006, overall output has ramped up to current rates of around 250kozpa with guidance of between 250-275koz in FY24.

PENNY

After receiving full approvals for haulage in May 2023, Ramelius has been able to ramp up work at Penny despite seeing some lower production in the first quarter of this financial year as a result of mine sequencing.

"Now that we have full approvals for haulage — which we got about three or four months ago — we've been able to ramp up the mine so that the haulage to the mill matches the mining rate," Mr Zeptner said.

"The September quarter just gone we, as expected, saw some lower production due to an increased amount of development ore which is generally a bit lower grade than seen in production.

"From this quarter onwards, we expect Penny to increase its production and be at full production rates from this point forward."

According to Mr Zeptner, full production at Penny is expected to be in the range of 70,000-80,000ozpa.

"Given that Penny is a 15g/t mine, so it's very high-grade ore, it's more or less around the 70,000-80,000oz per year, so it's a very significant portion of the 250,000oz we produce as a company," he said.

GROWTH

Ramping up exploration activities will result in Ramelius spending \$30m this year which is the most the company has ever spent on an annual basis.

"Over the past six years we've made seven acquisitions, either company or project acquisitions, so we're very active in WA gold consolidation," Mr Zeptner said.

"We'll continue to both explore and acquire because we have a longer-term strategy to get above 300,000oz.

"We've been around the 250,000oz production rate for a few years now but we have a goal to be sustainably above 300,000oz which we believe will deliver more value for shareholders."

Ramelius is planning on acquiring a new processing centre — in addition to those at Edna May and Mt Magnet — with the possibility it's completed before Roe and Rebecca come online.

"That's part of our strategic plan to have a third production centre because these production centres typically produce about 100,000oz each.

"So by having three of them, our 300,000oz production target probably makes a bit more sense with that in mind," Mr Zeptner said.

Ramelius is always looking for more potential acquisitions, but the company is remaining tight-lipped about these.



RAMELIUS RESOURCES

STAKING ITS CLAIM ON WA'S GOLD SECTOR

By Ashleigh Melanko



(Image source: Ramelius Resources)
Edna May gold mine.



(Image source: Ramelius Resources)
Lightning near the Penny gold mine.



(Image source: Ramelius Resources)
Symes open pits looking southwest.

ILLAWARRA METALLURGICAL COAL

PREMIUM QUALITY HARD COKING COAL PRODUCER

By Ashleigh Melanko

Steeped in coal mining history dating back more than 150 years, the first coal mines in the Illawarra and Macarthur regions of NSW opened in the early nineteenth century.

Soon after this, collieries were developed to mine coal for the growing local steel industry and labourers settled into the area, bringing their families with them.

Roads, schools and hospitals then popped up and communities flourished.

South32's (ASX:S32) Illawarra Metallurgical Coal operation is located in these regions in the southern coalfields of NSW, around 75km south of Sydney.

Illawarra Metallurgical Coal operates two underground metallurgical coal mines — Appin and Dendrobium — plus the West Cliff and Dendrobium coal preparation plants.

Over the years, mining operations have modernised at Illawarra Metallurgical Coal, making the operation safer and more efficient.

ILLAWARRA METALLURGICAL COAL

Today, both Appin and Dendrobium produce premium-quality, hard coking coal which is processed at the West Cliff and Dendrobium plants before being transported by road and rail to Port Kembla in Wollongong.

Metallurgical coal has the metallurgical properties to produce coke, which is used to make iron within a blast furnace.

The iron is then used to make steel which is widely used as a strong a low-cost metal, particularly in building infrastructure, vehicles and machinery.

In FY23, 6.52mt of coal was produced at Illawarra Metallurgical Coal — including 5.49mt of metallurgical coal — with 3.2mt coming from Appin and 3.3mt coming from Dendrobium.

Underlying earnings before interest, tax, depreciation and amortisation dropped 50% from the same time last year to \$1.08b (US\$692m), largely due to a decrease in the average realised price for metallurgical coal, lower volumes and higher concentrator and labour costs.

"Illawarra Metallurgical Coal returned to stable conditions following adverse weather and other temporary impacts," South32 chief executive Graham Kerr said in the company's FY23 report.

"Despite the headwinds experienced in FY23, and the expectation of continued macroeconomic challenges in FY24, we are continuing to deliver results now and create value for the future."

COMMUNITY PARTNERSHIP PROGRAM

South32 is committed to creating shared value and making a positive contribution to the quality of life of the communities, regions and countries where they operate.

In FY23, South32 invested \$1.41m (US\$900k) in communities around Illawarra Metallurgical Coal with a focus on the local environment, education, health, community support and services, and initiatives for Aboriginal and Torres Strait Islander People.

The Illawarra Metallurgical Coal's Community Partnership Program (CPP) is committed to making contributions towards the sustainable development of communities.

The CPP relates to the Appin Mine, as well as the towns of Wedderburn, Douglas Park, Razorback, Wilton and Menangle.

It aims to support projects, activities or opportunities that provide long lasting community benefit in the following areas:

- Community support and services — transport, infrastructure, youth initiatives, Indigenous services, disability services, early childhood support, sporting facilities, art and culture, economic development and flagship projects;
- Environment — environmental initiatives and improvement projects and programs;
- Education — primary and high schools, adult education and life skills;
- Health — health services and programs.

To be successful, the CPP assess applications based on how well the activity will address areas of need in the community, leave a lasting impact on the community, incorporate community participation and support, and complement other activities in the community.

VENTILATION AIR METHANE PROGRAM

In mid-2022, South32 contributed \$4.5m to fund a new facility featuring cutting-edge technology to tackle fugitive methane emissions. A further \$15m was granted by the NSW Government.

Located at South32's Illawarra coal mine, a pilot ventilation air methane (VAM) abatement program was undertaken to demonstrate the effectiveness of the technology.

The program was said to help encourage greater investment in and uptake of VAM abatement technologies to significantly reduce fugitive methane emissions from coal mining operations in NSW.

Developed by CSIRO, three technologies were created to mitigate methane emis-

sions by either destroying or enriching the gas or capturing VAM.

The choice of the technology was dependent upon the methane concentration in the VAM process stream.

These technologies include:

- **VAMMIT the destroyer** – VAMMIT is a methane mitigation unit with a compact flow reversal reactor with a newly-structured regenerative bed which destroys methane;
- **VAMCAP the concentrator** – VAMCAP is a capture and enrichment unit which collects and separates the methane from the ventilated air using carbon composites;
- **VAMCAT the generator** – VAMCAT uses a catalytic combustion gas turbine to create electricity from captured methane, deriving energy from what would otherwise be a waste product of mining.

In FY23, South32 progressed the commercial scale pilot of the ventilation air methane abatement technology into the feasibility phase.

FUTURE OPERATIONS

South32 expects FY24 production to reduce to 5mt with the next longwall at Dendrobium to begin in Q2 FY24.

Additionally, production is expected to increase by 10% to 5.5mt in FY25, consistent with medium-term production guidance for the complex.

Furthermore, South32 is investing to improve productivity and extend Appin's mine life while also focusing on optimising the Dendrobium mine within approved domains.

(Image source: South32)
Illawarra Metallurgical Coal.

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From L-R: Ethan Tsingos, Eliza Berry, Andrzej Gurba and James Page

AGURBA PROVIDES SPECIALIST UNDERSTANDING OF ENVIRONMENTAL CHALLENGES CONFRONTING UNDERGROUND COAL MINING

AGURBA Pty Ltd was established in 1995 (initially registered as AGURBA Coal Geology Consultants) as a small business specialising in geological services to underground coal mines in areas of coal geology, coal gas and coal petrography. Our ACARP report on coal gas drainage was referenced in the Minerals Council of Australia Pre-Budget Submission 2016-17.

Ultimately, we evolved into a multidisciplinary team of committed professionals with expertise in monitoring the impacts of underground coal mining on the environment, from development approval through mining to post-mining stages.

At AGURBA we monitor a diverse range of land uses including water catchments, bushland, private property, and major infrastructure. Our skilled team is committed to provide expert results in these often-remote environments, safely and efficiently. Services we offer include installation, maintenance and monitoring of groundwater, soil moisture and water level equipment, extensive water quality and water flow monitoring, assistance

in installation of weirs on tributaries to provide accurate flow gauging's, environmental impact identification and assessment, geomorphologic baseline mapping, swamp monitoring, water and gas sampling and geospatial analysis. Latterly, we begun conducting multispectral imagery studies on ecosystems' functionality and archaeological sites using Unmanned Aerial Vehicles.

With over 25 years of contribution to mining in southern coalfields of NSW, AGURBA has a wealth of experience and knowledge, and we are proudly continuing to grow and diversify to give our clients the uppermost service.

AGURBA Pty Ltd has affiliations with the Australasian Institute of Mining and Metallurgy (AusIMM), the Australian Institute of Geoscientists (AIG) and the Institute of Engineers Australia (IEAust).

AGURBA Pty Ltd is also a Corporate Member of the Association of Mining Engineers and Technicians, Poland (SITG) and frequently liaises with the Regional Board of SITG in Lublin. **AMR**



Andrzej Gurba

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Providing services monitoring the impacts of underground coal mining on the environment, from development approval through to post-mining stages.



Angus Walton



Ethan Tsingos

Visit agurba.com for more information.

DUST SUPPRESSION SOLUTIONS DESIGNED FOR MINING

The prevalence of dust from coal removal, haul road trucks, heavy machinery, blasting activities, crushing applications, and other mine processes poses a constant challenge for mine operators. It also presents a risk to the health of both workers and surrounding communities.

This is why dust suppression technology is so important. Asset owners need to not only protect their workers and the environment, but create more productive operations by implementing effective dust control solutions both above and below ground.

Australian owned and operated Kapture® is a market leader in dust suppression solutions. While Kapture® specialises in the mining industry, it's dust control products are widely used in the mining, oil and gas, civil construction, transport, steel manufacturing, municipal and defence sectors.

The company's technologically advanced product range is specifically engineered to meet strict performance and sustainability standards for a range of applications. Products have been rigorously tested in controlled environments and field applications to achieve maximum performance outcomes.

Kapture® is a highly concentrated solid block used as an additive to water for the suppression of dust. Specifically designed for the mining industry, it can be applied using existing site water trucks, tankers or sprinklers, as well as injected into water supply lines.

Made from a blend of water retaining agents and humectants, Kapture® works by breaking the water's surface tension causing it to uniformly spread over a larger surface area. It draws and holds moisture in, stopping it from evaporating in order to capture an increased amount of dust before becoming airborne. It can be applied to all types of clay, coal and siliceous matter.

Kapture® general manager Peter Reed explained how the product works and the philosophy behind its development. "Water alone pools on the surface of the soil and then evaporates. This means that multiple treatments are required to effectively suppress dust. Our dust suppression solutions combine and break the surface tension of the water when airborne, attracting and holding onto the dust for longer. The water then sinks below the soil's surface to avoid evaporation. Water retaining agents draw and hold moisture in to capture an increased amount of dust before becoming airborne.

"Kapture® was developed to reduce the risks associated with dust and silicon in underground coal mines and dusty areas, including silicosis and coal workers' pneumoconiosis," said Reed.

With a commitment to creating quality, cost-effective solutions that outperform conventional dust control methods, safety and sustainability, particularly within communities in which they operate, has been a driving force behind Kapture®'s product innovation.

ENGINEERED DUST CONTROL

From quick and probiotic quick dissolve, to drill assist and slow dissolve dust suppression blocks and powders, Kapture® offers a range of products that provide comprehensive coverage across operations of all scales.

The quick dissolve blocks and powder bags are highly concentrated and fast dissolving in water, which are sprayed across the soil. They are designed to break the water's surface tension making it penetrate and uniformly spread, which results in an increased amount of airborne dust being captured.

"Our probiotic quick dissolve blocks are the environmental choice for dust suppression," said Reed. "They feature a probiotic ingredient designed to target and digest harmful bacteria in settling ponds and waste water, result-



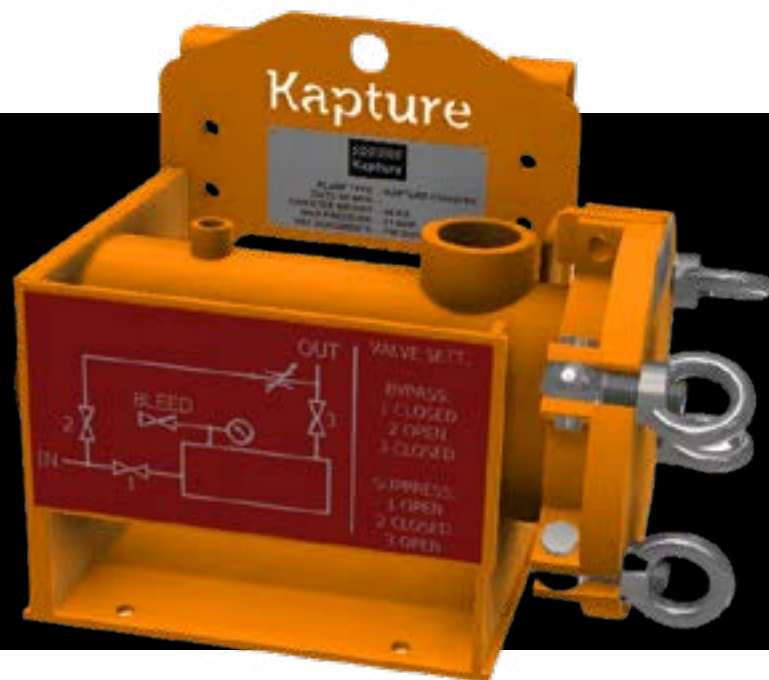
ing in cleaner waterways with a lower environmental impact."

Reed added that they also have a drill assist product designed for overburden drilling.

"This quickly dissolves in water to not only suppress dust, but enhance the drilling process. Water retaining agents bind the soil to assist in collaring of the hole in softer ground, whilst the Kapture® product allows a smoother drilling process and reduces the hazard of bogged drill rods.

"Additionally, our slow dissolve dust suppression blocks are designed for canister dispensers, which slowly dissolves over an entire shift. All the water used contains the dust suppression solution, which protects workers. It works by enhancing wettability to reduce the surface tension of the water, allowing dust particles to better penetrate the water drops.

"It can be used with longwall and development systems, mining systems, conveyor transfer points, road header tunnelling machines, and drill rig systems," said Reed. "As in the case of our drill assist blocks, the product also contains corrosive inhibitors to help minimise equipment deterioration."



ENGINEERED SOLUTIONS DESIGNED FOR MINING

Cost savings and greater productivity are always top of mind in any mine site. Essentially, reduced production times mean reduced production costs.

Kapture® dust suppression solutions can cut production times by almost half as less spray treatments are required. This is achieved via the Kapture® intermediate bulk container (IBC) spray system. The lightweight system is ideal for dust suppression dispersion in large areas, especially in underground mines. It holds 1000 Litres and takes two Kapture® DS500-QD dust suppression blocks for the right amount of surfactant.

"From a productivity perspective, field results have proven double the ground coverage compared to liquid alternatives," said Reed. "By removing the need of a forklift to cart an IBC, or reducing the number of spray treatments required compared to using water alone, crews can work faster.

"Reducing water consumption is a key benefit of our products. More water means increased costs and a negative impact on the environment. Kapture® is more effective than using water alone, which requires fewer application treatments, saving mine operators both water and production costs."

Kapture® has developed products that effectively isolate workers from the source of dust to create safer working areas. This not only decreases the risk of dust-related diseases, but provides a level of eye and hand protection that are not required when using the product. Safe manual handling practices can also be easily adhered due as the maximum carton weight is approximately eight kilograms, therefore can be moved without the need for a forklift.

"Our product is also biodegradable and made from natural ingredients such as coconut oil and palmitate. The outer carton is recyclable cardboard, and the individual plastic wrapping is soluble, which means mines can discard it in the water where it completely dissolves." **AMR**

For more information, visit www.kapturedust.com.au





ENGINEERED DUST CONTROL SOLUTIONS

Kapture® is a highly concentrated solid block or powder used as an additive to water for the suppression of dust. Specifically designed for the mining industry, it can be applied using existing site water trucks, tankers or sprinklers, as well as injected into water supply lines. The product offers a cost-effective solution for a range of industries including the oil and gas, civil, construction, city councils, rail and military sectors.

A RANGE OF UNDERGROUND MINING SOLUTIONS



Dust Suppression Blocks

Quick, Probiotic Quick Dissolve, Drill Assist, and Slow Dissolve dust suppression blocks that provide mine operators with complete coverage of their assets. Designed for different applications and environments.



Kapture® Dust Suppression Bags

A highly concentrated powder product that dissolves fast as an additive to water for dust suppression. The powder breaks the water's surface tension making it easier for the dust to be captured.



Kapture® 2" Canister

Designed for installation into water supply lines behind continuous miners and large flow applications. It allows the storage and replacement of up to four Kapture® Dust Suppression Blocks at a time.



Kapture® 1000L IBC Spray system

Designed for dusty road ways or areas in underground mines. A gravity fed spray system that is used with DS500-QD Bars or DS500-PSP Powders that dissolve in the water and covers approx. 1000 Sqm.



Kapture® Dust Gun

The Kapture® Dust Gun is designed to wet down dusty work sites in remote areas and remote roadways. Its use is ideal for areas where conventional water carts or suppression systems cannot access.

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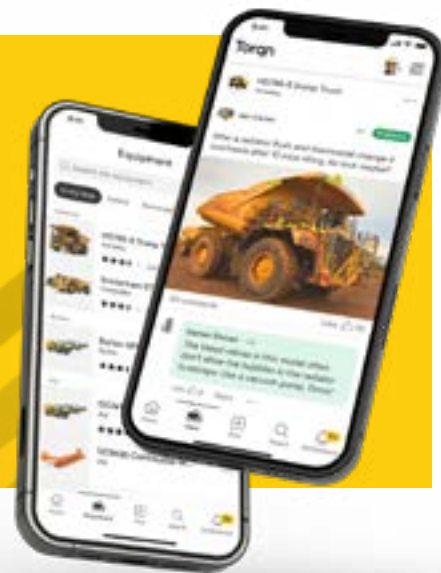
9-12/168 Shellharbour Rd Port Kembla NSW 2505

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E sales@kapturedust.com.au

www.kapturedust.com.au

GET TORQN - MAKE MINING SAFER AND MORE PRODUCTIVE



Australian miners use a lot of cutting-edge technology, yet information is still shared in a decidedly 20th-century fashion, which holds them back.

Purchasing decisions around new mining equipment like dump trucks and excavators, or trying to figure out why one of your old machines keeps breaking down, can be a daunting process. There's little information online and whatever information there is, is usually all over the place and is essentially like searching for a needle in a haystack.

The idea of a social media style site for miners, engineers, tradespeople, manufacturers and Regulators with common equipment interests therefore makes a lot of sense.

If you're someone like Troy McDonald – a career Mechanical Engineer and former President of Illawarra Coal – he knows it would be much easier if you could get insights and connect to a network of people with a few taps on your phone.

This is where Torqn – 'The global knowledge network platform for users, suppliers, and regulators of industrial plant and equipment' – comes in.

Users simply get the free Torqn App and sign up to collaborate in groups, called 'Loops', of the people that have the same interest in the mining equipment they use.

After having a flash of inspiration, McDonald contacted a former colleague and successful entrepreneur, Brett Baker, to get his opinion on his knowledge network site for mining equipment users'.

Baker, who had spent a decade working in the mining industry as a Safety & Training Manager was so sure McDonald's idea was a winner that he insisted on partnering with him.

"I'd been frustrated about how bureaucratic the mining industry was back when I was working in it," Baker says. "Sites tend to operate like little fiefdoms, and knowledge sharing was always difficult.

Part of the reason that the mines in a network aren't regularly sharing information is because it's difficult to do it efficiently."

SAFETY FIRST

Torqn's biggest selling point is its capacity to help the industry improve their on-site safety.

"Think about how inadequate the current mining industry safety-alert communication system is," Baker says. "Mining Regulators do their best to communicate safety alerts efficiently to the industry, but it's limited. If everybody on site has the Torqn App on their phone it solves a big problem.

"Everybody can get the safety alert immediately because the Regulator can now post the alert to the whole group of people that have signed up to the Torqn Loop," Baker says. "And anybody at particular risk can take immediate action.

BIG PLANS

Torqn, released in March of 2023, now boasts 40,000 registered users in over 120 countries. They are acquiring 2000 users per week and have just launched both Business Listings and Torqn Enterprise.

While its founders are focused initially on getting the mining industry onboard, they have much larger ambitions.

"Capital-intensive industries such as agribusiness, construction, aviation and renewable energy will benefit from Torqn," Baker says. "As could anybody using expensive equipment anywhere around the world."

"They say you should solve a big problem if you want a big business," McDonald adds. "We believe Torqn is solving some big problems and will become a very big business." **AMR**



[TORQN.COM/SUPPLIERS](https://torqn.com/suppliers)

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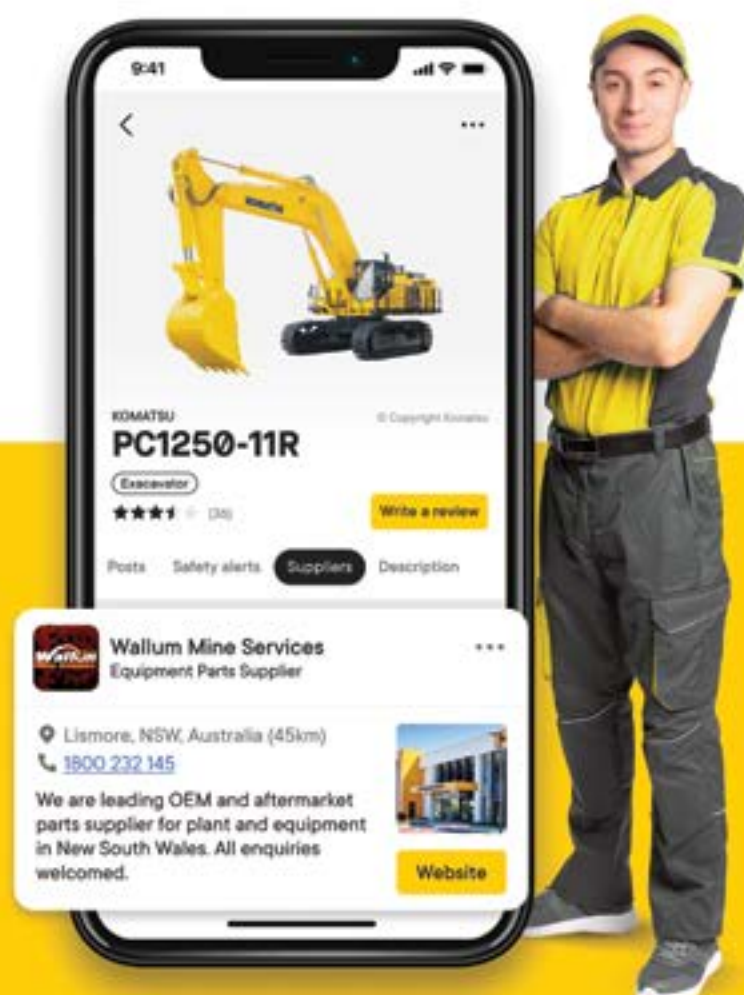
Get new customers without the hassle of finding them.

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FOR MORE INFO: [CALL 1300 017 154](tel:1300017154) OR VISIT [TORQN.COM/SUPPLIERS](https://torqn.com/suppliers)



SEW-EURODRIVE

opens a new heavy industrial gear service facility in Newcastle

With annual output of \$42.6b, Newcastle's resources and manufacturing sector drives the local industry.

Thus, it made business sense for SEW-EURODRIVE to build a Heavy Industrial Gears Service and Repair Centre in Tomago. Situated 16km from Newcastle Port, the new facility will serve a range of sectors including manufacturing, resources, bulk materials handlings and large conveyor systems used for shipping and export.

The 2700m² purpose-built facility will primarily service and repair SEW-EURODRIVE's heavy industrial gear units.

The Newcastle facility is supported with two heavy lifting bays fitted with four large-capacity gantry cranes which can be loaded simultaneously to boost the total

lifting capacity to 40 tonnes per bay.

Similar to its Mackay Service Centre, the Newcastle facility also houses a Load Testing Cell that is quickly developing into the industry's expectation for new and remanufactured heavy industrial equipment.

SEW-EURODRIVE's newest addition to its service offering is fitted with dedicated and bespoke equipment that is the cornerstone in providing service and remanufacturing capabilities for not only its proprietary equipment, but industrial gear units manufactured by others.

"Without specialised equipment and

engineering knowledge, other service businesses may find it challenging to provide the same diversity in servicing large industrial gear units," National Industrial Gears Service Manager, Robert Justice said.

"Even if a non-SEW-EURODRIVE gear unit fails or simply requires service, we can reengineer, remanufacture, test and supply a unit that's been rebuilt to meet or surpass the original specifications."

The company also offers drop-in solutions for legacy gearing units that are sometimes obsolete.

Not only do you have to consider the downtime for equipment repair, but also

the cost to remove it. SEW-EURODRIVE's drop-in replacement solution significantly reduces downtime, creates a reliable solution and increases overall system efficiency.

"With today's technology, we can provide units that have identical crucial dimensions supported by torque densities far greater than what they were 50 or 60 years ago," Justice said.

In addition to SEW-EURODRIVE's Mackay and Newcastle centres, a third heavy industrial gear service facility is scheduled to open in Adelaide in the next 12 months. This is in addition to existing service and assembly centres in Melbourne, Mackay, Perth, Brisbane and Sydney. **AMR**

SEW EURODRIVE

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Ensure maximum efficiency savings with SEW-EURODRIVE's drop in replacement solutions.

These solutions:

- Greatly reduce downtime
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- Create a reliable solution

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Vitrinite's Vulcan Mine Complex Contains Premium Hard Coking Coal.

The Vulcan Mine is a new player in the Bowen Basin coal industry, located on the Collinsville Shelf in Western Australia. Developed by Vitrinite in just three years, the opencast mine boasts over 55 km of confirmed surface hard coking coal. The mine is characterized by benign regional structures with minor local deformation, making it an attractive site for premium hard coking coal. The three target seams feature high-quality coal with crucible swelling numbers of 7.5-9, low volume volatile matter 21-26%, Romax of 1.30-1.45, and high fluidity. The mine is conveniently located near rail, water, power, and general services in the nearby towns of Dysart and Moranbah.

Rapid Growth

Since September 2021, when the Queensland government granted a mining lease, Vitrinite has been shipping small consignments of coal to Korean and Japanese markets. The company now has a workforce of approximately 170, comprising both local and fly-in/fly-out employees, and is producing two million tonnes of coal per year. The A\$160 million project demonstrates continued investor confidence in Queensland's resources, infrastructure, and workforce, according to Queensland Resources Minister Scott Stewart. The resources industry is a major contributor to the state's economic recovery, supporting a sector-record 85,000 jobs.

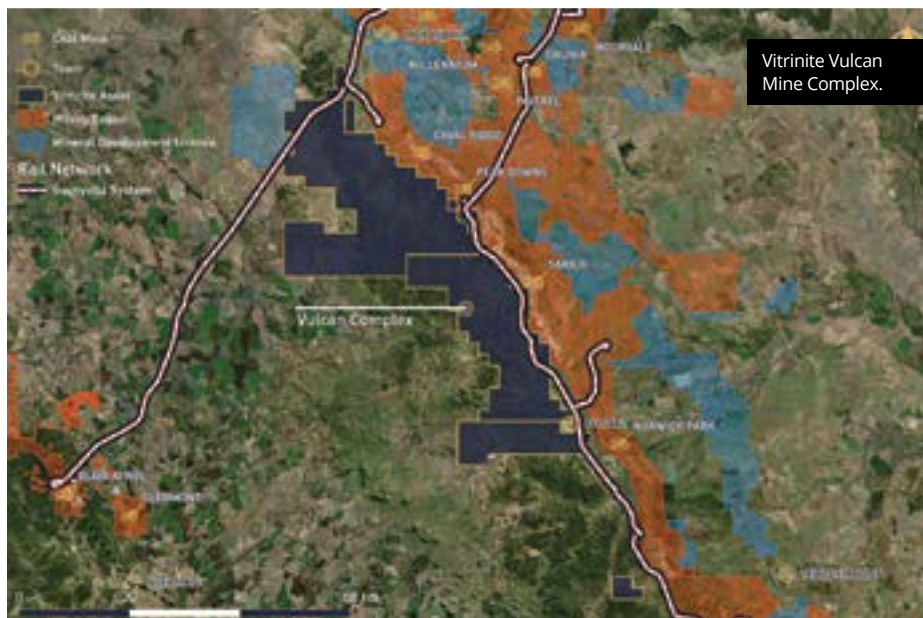
Vitrinite's Chief Operating Officer, Mick Callan, has worked in the coal industry for 21 years and describes the operations at Vulcan as leaner than many other companies in the Bowen Basin. The company is in the lower cost bracket due to its lean operations, such as outsourcing coal washing to under-utilised facilities. This allows the company to deliver premium grade coal economically and efficiently to South East Asian markets.

The Need for Technology

Vitrinite was looking towards state-of-the-art technology in order to maintain the delivery of premium grade coal economically and efficiently to South East Asian markets, and, according to Callan, the company has taken a major step towards achieving industry-best production targets by contracting SmartTech Australia to provide technology services for the Vulcan mine. SmartTech handles all the instrumentation on all of the Vulcan Mine's run-of-mine equipment. The ore stockpiled before the screen is sorted and the blend stockpiled again using equipment with SmartTech supplied Loadrite equipment installed on them.

DEC2023 AMR

VULCAN RAMPS UP COAL PRODUCTION WITH LOADRITE



Vitrinite Vulcan Mine Complex.



Some of Vitrinite's Mining Dozers Equipped with LOADRITE Onboard Weighing Systems.



GHWM300M Highwall Mining Unit.

SmartTech's Loadrite weighing system has been installed on the mine's wheel loaders, enabling the company to rely on tonnages that are being reported by Loadrite on the Komatsu 600 and 800 wheel loaders, which then transfer the coal from the conveyers to road trains to haul to coal wash facilities. The accuracy of the tonnages in the road trains is important in giving controllers the

information needed to invoice customers. The system involves the use of sensors in the trucks, however the fact the Loadrite equipment generates data automatically and provides accurate information is important to enable the company to reconcile data, helping to maintain control of the movement of material around the site safely and efficiently, and allowing the company to

run the business effectively, accurately, and profitably.

Dan Barry, General Manager of SmartTech said his company was involved in providing Vitrinite with a range of material tracking and safety instrumentation to help deliver a more effective and economical operation. He said the need to track mass at the mine site was predominantly accomplished through Loadrite onboard weighing solutions. The data received from the onboard scale can also indicate that more people are required on a shift, or that there was a need to expand the operation by the addition of more equipment to achieve production targets. The Loadrite data has become a valuable tool at the Vulcan Mine, in providing a cost-effective way to obtain a large quantity of vital information.

SmartTech technology also supplies information to help with production and safety management, ensuring machines are not overloaded or carrying material outside manufacturer parameters.

Systems you can Trust

Loadrite is a certified legal for trade system which can eliminate the expense of a scale house and operator; provide faster truck turnaround times; and traceable data on loading activity. At Vulcan, Loadrite is installed on the ore truck loader buckets, which can then calibrate and certify the loads from conveyor to the next destination. In fact, it covers multiple distribution movement by each vehicle. By using Loadrite the Vulcan mine can follow the ore through a number of transfers through Loadrite InsightHQ, a website portal which can provide real-time visibility of load/haul, processing, and products from haul trucks, conveyors, and loaders.

Overall, SmartTech technology is a valuable tool for the Vulcan Mine, providing a cost-effective way to obtain vital information for production and safety management. The Loadrite data is an important resource in achieving production targets, helping the company run the business effectively, accurately, and profitably.

In conclusion, the Vulcan Mine is a promising addition to the Bowen Basin coal industry, offering premium hard coking coal with a lean, cost-effective operation. The partnership with SmartTech Australia is a major step towards achieving industry-best production targets and ensuring the efficient delivery of high-quality coal to markets in South East Asia. **AMR**

The background of the advertisement is a photograph of a yellow excavator working on a dirt mound. The excavator's arm is raised, and its bucket is full of dirt. The sky is filled with dramatic, orange and blue clouds, suggesting a sunset or sunrise. The excavator is the central focus of the image, with its arm extending from the bottom left towards the top right.

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SURVEY DONE SIMPLER, SMARTER, FASTER

In today's rapidly evolving mining industry, the ability to access accurate and up-to-date information is crucial for making informed decisions and optimising project outcomes. Trimble Stratus is an advanced drone data platform designed to revolutionise site mapping, measurement and information sharing. With its wide range of applications, Trimble Stratus helps mine sites to enhance planning, streamline operations, uncover non-compliance issues and improve overall efficiency.

Trimble Stratus, available from SITECH WA, streamlines the surveying process in mining operations by leveraging drones to conduct surveys more efficiently, covering large areas in much less time compared to traditional surveying methods. The software enables surveyors to accurately map and monitor mine sites, allowing enhanced visibility into operations with up-to-date aerial imagery to facilitate precise mapping of mine boundaries, protected areas, equipment locations and infrastructure. This information assists in effective planning, resource allocation, tracking material movement and monitoring of mining activities and progress.

A major advantage of Trimble Stratus is the ability to calculate exactly how much material you have in inventory and accurately measure changes in stockpiles on a frequent basis. The user-friendly software allows surveyors to easily and quickly upload images into the system, where the software creates detailed and interactive models which record the usage of material for each stockpile. This allows surveyors and site managers to make sure reconciliations reflect the actual inventory. Other useful applications of the system include: measuring haul road gradients, generating terrain maps, uploading planning areas to visually track progress based on a 3D location survey, comparing different measurements to see changes over time and faster, better inventory estimates.

Safety and compliance are paramount in mining. Trimble Stratus offers the ability to survey inaccessible or hazardous areas using drones, which reduces the need for personnel to physically enter these spaces, minimising potential dangers. The platform also enables the tracking of changes in slope angles, allowing better management of potential risks like slips and erosion.

Additionally, frequent and detailed images provided by Trimble Stratus assist in demonstrating compliance with regulatory requirements, particularly in terms of environmental responsibilities. For example, the software offers hydrology analysis to visualise how rainfall will affect runoff and closely monitor site conditions, ensuring compliance.

Trimble Stratus is an excellent communication tool as the platform's intuitive interface facilitates seamless sharing of survey data and imagery among team members, contractors and stakeholders. By eliminating information silos and ensuring everyone works from the same up-to-date digital survey data, Trimble Stratus enables faster decision-making, reduces misunderstandings, improves coordination and reduces delays. The instant access to real-time information amongst collaborators reduces the need for multiple site visits, as stakeholders can track progress and inspect work remotely.

Trimble Stratus is a game-changing solution for mining professionals seeking to



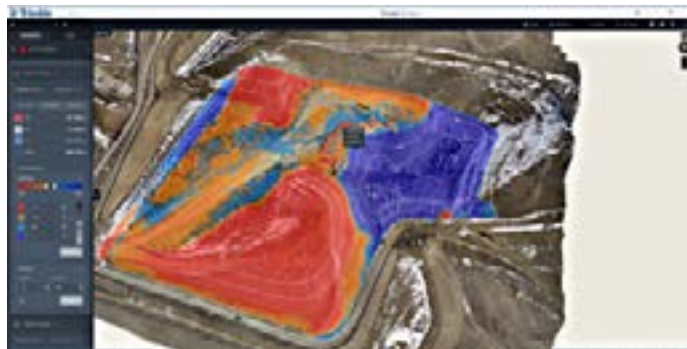
unlock the full potential of drone data in their projects. The platform's advanced mapping, surveying, and data analysis features empower mining companies to make informed decisions, streamline workflows, optimise resource allocation and reduce costly mistakes to drive project success.

As technology continues to rapidly evolve, drone surveying software will become industry standard and those who continue using traditional methods will fall further behind in efficiency. With its comprehensive features and benefits, Trimble Stratus is reshaping the mining industry, driving efficiency and delivering exceptional results. **AMR**

To learn more about how Trimble Stratus can improve surveying efficiency and reduce costs at your mine site, contact the team at SITECH WA on **(08) 9392 7700** or **sales@sitechwa.com.au**.

Trimble Stratus is easy to set up with 6 simple steps:

1. Place ground control
2. Fly drone over site
3. Upload ground control
4. Upload drone images
5. Dataset is processed
6. Analyse and share site maps and models





TRIMBLE STRATUS TURNS AERIAL DATA INTO BUSINESS INTELLIGENCE

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Learn More





HOW ROBOTIC AUTOMATION IN AUSTRALIA IS IMPROVING MINING OPERATIONS

Australian businesses, especially those in remote areas where finding skilled labour can be difficult, often face labour shortages and resulting bottlenecks due to expensive machines that often sit idle. To help companies overcome these challenges and improve their operations, Automation Solutions and Complete CNC Solutions have come together to offer industrial automation and machine tool services.

Automation Solutions specialises in providing innovative robotic solutions such as machine tending and material handling cells, which can streamline manufacturing operations. Complete CNC Solutions specialises in machine tools, special products, and services, complementing Automation Solutions' capabilities in industrial automation and robotics control systems.

Together, they offer a one-stop solution for businesses' automation and machine tool needs. These robotic systems handle raw materials and finished products that can run unmanned throughout the day and night, allowing mining companies to extend machine run time and achieve a sharp increase in output.

By reducing the labour required to produce finished machined parts, businesses can redirect current human resources to high-value tasks such as programming, quality, and machine set-up.

Lights-out machining, which allows for efficient finishing of production runs even outside regular business hours, can also be achieved with the assistance of robots.

Automation Solutions and Complete CNC Solutions offer comprehensive industrial automation and machine tool services that enable businesses to leverage the benefits of robotic automation, streamline operations, and reduce labour costs.

In addition to robotic automation, Complete CNC Solutions' maintenance and machine calibration services further enhance efficiency, minimising downtime and maximising productivity.

Not only providing new equipment solutions, but also able to upgrade existing machines to leverage the benefits of robots, seamlessly integrating robotics into the workflow. Upgrading existing machines offers cost savings, maintains functionality, and ensures a smoother transition.

Automation Solutions and Complete CNC Solutions provide innovative solutions to overcome production challenges faced by businesses throughout Australia. Their expertise in industrial automation and machine tools allows them to offer reliable solutions that help companies increase productivity, streamline operations, and reduce labour costs. **AMR**

www.automationsolutions.au/



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SPARTEL

REVOLUTIONISING SUSTAINABILITY IN THE MINING INDUSTRY

In an era of increasing environmental consciousness and regulation, the mining industry faces the pressing need for sustainable waste management solutions. Recognising this need, Spartel Pty Ltd emerges as a leading provider of innovative technologies and services tailored specifically for the mining industry. In business since 1996, Spartel has over 25 years of experience in the industry as experts in waste management and pollution control. With a commitment to environmental responsibility, Spartel offers a comprehensive range of relevant solutions to address waste management challenges and promote sustainable practices.

On-Site Organic Waste Composting Technology

One of the key technologies offered by Spartel is their state-of-the-art on-site organic waste composting technology. Designed to handle various organic waste streams, including food waste, green waste, and overburden, this ground-breaking technology enables mining operations to effectively manage their organic waste on-site. The composting technology comes with a remote access wireless process control system with a range of 2 km.

By implementing this composting system, mining companies can eliminate organic waste disposal to landfill, eliminate vermin and odour, produce a richer product for

mine site rehabilitation and prolong the life of the landfill leading to significant cost savings promote resource recovery, and contribute to a circular economy.

Glass Bottle Crushers and Recycling Services

Spartel understands the significant volume of glass waste generated in the mining industry. To tackle this challenge, they provide innovative onsite glass bottle crushers that can achieve an impressive 80% volume reduction. These crushers are designed to efficiently process glass bottles, transforming them into manageable cullet for recycling. Spartel also offers mine site glass recycling services, ensuring that the recovered glass is properly recycled and diverted from landfill, thereby minimising the environmental impact.

Plastic Bottle/Container Shredders

In addition to glass waste, plastic bottles and containers pose a significant challenge for the mining industry. Spartel addresses this issue by offering advanced plastic bottle/container shredders, achieving volume reduction of an amazing 96%, making the plastics recycling process more efficient and cost effective. By implementing these shredders, mining operations can effectively manage their plastic waste, promote recycling, contribute to a cleaner environment and achieve cost savings.



Certified Organic Fertiliser

Spartel revolutionised the fertiliser industry in 2006 with FABFert, an organic fertiliser designed for vegetable farms and mine site rehabilitation and landscaping. It combines high nutrient levels, low odour, and minimal environmental impact. FABFert contains valuable nutrients free of chemicals. Spartel ensures product quality control.

Odour Control Technologies and Products

Spartel provides advanced odour control

technologies and tailored products for the mining industry, creating a pleasant working environment while demonstrating environmental stewardship. They offer a wide range of innovative solutions to address waste management challenges, helping mining companies comply with regulations and enhance their reputation as responsible corporate citizens. Spartel leads in environmental innovation, delivering efficient solutions for a greener, sustainable future in the evolving mining industry. **AMR**



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On-Site Organic Waste Composting:

Efficiently manage food waste, green waste, and overburden through Spartel's advanced composting technology. We also provide complete organic waste collection and compost Plant operation services.

www.FAB-COM.com.au

Glass Bottle Crushers and Recycling:

Achieve an 80% volume reduction of glass waste while promoting recycling and minimising environmental impact. We also provide crushed glass collection and recycling services and lease arrangement for crushers.

www.bottlecrusher.com.au

Plastic Bottle/Container Shredders:

Effectively process and manage plastic waste with Spartel's state-of-the-art shredders, contributing to a cleaner environment. We also provide shredded plastic collection and recycling services and lease arrangement for crushers.

www.bottlecrusher.com.au

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THE EARTHMOVERS WITH AN EDGE

Established in 2005, HME Earthmoving has become a household name in the mining, rural and construction industry across Queensland's Central Highlands.

Known for supplying high production reliable crushing and screening equipment. We have experience working in mining operations, quarries and wind farms.

HME have crushing plants that have been designed to suit diverse production goals. We also run our own heavy haulage in order to relocate our plants.

With over 30 years of industry experience spanning operator and mine supervisor roles, the company's Director, David Hills, knows how to get the job done.

David and his team are committed to delivering reliable, well-maintained equipment to meet the performance requirements his clients have come to expect.

"Our mission is to be recognised as the pre-eminent supplier of quality opera-

tors, machinery and service support," he said.

"Building on our solid reputation for providing integrated earthmoving solutions is a core focus for us. We offer a completely hassle free service with competitive rates on short or long-term dry and wet equipment hire. We also provide operators, fitters and machinery when and where required for small and large-scale projects."

We provide compliant, quality operators that are production orientated with safety being top priority.

All our equipment is BMA compliant and highly maintained with maintenance history made available upon request.

Quality, reliability and relationship with global OEM's continue to prove key fac-

tors in the company's success, from both an equipment and serviceability perspective.

"We provide hire agreements to suit our clients' current contract conditions and establish workable servicing agreements to prevent unnecessary downtime. This is supported by our network of suppliers and freight carriers, which give our clients peace of mind, and help us achieve the best project outcomes," said David.

BIODEGRADABLE DUST SUPPRESSION

In an effort to combat airborne dust and mitigate the risk of silicosis, HME Earthmoving has added a Polo Citrus Dust Suppression System to its fleet. The purpose-built mobile dust suppression system is trailer mounted and can be manoeuvred around a quarry or mine site to support crushing and screening applications.

"As we process over 3,000 tonnes of material per day, we're mindful of the airborne

dust that's created in the crushing process," said David.

"That's why we invested in Polo Citrus' dust suppression system. We can position it next to our crusher, and simply apply the foam to the material prior to kick starting the crushing process.

"The foam encapsulates the dust particles and prevents them from becoming airborne. It's biodegradable and requires minimal water consumption, which makes it an environmentally-friendly alternative.

"It also provides a very cost-effective option to preventing dust accumulation onsite as it requires less maintenance, is extremely safe and easy to use, which protects both our personnel and equipment." **AMR**

For more information, visit <https://hillshme.com.au/>



www.hillshme.com.au



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As the focal point of the Pilbara mining industry, the WA town of Port Hedland has seen some significant growth in recent years.

A combination of strong demand and limited supply, Port Hedland's property market has experienced strong growth, with both property values and rental yields increasing annually. With several large new industries planned to enter the region, the need for residential and commercial property is becoming more acute.

Hedland First National Real Estate is the area's largest, most respected and successful real estate agency servicing the East Pilbara, including Port Hedland, South Hedland, Wedgefield, Newman, Marble Bar and Roebourne.

Hedland First National has nearly 20 years of experience in the marketing and sale of

industrial land across both Hedland and the Pilbara.

They manage over 1300 residential and commercial properties in Port and South Hedland, Wedgefield and Newman. This large portfolio means Hedland First National is in constant communication with businesses and are typically a first calling point for businesses looking to enter the market.

Additionally, their dedicated Strata Management Department manages a large portfolio and are experts in the complexity of strata legislation. As the only dedicated strata managers in Hedland, their advice can be invaluable in the design, construction and management of strata developments.

In 2022, Hedland First National won the First National Group WA award for the highest number of exclusive listings and settled commercial sales.

Other awards include the following:

- REIWA – Large Agency of the Year 2018 – The only time a Pilbara-based agency has won this prestigious award, nominated again in 2020 - finalist.
- First National Group – Investor Relations Office of the Year - Commercial 2021 (top commercial office in First National network of over 400 agencies across Australasia).
- First National Group – WA 2022 - Highest number of settled sales Commercial.
- Best of Hedland – Best Real Estate Agency, every year run since 2017.
- Rate my Agent – Agency of the Year Port and South Hedland 2021, 2022, 2023.



Hedland First National's point of contact for the Commercial department is Commercial Sales and Leasing Representative, Helen Farrell. **AMR**

For more information, visit www.hfn.com.au or contact Helen on hfarrell@hfn.com.au or 0417 428 667.

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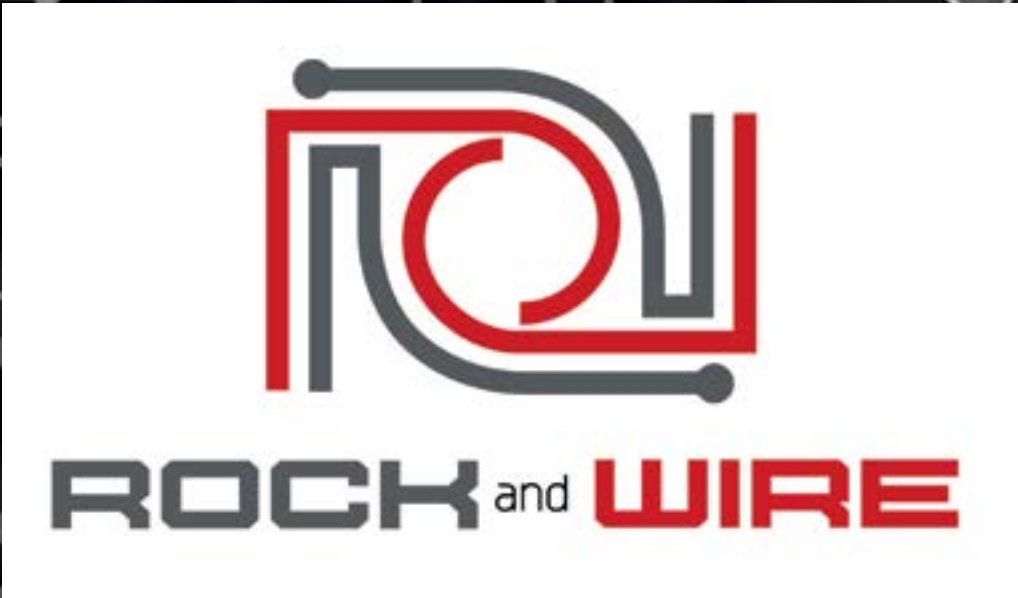
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WA'S FABRICATION SPECIALISTS



Specialist steel fabrication company Arch Engineering has been operating since 1970.

With the capacity to complete a wide variety of fabricated steel projects for the mining, process, oil and gas industries, it can manage, implement, and integrate all aspects of complex industry projects from drafting, fabrication through to surface treatment and delivery.

The business, located in Bibra Lake, WA, has a 3000m² facility and employs a skilled workforce with commitment and experience to match all project requirements.

Arch's fabrication team is experienced and possesses strong capabilities to execute wide ranging fabrication projects for mining, oil and gas.

The team is committed to high quality standards and efficiency to ensure client expectations can be met, and boasts quality management system certification to ISO 9001:2008.

Arch Engineering's fabrication workshops are equipped for all type of fabrication and modularisation services.

They incorporate three fully equipped workshops utilising four overhead cranes with up to 20t capacity capable of handling all types of fabrication.

Its mining and mineral processing services include:

- A wide range of structural packages
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- Crushing equipment
- Conveyors
- Shuttles
- Chutes
- Mining consumables and tools
- Plate work fabrication
- Pipe supports and clamps
- Railway equipment
- Handrails, stairs, walkways
- Trusses
- Silo conveyors
- Monorail structures
- General steel fabrication

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All workshops are fully equipped for all types of fabrication services.

Facilities incorporate three fully equipped workshops utilising 4 overhead cranes with up to 20 tonne capacity capable of handling all types of fabrication such as:

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- PLATEWORK
- STORAGE TANKS
- CONVEYORS
- OFFSHORE STRUCTURES
- SUBSEA STRUCTURES

WA'S STEEL FABRICATION SPECIALISTS



A TRUSTED LIFELINE FOR REMOTE SITES.

Established in 1989, Laverton-based Desert Sands Cartage specialises in supplying remote outback and mining projects in regional WA and the Northern Territory with potable water, sand, fuel, and various other bulk haulage requirements.

Desert Sands also offers earthworks and mobile and on-site concrete delivery to clients for various construction projects.

In response to increasing demand for portable concrete supply and delivery, Desert Sands Cartage recently increased its capabilities by adding a Porta-Batch mobile concrete batching plant to its fleet, with a 50-tonne cement silo.

The batching plant can produce more than

32 cubic metres of concrete per hour and can be deployed at most remote locations in the Outback.

This is one of two similar batching plants Desert Sands Cartage has put to work to supply large-scale construction projects in remote areas.

Servicing Remote Regions

Desert Sands director Rex Ryles says his company can mobilise to remote locations to service its clients, whether it be to batch and deliver concrete using its new Porta-Batch plant, deliver earthworks materials and services, alongside many other services for mining, civil, and local government projects.

“We can also provide potable drinking wa-

ter for personnel mobilised on-site for all stages of the mining process, for example, exploration, earthworks, and construction phases,” he said.

“No matter where your site is located, we travel far and wide to ensure you and your staff are looked after and have a reliable source of drinking water.”

No job is too big or too small for Desert Sands Cartage, with clients ranging from the local Shire to larger operations such as Gruyere gold mine, Anglo Gold Ashanti sites, and various other large-scale mining projects.

A Range of Cartage Solutions

Desert Sands Cartage Contractors provide services including but not limited to:

Side tipper haulage, mobile batching plant/concrete delivery, supply and delivery of potable water alongside diesel and petroleum fuels, screened sands, river rock and blue metal materials.

Other services include maintenance grading, road building, site works, construction and excavator and loader-work.

Desert Sands can also provide contract screening, semi-drop deck hire, front-end loader hire, road maintenance and constructions for local government organisations, general civil works, bulk tipper haulage and much more. **AMR**

For more information, visit www.desertsandscartage.com.au or call +61 8 9031 1326



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JETCRETE AUSTRALIA'S LARGEST SHOTCRETE PROVIDER

By providing unparalleled ground support services across the country, Jetcrete has earned the trust of mining professionals and related industries.

With over 40 years of experience, Jetcrete's knowledge lies in shotcreting — the application of specially adapted materials using cutting-edge techniques.

In an industry that can be both physically and mentally taxing, Jetcrete knows the importance of supporting people, suppliers and clients to help them thrive, as well as provide complete support at every stage of the project.

Shotcreting

Jetcrete is the largest shotcrete provider in Australia, delivering underground and fibrecrete ground support for both the development and rehabilitation of underground mines. In collaboration with key industry suppliers, they have developed several major advances in shotcrete technology to complete difficult shotcreting tasks efficiently and safely.

The first development are the robotic shotcrete units. Up until 30 years ago, shotcrete was applied by hand only and in 1993, Jetcrete attached a shotcrete system to a drilling jumbo rig, enabling a remote-control shotcrete application to undertake overhead shotcrete work safely.

The second development of hydrosclaving removed the need for a jumbo rig for sclaving to improve mining development in-cycle efficiency.

Jetcrete and Byrncut introduced this process to Australian mining in the early 2000s and it has since become an integral part of any efficient mining cycle.

The final development of 3D laser scanners improves QAQC thickness verification without the need for additional resources.

Concrete Manufacturing

Jetcrete has been at the forefront of concrete manufacturing since 2003. They own 16 batch plants, enabling mining sites to access 24-hour concrete, CAF and shotcrete manufacturing. This results in increased production, reduced costs and with experienced technical support, a better quality assurance on the manufacturing and delivery process.

Their active involvement with major suppliers helps them develop specialise mixes onsite to meet the requirements of the soft and hard rock mines.

Cable Bolting, Laser Scanning & Resin Injection

Recently, Jetcrete expanded its scope of services to include cable bolting and with a

growing number of projects, has installed an average of 350,000 metres of cables per year.

Jetcrete uses the latest laser scanning technology to measure application thickness of the shotcrete at the site.

This enables the accurate detection of safety concerns with Jetcrete then able to use only the necessary amount of concrete to support the ground, improving safety and efficiency.

An alternative rock support system for underground mining, resin injection provides additional support for encapsulation of TG cable bolts and ground consolidation.

This stabilises rock, coal, sand, gravel, concrete and caved materials, stops water ingress and supports the injection of any cable bolt.

Remote Shaft Lining

Over the past 20 years, Jetcrete has developed a tele-remote system that has eliminated the need for people to enter the shaft during the entire process. They were the first company to introduce an EX-d – Group 1 compliant shaft liner, enabling safe operations in zone 1 hazardous environments.

A remote shotcrete application can work in vertical shafts from 1m to 6m in diameter and up to a maximum depth of 400m.

Ready Jet Drum Blasting

Jetcrete's latest addition — Ready Jet Drum Blasting — is designed to remove hardened concrete from agitator drums in a safer and more efficient method.

The remote-controlled, high-pressure cleaning system eliminates the need for workers to enter the concrete mixer drum where they are exposed to confined spaces, loud noise, falling debris and respiratory dangers.

Cleaning is controlled from outside of the drum using a remote control, resulting in significantly reduced health and safety hazards. Not only does this mark a safer way of cleaning the drum, but this method is also faster and only one worker is needed for the cleaning services.

With its comprehensive range of services, which includes shotcreting, concrete manufacturing, remote shaft lining, cable bolting, laser scanning, resin injection and civil construction, Jetcrete has the capacity to support projects of any scale and difficulty. When it comes to ground support work, Jetcrete is the name to trust.

For more information, visit
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DON'T THROW OUT THE BABY WITH THE BATHWATER!

DESIGNING A PRE-EMPLOYMENT MEDICAL TO MANAGE RISK WITHOUT LOSING THE BEST TALENT

Many recruiters are under pressure to hire good talent, but the tools (including pre-employment medicals) used to screen candidates are often not specific to the role that they will be doing. These generic pre-employment medicals can rule out right candidates for the wrong reasons.

For example, one person may have been rated negatively on their ability to climb ladders, but that isn't a task required for their proposed role.

The opposite also can be true, which presents greater risk: screening tools that do not adequately screen for the tasks required for the role. This can result in higher staff turnover when someone can't perform the role. Worse, they could suffer an injury as a result.

In mining and other specialised industries such as aviation and rail, there are specific medical requirements for someone to work in that industry such as the Coal Mine Workers Health Scheme, Order 43 or

Mineral Mines and Quarries.

Given the regulated nature of these requirements, companies may rely on these as their only screening method. While the main purpose of these assessments is to protect workers against specific risks (such as pneumoconiosis in the coal industry and silicosis in mineral mines and quarries), they generally do not include a functional assessment and/or are not role-specific. For example, an electrician on a mine site has very different role requirements to a heavy vehicle driver and there are many other roles in the mining supply chain that do not fall under specific health schemes, including transport and construction.

A good candidate screening process should include:

1. industry-specific mandatory medical screening and reporting
2. a medical examination that includes a role-specific functional assessment
3. any other relevant factors, such as working with hazardous exposures or psychological stressors.

Using accurate information about a candidate's health or capabilities, the potential employer can determine whether any risks can be managed or mitigated in the workplace. There may be some tasks that the candidate cannot complete safely – but many others they can. With a more complete picture, employers can appropriately match candidates to the right roles and the right tasks.

If you are implementing pre-employment medicals in your workplace or reviewing your current procedures, it's important to get the right advice. Aspen Medical

Advisory Services can work with you to conduct a workplace Health Risk Assessment (HRA) to review the relevant risks at your site. Further, we can work with you to ensure that money you spend on your pre-employment screening process is giving you the right information and is money well spent.

After investing in recruiting good people, most employers want to retain them as their knowledge of the role and workplace increases. HRAs allow you to mitigate risks and manage the health and wellbeing of your employees, leading to increased retention and higher business performance. **AMR**



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GETTING TO KNOW INDUCTION BEND MANUFACTURER: INDUCTABEND



Australia's premier induction bend manufacturer Inductabend specialises in high integrity heat induction bending of pipe and other sections for gas pipelines, mining and construction. Generally, if it can't be cold bent, it can be induction formed.

Founded in 1992 by Barry Crouch and Rob Stead, the business has been servicing the mining, oil and gas and building industries in Australia for over 30 years.

Its founders both had extensive experience in manufacturing and engineering, with Barry having previously worked as an engineer for the SEC and Rob owning and operating several manufacturing businesses.

Their first experience working together was running Smithweld, a specialist cold rolling and bending company.

After a few years cold rolling, the opportunity to purchase an induction bending machine, originally brought into Australia to assist with the construction of coal fired power plants, presented itself and thus Inductabend was born.

As managing director, Barry has been involved in the day-to-day operations of Inductabend from the beginning. He and other long serving employees including general manager John Rea contribute to the wealth of experience and knowledge Inductabend has at its disposal to aid its customers in ensuring their bends are made to fit their purpose.

Presently, the business is entering a transitory phase with the directors committing to the long-term future of the business in Australia. This is being done through investing in, updating and upgrading its plant and equipment, as well as continuous investment in research and development of new cutting-edge induction bending (and heat treatment) technologies.

New management is also being implemented with the introduction of Nathan and Jordan Crouch into the business. Both are experienced professionals with backgrounds in civil engineering (utilities water and gas), finance and accounting.

What Is Induction Bending?

Induction bending is a hot bending process specifically designed to produce high

quality pipe bends with mechanical properties equivalent to or exceeding those possessed by the mother pipe the bend it's produced from.

Inductabend has continued to develop and improve its capabilities, product offerings and overall quality as the core value adding proposition for Australia's industrial markets.

"We work with our customers to tailor bend geometries and mechanical characteristics to their needs. In order to ensure consistent performance of our bends we employ a wide range of destructive and non-destructive testing methods to create custom testing programs tailored to our client's pipeline application and risk profile".

Products

Inductabend owns and operates three induction bending machines that cover a wide range of applications. Pipe diameters from DN25 to DN900 with wall thicknesses of up to 100mm can be bent to the purchaser's exact desired angle and radius (generally 2.5D and up) with custom tangent lengths on each end of the bend.

Complex compound bends can also be produced, including S bends and even helical bends for specialist applications.

Induction bending is compatible with a wide range of materials including all carbon steels, alloy steels, high X grade steels, stainless steels, nickel alloys, titanium and other exotic alloys.

Recently, Inductabend internally developed a new world-first method of bending that allows us to utilise induction bending for the forming of bends with radii from 14m and up, allowing for gradual consistent changes in direction to minimise wear on steel pipelines whilst maintaining their desired mechanical properties.

Additional services such as end preparations for welding, Victaulic grooving and coating are also available to customers when placing orders with Inductabend.

Inductabend also owns some cold field benders (up to DN1200 capacity) that are available for dry hire. **AMR**



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- High X grade bends
Compound bends
Helix bends
Custom OD mandrels
- Structural steel section bending
- Fully customisable bend geometry
- Other specialist heating applications
- Onsite induction bending (large diameter high volume projects)
- Cold field bending machines also available for hire (up to DN1200)

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Rapp-it Pipe Repair Bandages have been supplied within Australia and internationally for over 30 years by Marine & Industrial Marketing, a wholly Australian owned and operated company.



Developed to industrial specifications and certified by NATO, Rapp-it is the trusted repair solution for all major mining, processing, offshore oil and gas, agricultural, and marine companies. All Rapp-it specifications are tested in independent laboratories.

Rapp-it is continually improved in line with industry requirements to guarantee a quality repair. Rapp-it undergoes stringent quality management and is fully compliant with all legally required safety specifications, including GHS and WHS regulations.

Rapp-it is suitable for use on all types of pipes, including polypipe (PP/HDPE), GRE, ABS, steel, PVC, rubber, concrete, galvanised, ceramic, clay, stainless steel, basalt, fibreglass, copper, and all insert piping. It can be applied on cracked, fractured, damaged, and leaking pipes, around straight lengths and difficult shapes like tee and elbow joints, y pieces, couplings and clamps.

To apply Rapp-it, simply shut down the pipe, then clean and roughen the surface. Mix and apply Rapp-it Steel Putty. While

the putty is curing, submerge the Rapp-it Bandage in water for 10 seconds and apply over the putty, extending 50mm either side of the leak. A minimum of 10-12 wraps over the leak, and a strong, tight wrap is important.

Rapp-it can be used on all lines and is resistant to most chemicals. It's suitable for everything; from potable water to acid lines.

Rapp-it can also be used on all rubber and flexible hoses, so long as they do not lay flat or have a pressure that exceeds 2500 kPa.

Ideal in emergency situations, Rapp-it protects your operation from harmful spills and leaks on chemical, sludge, oil, gas and water lines. Cover your operations by keeping Rapp-it on hand at all times. **AMR**

For more information, visit <https://piperepair.com.au/>



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RAPP-IT SPECIFICATIONS

Resin Makeup	Water-activated polyurethane resin
Heat Resistance	150°C (300°F)
Pressure Resistance	Up to 2500kPA (360psi)
Sets	30 minutes
Substrates	Steel, Polypipe, GRE, ABS, PVC, Copper, Concrete, Rubber, Galvanised, Ceramic



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Clover Pipelines makes first-in-Australia contribution to Pilbara mining project

As you read this, production has commenced on Fortescue's Iron Bridge magnetite mine, located 145 kilometres south of Port Hedland, Western Australia.

Construction on the project began in 2019 and Clover Pipelines was involved in the early design and specification stage for the borefields and return water pipelines package.

Clover is an integrated pipeline infrastructure business that combines strategic project consultation, product innovation and service excellence. We work with local and global partners to specify world-leading pipelines across Australia and the Asia Pacific region, recommending

material types and options analysis.

Our role in the Iron Bridge project was extensive. It included recommending material type and covered manufacture, type testing, supply, delivery, unloading, de-nesting and staging at laydown site, as well as loading, transportation, and unloading from laydown to the construction site. Quality assurance, site inspections, verification of installation practices and supply of plant and labour were also critical elements of our contribution.

The project is significant for Fortescue, the world's fourth largest iron ore miner. The site incorporates the North Star and Glacier Valley ore bodies and, once fully operational, will deliver 22 million

tonnes per annum of high-grade 67% Fe magnetite concentrate.

It was significant for Clover, as well. This is, to date, the largest and most complex mining project the company has participated in. It is also undoubtedly the most challenging.

The vast majority of the project was delivered at the height of the COVID pandemic. It goes without saying that this was a period of enormous economic uncertainty and constraint. On the 5th of April, 2020, Western Australian closed its borders; the restrictions were only lifted two years later. While the original design called for a steel pipeline, through a process of workshop consultation (including cost comparison, specifications, material data and type testing), we suggested an alternative product: glass reinforced polyester (GRP). Because the product can be delivered nested (and can then be de-nested on site), it had the potential to reduce the material freight costs by more than fifty percent. Despite being lighter, easier to handle and quicker to install than steel, the corrosion-resistant material has a nominal working pressure rating of PN35 (3,500kPa) (or extremely high pressure).

So what was the catch? It would be the first time GRP had ever been used in Australia in this application for mining.

Despite the pandemic and the obstacles that inevitably come from implementing something for the first time, we maintained an uninterrupted supply chain throughout the project, and recorded zero lost time injuries or medically treated injuries while working 47,685 hours.

HOW?

Originally, Clover proposed to deliver the project in-house, using majority Clover employees. After the seriousness of the pandemic and the stringency of the border restrictions became clear, we quickly changed tack, and continued our work using a local Western Australian workforce (including subcontractors). Adhering to our commitment to employing First Nations people, a significant contingent

of these employees were local Indigenous labourers and operators. We also used local transport, local supplies and local services throughout the project.

Because senior staff and managers were unable to visit the site for the majority of the project's lifespan, it was managed mostly remotely from Clover's east coast headquarters. Part of that remote management included the establishment and operation of a 100,000 square metre intermodal site. We were required to conform to extremely strict Fortescue controls after achieving and maintaining prequalification as a mining contractor. We stringently adhered to health, safety, environment, security, fatigue management, working-in-heat and cyclone management protocols. In fact, we managed the risk of more than one cyclone near miss over the period of our engagement.

In spite of the obvious limitations that come with remote management, we maintained these robust quality and safety processes, an experienced pipeline team and on-site supervision for the duration of the project.

Upon completing the contract, Clover had delivered very close to 20 million kilograms of product over 47,865 hours, including 179 kilometres of GRP pipe (of between DN900 and DN1100) and 571 individual fittings. It was, as we mentioned earlier, easily the largest, most complex and most challenging mining project we have ever worked on.

At the conclusion, we had contributed to the installation of the largest high-pressure GRP pipeline in the Southern Hemisphere.

Our success under trying circumstances demonstrated that our experience in pipeline infrastructure has transferred seamlessly not just into mining as an industry but into mining projects of significant scale.

Clover's experienced team combines robust and reliable service to deliver unique product solutions for a wide spectrum of mining and resource applications.

Find out more about our experience in the mining and resources industry. [AMR](#)





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For welding applications, there are Bore Welding & Cladding Machines and Induction Heat Treatment Equipment.

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FMT is the Australian agent for major international brands including:

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Goodway Technologies is a USA-based manufacturer of specialised industrial maintenance products for HVAC, Energy, Manufacturing, Food and Beverage Production markets.

Since 1966, facilities and plant maintenance personnel have used their innovative products to maintain HVAC systems, plant machinery, hazardous material clean-up, surface cleaning and other critical maintenance needs.

Established in 1995, Field Machine Tools (FMT) is a privately owned Australian company that provides engineering solutions for field applications to minimise downtime.

The scope of operations is to provide the most complete product lines available to OEM equipment manufacturers, maintenance providers, field service companies, power stations, petro chemical plants, mining industry and other related industries. **AMR**

Call Field Machine Tools on **1300 FMT FMT** (1300 368 368), email **sales@fmt.com.au** or visit **www.fmt.com.au** for more information.

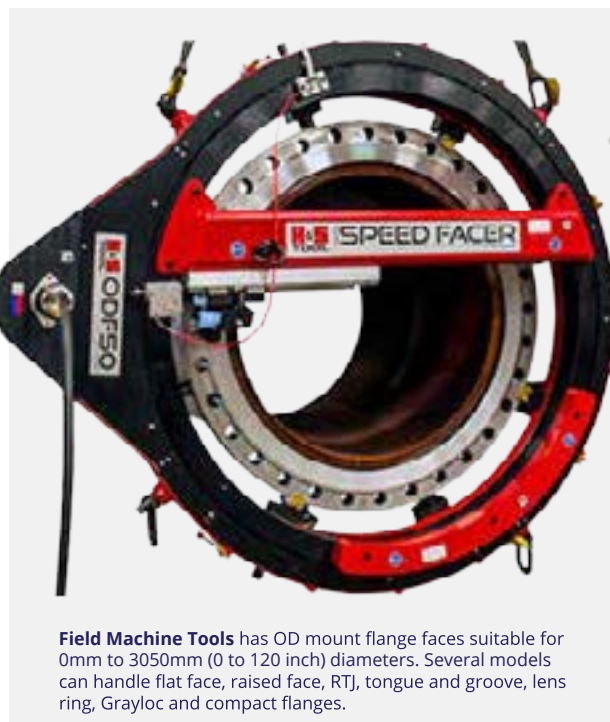


Field Machine Tools has a range of end prep machines suitable for 12.7mm to 610mm bore mount to face, bevel or counter bore tube and pipe.



Field Machine Tools has rugged and innovative portable flange facers for 19.1mm to 5054mm (0.75 to 199 inch) diameters. Several of the machines can be configured for facing, milling or both.

DEC2023 **AMR**



Field Machine Tools has OD mount flange facers suitable for 0mm to 3050mm (0 to 120 inch) diameters. Several models can handle flat face, raised face, RTJ, tongue and groove, lens ring, Grayloc and compact flanges.



Field Machine Tools has a range of Clamshell Lathes suitable from 33mm to 1676mm OD pipe preparation whether severing, bevelling or counter boring.

CRUSADER LAYFLAT HOSE SYSTEM IDEAL FOR PUMPING UP HIGH PIT WALLS

Crusader Hose has developed an advanced layflat piping system for pumping water up high mine walls. This dewatering process has, until now, been done using rigid pipe, which has higher safety risks due to handling and pressure limitations.

Crusader Hose is an Australian manufacturer of layflat hose for over 38 years. It has a state-of-the-art factory with weaving looms and extruders that process quality high-pressure flexible hose. Customers include the Australian Army, to whom they have supplied 50 km of layflat hose for fuel pumping, including a flexible sea-based pipeline across the Great Barrier Reef. Working closely with the Army and satisfying their critical demands has further developed their expertise in hose manufacturing. Crusader Hose has brought this increased proficiency to the mining sector and has developed an advanced layflat pipeline system for pumping water up high pit walls – the safe and efficient Crusader Layflat Hose System.

Before the Crusader Layflat Hose System is explained, imagine establishing a pipeline up a 150 m high pit wall without anchoring, building supports or recruiting welding experts. Imagine replacing poly pipe with something flexible, less bulky, and easy to use.

PUMPING UP HIGH MINE WALLS WITH THE CRUSADER LAYFLAT HOSE SYSTEM

Installation method

A rope is slung into place using either a cross-bow or a drone. One end of the rope is then connected to the Waterlord layflat hose sitting on a turntable at the top of the pit, and the tail end is connected to a vehicle at the bottom of the pit. As the vehicle moves forward, this rope is pulled, and the layflat hose is dragged down the slope. It's that easy. As the layflat hose is flat and follows the contours of the terrain without pulling on it, it does not slide down or creep.

No anchoring is required at the top of the pit, unlike poly, which is stiff and prone to sliding down. "I was at a major iron ore

mine in the Pilbara where they had 15-ton concrete blocks to anchor the poly," said Francois Steverlynck, Managing Director of Crusader Hose, "Not only do you eliminate this cumbersome handling risk, but you also do not have the risk of the rigid pipeline sliding down the wall." Crusader Hose sees this as a significant safety benefit.

THE CRUSADER LAYFLAT HOSE SYSTEM

Made up of three components, the System consists of a High-pressure woven layflat hose, Secure couplings and Reel handling systems.

High-pressure woven layflat hose

The textile reinforcement created by the weaving process is the "guts" of the hose. This fabric is woven from high-tenacity polyester yarns, which handles all the hose's high-pressure and tensile loads. Thermoplastic polyurethane covers the textile reinforcement inside and outside, protecting it from abrasion damage. The PU cover also seals off the textile reinforcement from percolation.

The textile reinforcement determines the burst pressure. When a thicker yarn is plied by twisting more fibres together, the woven textile reinforcement results in an even higher pressure-capable hose.

Crusader Hose has developed a 100 bar burst pressure rating on their 6" layflat hose, and it is only 4mm thick! This is a critical consideration when comparing layflat with HDPE. Poly pipe, which has no textile reinforcement, must be thicker to increase its burst pressure. A 22mm thick pipe can only handle a burst pressure of 16 bar.

Therefore, the lightweight yet super-strong layflat hose is the system of choice for ease of handling and high-pressure pumping.

Secure couplings

There is no point in supplying a high-pressure hose if you cannot keep the couplings on. Crusader Hose has worked closely with the mining industry to design the Boa coupling clamp that stays on with 100 bar pressure.

Flanged ends are securely attached using the three-section clamp. Tightened using cap screws, makes this method makes it easy to cut the hose and fit the couplings on-site.

It is worth noting that as pumping up high pit walls is usually done at pressures ranging from 15 to 40 bar, there is a high safety margin using these Boa clamps.

Reel handling systems

The woven hose comes in lengths up to 500 m and diameters up to 300 mm. The 300 mm Waterlord layflat hose weighs 4 kg per metre, requiring reeling equipment for ease of handling. Crusader Hose has an engineering department that designs reel systems for deploying and retrieving the layflat hose, removing most of the manual handling requirements.

As Crusader Hose manufacture and test over 1500 m of layflat hose daily at their factory, they are experts in having the best reel systems for various site conditions. The Australian Army has a Timor system whereby they can deploy or retrieve over 15 km in one day with a squad.

For rapid deployment, whether for a temporary or fixed pipeline across the mine, there is no poly welding and no laborious handling of 12 m sections of pipe.

UV stabilised and temperature rating

The Crusader layflat hose is UV-stabilised. Due to the textile reinforcement, the hose pressure is unaffected by the hot sun and does not need to be derated due to temperature. Hose supplied to the Army is still performing as new after 25 years of use.

Compact and transport-saving

The layflat hose rolls up flat. It is, therefore, compact, and Crusader can pack up to 4km of 300mm diameter Waterlord hose onto a single truck. The equivalent amount of polypipe would take nine trucks to fill. The cost savings of using layflat pipelines versus poly adds up to big dollars when compared.

Three pipelines up the high pit wall.

INTERESTED? WHERE TO FROM HERE?

Crusader Hose can assist with installation and pipeline commissioning as they understand that mine personnel may need to be shown efficient and safe handling practices when using layflat hose. "We will be assisting a large mine in the Goldfields to install a layflat pipeline 300 m up their high wall," said Francois. "We offer customer service and support across Australia," he concluded.

By creating dewatering systems that are easy to use and reduce risk, Australian Made and owned Crusader Hose is working hard to help mines improve safety and profitability, one flexible pipeline at a time. **AMR**



Layflat lays across contours of the terrain.



Waterlord high-pressure layflat hose.

DRILL BITS FOR DRILLERS



Hard Metals Australia is an Australian based manufacturer of interface products for the drilling, construction and agricultural industries.

Our philosophy is firmly entrenched on the understanding clients spend significant amounts of capital on machines to perform dedicated tasks in pursuit of a commercially positive outcome for their projects. What is often overlooked is the interface between that machine and the project.

This is where Hard Metals specialises. With

over 40 years of experience in the design of drilling tools, Hard Metals has an impressive portfolio of IP and exceptional tools now sold overseas through agents and our subsidiaries in Canada and the USA.

Our list of accomplishments includes the Wombat Hole Opener which has been accepted by the North American Drilling Companies for Oil and Gas Applications.

The original variant was based around PDC cutting elements.

The latest upgrade will enable the reamer to use TCI Roller Cones for difficult and very hard conditions.

The new Wombat Rock Roller has been developed to allow drilling in these extreme conditions where PDC drilling is not suited.

The Wombat Rock Roller is equipped with premium roller cones, designed specifically for HDD applications.

Because the roller design is interchangeable with the standard Wombat body,

existing PDC reamer wings can be easily swapped when the requirement arises. The Wombat hole opener is a significant step forward in the art of reaming and hole opening.

With built in stabilisation, the flexibility of simple replacement of cutter types and diameter in the field combined with excellent down the hole performance make this a worth accessory to any drillers tool box.

The future of HDD hole opening is here....
AMR



ROCK ROLLER

The new Wombat Rock Roller has been developed to allow for drilling in high hardness and unfavourable conditions where our PDC Wombat is not suited.

The Wombat Rock Roller is equipped with premium roller cones, designed specifically for HDD applications. The service life of the Wombat Rock Roller is greatly improved with added gauge protection.

- + Equipped with tungsten carbide insert or mill tooth rollers to cope with difficult ground conditions.
- + New roller design is interchangeable with existing carbide or PDC reamer wings.
- + Additional gauge protection added to ensure reduced wear of the shirrtail.

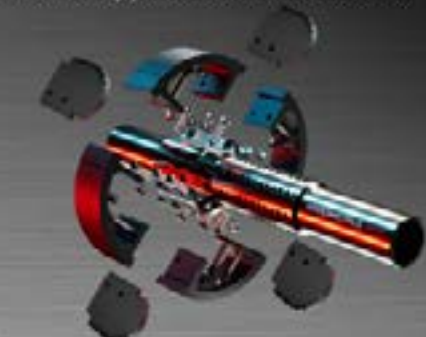


For more information, contact:
sales@hardmetals.com or (02) 9009 4455

PDC HOLE OPENER

Make your HDD projects run efficiently with the Wombat Hole Opener. The Wombat features innovative field replaceable cutting wings, roller cones, tungsten carbide wings and PDC as required for any and every condition. This flexibility allows for worn cutters to be changed out and cutting diameter increased without requiring removal from the drill string. Combined with in-built stabilization and superb down hole performance, the Wombat is a worthy addition to any professional driller's toolbox.

- + Quickly and easily change diameter with replaceable cutters from 10" to 60"
- + Patented ring design to improve structural rigidity and simplify the assembly and disassembly process
- + Tungsten carbide gauge protection for improved stability during drilling
- + Premium grade PDC's for improved bit life and impact resistance
- + Backout teeth to protect the reamer during a tripout

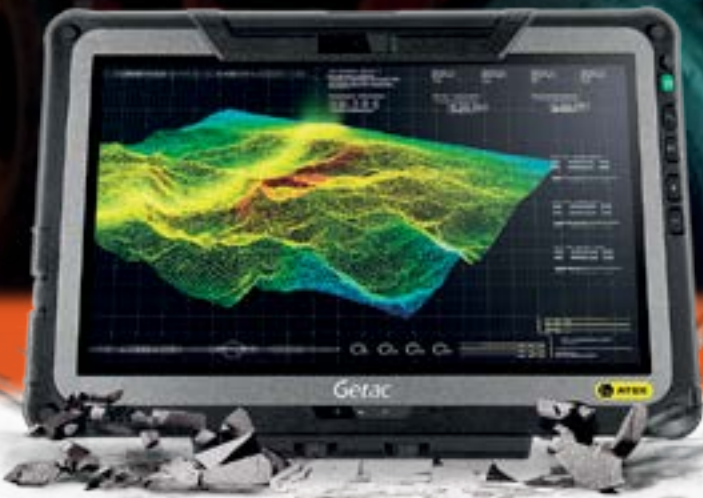


Standard Body Types	
Product Code	Item Description
BS1.54	Wombat Reamer Body 2 1/8" IF D=33'-10"
BS2.54	Wombat Reamer Body 3 1/8" IF D=58'-10"
BS3.54	Wombat Reamer Body 4 1/8" IF D=83'-10"
BS4.54	Wombat Reamer Body 5 1/8" IF D=108'-10"
BS5.54	Wombat Reamer Body 6 1/8" IF D=133'-10"
BS6.54	Wombat Reamer Body 7 1/8" IF D=158'-10"
BS7.54	Wombat Reamer Body 8 1/8" IF D=183'-10"
BS8.54	Wombat Reamer Body 9 1/8" IF D=208'-10"
BS9.54	Wombat Reamer Body 10 1/8" IF D=233'-10"
BS10.54	Wombat Reamer Body 11 1/8" IF D=258'-10"
BS11.54	Wombat Reamer Body 12 1/8" IF D=283'-10"
BS12.54	Wombat Reamer Body 13 1/8" IF D=308'-10"
BS13.54	Wombat Reamer Body 14 1/8" IF D=333'-10"
BS14.54	Wombat Reamer Body 15 1/8" IF D=358'-10"
BS15.54	Wombat Reamer Body 16 1/8" IF D=383'-10"
BS16.54	Wombat Reamer Body 17 1/8" IF D=408'-10"
BS17.54	Wombat Reamer Body 18 1/8" IF D=433'-10"
BS18.54	Wombat Reamer Body 19 1/8" IF D=458'-10"
BS19.54	Wombat Reamer Body 20 1/8" IF D=483'-10"
BS20.54	Wombat Reamer Body 21 1/8" IF D=508'-10"
BS21.54	Wombat Reamer Body 22 1/8" IF D=533'-10"
BS22.54	Wombat Reamer Body 23 1/8" IF D=558'-10"
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BS210.54	Wombat Reamer Body 211 1/8" IF D=5258'-10"
BS211.54	Wombat Reamer Body 212 1/8" IF D=5283'-10"
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BS214.54	Wombat Reamer Body 215 1/8" IF D=5358'-10"
BS215.54	Wombat Reamer Body 216 1/8" IF D=5383'-10"
BS216.54	Wombat Reamer Body 217 1/8" IF D=5408'-10"
BS217.54	Wombat Reamer Body 218 1/8" IF D=5433'-10"
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BS220.54	Wombat Reamer Body 221 1/8" IF D=5508'-10"
BS221.54	Wombat Reamer Body 222 1/8" IF D=5533'-10"
BS222.54	Wombat Reamer Body 223 1/8" IF D=5558'-10"
BS223.54	Wombat Reamer Body 224 1/8" IF D=5583'-10"
BS224.54	Wombat Reamer Body 225 1/8" IF D=5608'-10"
BS225.54	Wombat Reamer Body 226 1/8" IF D=5633'-10"
BS226.54	Wombat Reamer Body 227 1/8" IF D=5658'-10"
BS227.54	Wombat Reamer Body 228 1/8" IF D=5683'-10"
BS228.54	Wombat Reamer Body 229 1/8" IF D=5708'-10"
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BS237.54	Wombat Reamer Body 238 1/8" IF D=5933'-10"
BS238.54	Wombat Reamer Body 239 1/8" IF D=5958'-10"
BS239.54	Wombat Reamer Body 240 1/8" IF D=5983'-10"
BS240.54	Wombat Reamer Body 241 1/8" IF D=6008'-10"
BS241.54	Wombat Reamer Body 242 1/8" IF D=6033'-10"
BS242.54	Wombat Reamer Body



Getac

CREATED FOR YOUR INDUSTRY



Getac equipment is the ideal choice to improve safety, efficiency and productivity in the mining industry.

Robustness and Durability:

Strong, durable and able to withstand extreme conditions and operations in hazardous environments with ATEX and IECEx certifications.

Exploration Optimisation:

Enables real-time data collection, analysis, and transmission, simplifying the tasks of analysing samples, creating 3D geological maps, and performing safety inspections.

Mobility and Ergonomic:

Deployed in remote locations guaranteeing task execution and mobility while maintaining the necessary robustness.

Reduction of Errors and Data Loss:

Data is entered accurately and quickly improving the accuracy of decision making, eliminating the use of paper.



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REAL-TIME REMOTE CONDITION-MONITORING FOR OPTIMUM SAFETY, EFFICIENCY, AND PERFORMANCE

Pulford introduces IIoT platform for its Nitrogen Tyre Inflation Systems

Pulford Air & Gas has introduced an intelligent IIoT platform for its bespoke Nitrogen Tyre Inflation Systems. With this software, the system can be remotely monitored in real-time, predicting maintenance requirements, as well alerting the user to any system changes which could lead to a failure and unplanned downtime. The result, optimum safety, efficiency, and performance.

Every year mines across the country encounter numerous stoppages in production due to 'hot tyre' events, which can lead to tyre fires or explosions, resulting in potentially catastrophic consequences such as personal injury to loss of life. By filling tyres with nitrogen and reducing the amount of oxygen in the tyre to less than 5.5 percent, Pulford's Nitrogen Tyre Inflation System can prevent a tyre explosion or fire, from

internal and external heat sources or from electrification. This provides mine site operators with more confidence that their trucks will offer greater safety in the case of a 'hot tyre' event.

For optimum safety, efficiency and performance, Pulford's Nitrogen Tyre Inflation Systems are now available with an intelligent IIoT (Industrial Internet of Things) software platform. This

continuously gathers flow, temperature, pressure sensor, and nitrogen purity data, converting it into digital, and readable, information.

The platform is then able to remotely report on the real-time performance of the Nitrogen Tyre Inflation System, predicting when maintenance is required, as well as alerting the user if the system is running differently than normal, which may be a sign of potential machine failure.

And, when it comes to Pulford Nitrogen Tyre Inflation Systems already in the field, it is possible to retrofit them with the IIoT platform, ensuring existing users can also access the benefits that this remote condition-monitoring system has to offer.

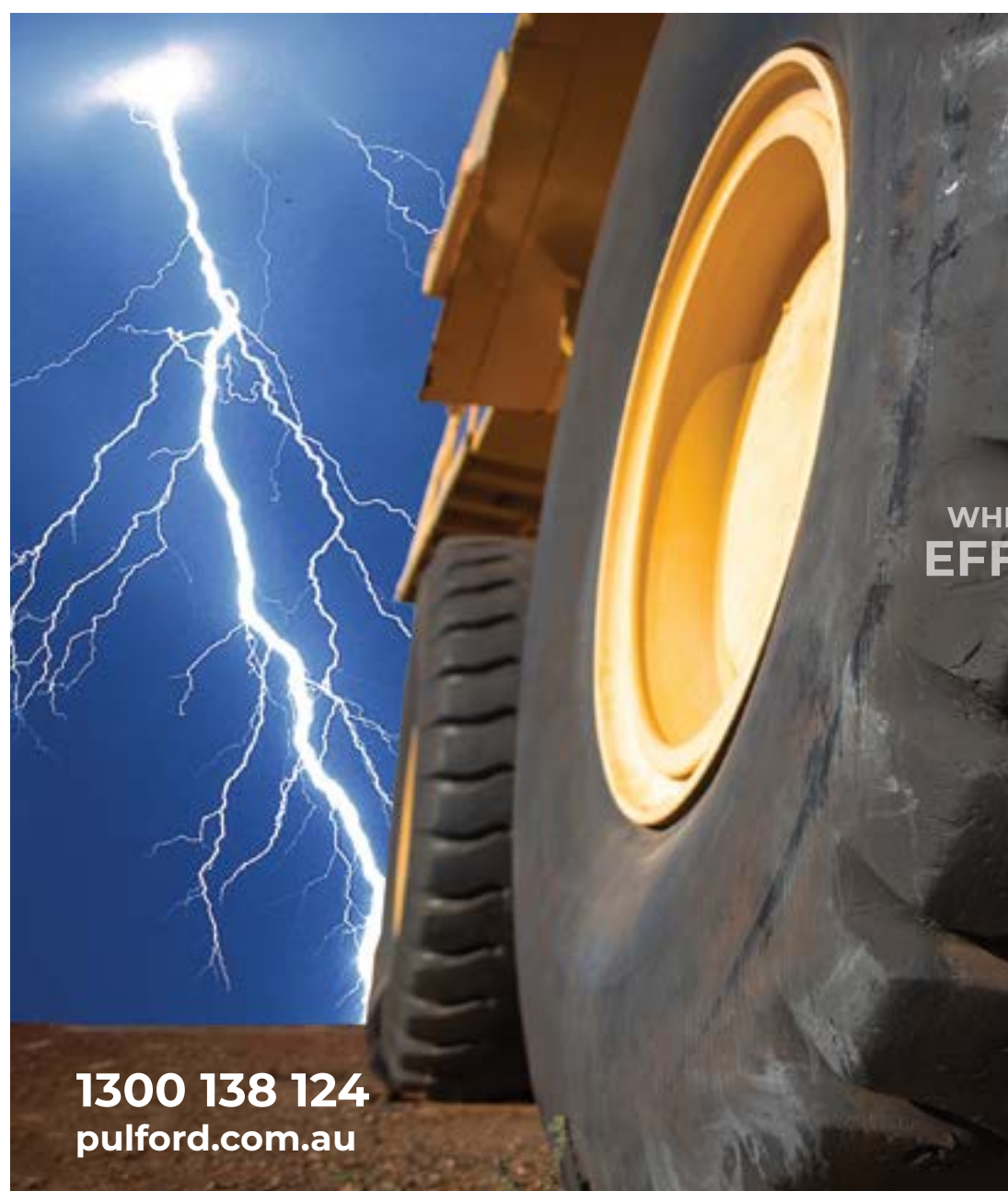
An efficient on-site solution, the Nitrogen Tyre Inflation System from Pulford has been designed and developed with Australian conditions in mind. The system can be matched to specific fleet sizes and truck types, and it can be designed for any range



The intelligent IIoT platform can be retrofitted to existing Pulford Nitrogen Tyre Inflation Systems already in the field

or application from 1 m³/hr up to 3000 m³/hr, offering faster tyre inflation than most conventional systems. The inclusion of a large storage vessel ensures the system can instantly inflate up to two 57" tyres and offers fast recharge times for multiple inflations. Pulford's system produces over 98 per cent purity for single inflation fills, with no need to double inflate. For a truly integrated solution, Pulford's Nitrogen Tyre Inflation System IIoT Platform software, can be integrated with an existing ERP, MES and SCADA System. **AMR**

For more information visit
pulford.com.au or
phone **1300 138 124**.



1300 138 124
pulford.com.au

WHEN
EFFICIENCY
MATTERS

WHEN
PRODUCTIVITY
MATTERS

WHEN
SAFETY
MATTERS

WHEN
EFFICIENCY
MATTERS

WHEN
PRODUCTIVITY
MATTERS

Nitrogen Tyre Inflation Systems

When safety matters, when productivity matters, when efficiency matters, Pulford's Nitrogen Tyre Inflation System is the clear choice.

Trust the experts in nitrogen tyre inflation systems, with almost two decades of experience and numerous installations across Australia.

FLEXIBLE | BESPOKE | PRICELESS

pulford
AIR & GAS

CHANGE THE WAY YOU THINK ABOUT BREATHING APPARATUS

M1 SCBA – NSW UNDERGROUND MINES REGISTERED

MSA Safety Incorporated is the global leader in the development, manufacture and supply of safety products that protect people and facility infrastructures.

These products are used by workers around the world across a broad range of industries, including oil and gas, petrochemical, fire services, mining, construction, and the military. Many of these products protect users against hazardous or life-threatening situations.

MSA's core products include self-contained breathing apparatus, fixed gas and flame detection systems, portable gas detection instruments, fall protection devices, industrial head protection products, and fire and rescue helmets.

MSA's M1 Self Contained Breathing Apparatus (SCBA) represents the most advanced and ergonomic SCBA system on

the market, featuring complete reliability, enhanced comfort, and a facemask boasting undistracted view, with excellent voice transmission for positive communication for those working in underground mining operations.

MSA is proud to announce that this year, NSW Underground Mines Registration was realised for the M1 SCBA. A unique configuration of this globally recognised set is the perfect choice for underground coal operations.

Beyond being flame retardant, the M1 SCBA was designed to resist permeation by dangerous chemicals such as hydrogen sulphide and phosgene, making it safer for the user to wear and for technicians to clean and maintain. It has been tested to be stored for use in temperatures between -40°C to +60°C, it was designed to withstand harsh environments like mining, and it has a reflective harness to provide greater visibility

of individuals in dark environments. It also has a 10-year manufacturer's warranty.

The M1 SCBA incorporates an innovative facemask with a flat lens design that prevents optical refractions and reflections while optimised airflow continuously flushes the lens to avoid fogging. The broad sealing line provides the ultimate tightness and comfort, and an optimised balance point provides greater freedom for head movement.

The light backplate gives the wearer better comfort and balance, the waist belt was designed for even weight distribution and the unique padded harness with S-shape prevents pressure points and slipping.

Don't worry about the set getting dirty in underground operations, with the tailor-made dust and water-repellent harness materials specifically designed for easy mechanical cleaning and more reli-

able decontamination. Furthermore, the entire SCBA is machine washable with no disassembly needed. **AMR**

For more information, visit MSA M1 SCBA | MSA Safety | Australia or contact MSA customer service via email aus.customerservice@msasafety.com or phone **1300 728 672**.



The Safety Company

EQUIPMENT THAT MAKES MAINTENANCE EASY AND RELIABLE

- ✓ Reduced maintenance costs due to extended service intervals
- ✓ Simplified disassembly and assembly of components
- ✓ Easy to upgrade and service without special tools
- ✓ All components for longer life with 10-year warranty



FOUR DECADES OF EXPERTISE IN ICE & COLD SOLUTIONS

Extrême temperatures and conditions are no stranger to mining regions on both sides of the country, and whilst we hit the summer months of Australia with forecasts yet again of more than 40 degrees, there's no better time for mining companies to keep their workforce hydrated.

Coast Distributors are the ice and cold solutions company providing the very best in high quality ice machinery. Working together with mining companies in prioritising employee health and safety, Coast Distributors ensure hydration for every worker with modern technology and service you can rely on.

As a market leader, Coast Distributors has over 80 years' combined experience in the industry, offering an extensive range of ice makers, dispensers and chillers built for mine site conditions. Founded in 1984 by Bruce Hammond, Coast Distributors have expanded significantly over the last four decades and is now an exclusive agent for brands including Ice-O-Matic, Follett, Grant and Staff Ice Systems, and can also provide a range of ice types from Full Cube, Half Cube and Grande Cube to Chewblet, Granular Flake and Sub Zero Micro Flake.

From humble beginnings with a standard modular package – an ice machine sitting on an ice storage bin – Coast Distributors has come a long way with its advanced machinery, pushing safe hygiene practices to ensure as little ice contamination as possible. In the early 2000s, an ice machine could see up to 50 or more workers manually handling and scooping ice into their water bottles, leaving micro-organisms (bacteria) growing in a matrix of perfect conditions. But now, thanks to modern day mechanisation, Coast Distributors have the most optimal auto-dispensed ice machines and water chillers to ensure contaminant-free ice with a product that is fit for purpose for the mining industry.

But it's not just about supplying machinery for hydration.

The team at Coast Distributors will work together with you in finding the right

package for your site. Whether you have 20 employees or more than 2000, their specialists will find a solution to ensure your site is fitted with the right amount of ice makers and dispensers, liaise with you on maintenance and handling, and be with you every step of the way so that your workers are hydrated and operating at their full potential – even offering a 24-hour sales and technical support service on the off chance a machine goes down, with assistance to rectify any given problem over a quick phone call.

Having multiple units in a package provided by Coast Distributors means that not only are you offering safe and hygienic ice to your employees quickly, but on the off chance that one machine needs a service or some fine tuning done, your employees are still guaranteed to be serviced by another unit and their work isn't impacted.

Coast Distributors considers all these important factors when examining what package will best suit your mine site.

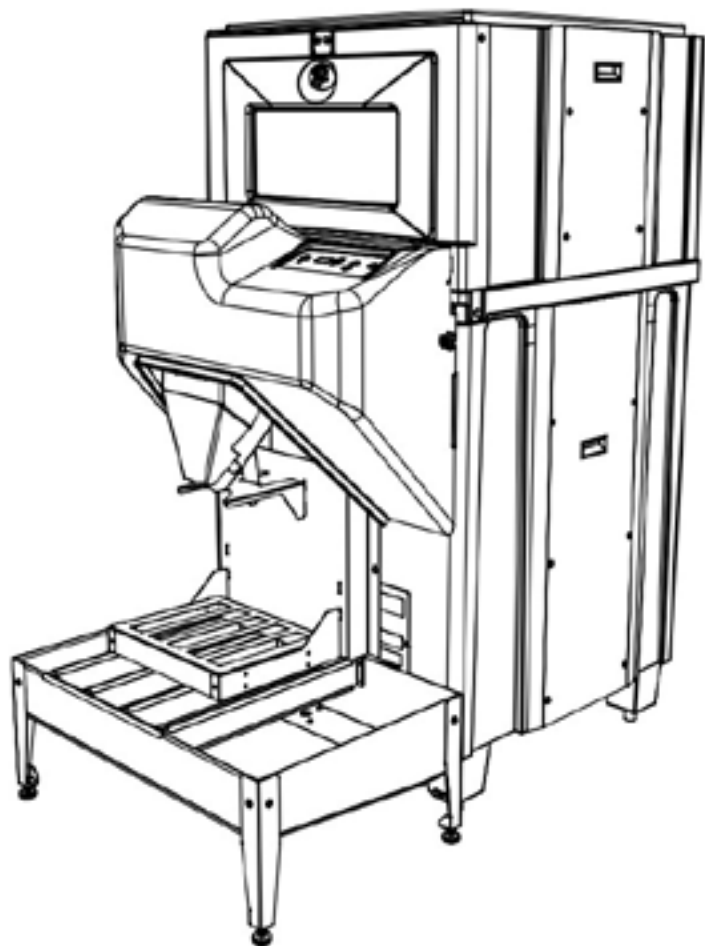
But one of the newest, and most exciting, projects that Coast Distributors has begun to facilitate is on-site dedicated ice rooms. Current trends have been moving towards containerised rooms

where employees can walk in one door and out the other to refill their ice and water supply, and continue promptly without the hassles of waiting in a long queue. Coast Distributors works together with containment companies to create the perfect ice room, dependant on how many machines are expected for use, so that mining production isn't impacted by de-hydrated workers – instead of one or two people filling up at any given time, this number can increase to six or more.

This is the advantage of having a committed and enthusiastic representative from Coast Distributors – all you need to do is leave the logistics up to the experts so the right solution is placed at your fingertips.

Built on honesty, integrity, quality and innovation to meet the demands of the mining industry, Coast Distributors exceeds all Australian standards when it comes to power and water consumption. Offering competitive prices, advanced machinery, and a 24-hour sales and technical support service, you won't find anyone better than Coast Distributors or their products. **AMR**

For more information:
coastdistributors.com.au



COAST ICE & COLD SOLUTIONS

WORKSITES, MINING & REHYDRATION



THE ICE MACHINE SPECIALISTS!

With over 40 years of experience in ice making and refrigeration, Coasts Ice and Cold Solutions is a proud market leader, providing quality ice-making and dispensing equipment Australia-wide.

Our extensive range of ice machines allows you to transport, store, bag, dispense and pump ice to where you need it.

Ice-O-Matic
Ice. Pure and Simple

FOLLETT
Innovative solutions, inspired by ice

www.coastdistributors.com.au



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Head Office: 12 Brady St, Berkley NSW 2506



www.coastdistributors.com.au

OVERCOMING THE CHALLENGES OF EXTREME HEAT WITH MX3 DIAGNOSTICS

Working in high heat environments across Australia puts workers at an increased risk of impaired performance and heat illnesses – all of which are preventable when the right measures are taken.

High temperature environments are a way of life for many Australians, and there can be serious consequences when procedures are not put in place to manage heat exposure. When the body is affected by heat, illness can present itself in several ways such as nausea, vomiting, headache, dizziness, elevated heart rate, fatigue and rapid breathing. If left untreated, heat strain can lead to severe injuries including, heat exhaustion, heat stroke and even death.

Heat stress is serious business in Australia – between 2000 and 2015, there were 17 heat-related deaths in the workplace, and there is an estimated \$6.9 billion a year in productivity losses caused by occupational heat exposure. Between 2009 and 2018, there were 1774 workers' compensation claims resulting from working in the heat, and currently about 12% of heat-related claims are for serious conditions requiring more than 5 days off work.

To avoid these serious incidents of heat stress, there is a need for mining and exploration sectors to put in place policies and procedures for protecting workers from the heat, and for dealing with situations where workers develop heat-related illnesses. Employers are responsible for protecting their workers from heat-related hazards by:

- Providing water, rest and shade
- Allowing for gradual acclimatisation
- Provide heat safety training
- Monitoring for signs and symptoms of heat strain, including dehydration

Promoting and supporting hydration on the worksite is one of the simplest ways to reduce a worker's risk of suffering from heat strain. MX3 Diagnostics have developed a one-of-a-kind non-invasive hydration testing kit that can provide instantaneous and reliable hydration assessments, away from clinics and labs.

The company's revolutionary platform – the MX3 Hydration Testing System – is the first simple and reliable way to measure and track saliva osmolality, a sensitive hydration biomarker – anytime, anywhere. Using only a saliva sample from the tip of the tongue, results are shown in seconds on a portable handheld meter and immediate action can be taken to manage dehydration.

Using the system, which is comprised of disposable Hydration Test Strips and a lightweight portable device called the MX3 LAB, employers can immediately protect their workforce and maintain productivity. The MX3 LAB can connect via Bluetooth to the MX3 Mobile App or MX3 Web Portal – a sophisticated suite of software tools that accumulate data to create analyses, reports and alerts.

By using the MX3 App and MX3 Portal, mining and exploration companies have unparalleled access to their hydration assessment data, allowing them to monitor the hydration status of workers across multiple sites in real-time and make informed decisions about hydration strategies and worker safety.

In 4 easy steps, mine sites can:

- Take saliva measurements
- Immediately view results
- Take action to rehydrate
- Generate reports and analytics

Since launching in 2019, the MX3 Hydration Testing System has been adopted by hundreds of work sites across the country, with millions of hydration assessments performed every year.

Founded to make it easier for employers to measure and manage their personal health and the health of their teams, MX3 has been built on the foundations of expertise from engineers, medical professionals, and researchers who have high knowledge in

electrochemistry, biomedicine, microfluidics, product engineering and design, signal processing, and machine learning.

Widely used across mine sites, MX3 Diagnostics have helped mining companies simplify their hydration testing by removing time consuming practices and replacing them with the highly advanced MX3 Hydration Testing System.

As we head into the hot summer months, mine sites can act now to prevent a potentially fatal situation and take the necessary precautions to avoid dehydration.

Get in touch today with the expert team at MX3 Diagnostics to help improve the overall safety of your workers. **AMR**



Beat the Heat – Hydration, Health and Performance with Aqualyte Hydration

During the hot summer months, hydration is critical to maintaining workers' health and the prevention of heat-related illnesses such as heat stress and heatstroke.



COMPARED TO OTHER ELECTROLYTE DRINKS, AQUALYTE IS:

- Low in sugar,
- Has a great natural taste,
- Is formulated to be absorbed quickly,
- Contains only the essential electrolytes lost in sweat,
- Is made with natural ingredients, and
- Is Australian owned and made.

When working outdoors or underground, core body temperature starts to rise as heat is absorbed from the environment and created internally by physical activity.

The most effective way to lose heat from the body is through the process of sweating, which accounts for up to 98% of heat loss. It's critical therefore that workers performing manual tasks in hot environments replenish sweat loss by consuming appropriate amounts of fluids throughout the day.

In order to prevent dehydration, the volume of fluid consumed should match sweat loss.

Not only does dehydration have a major impact on physical performance (decreased productivity), it also negatively affects cognitive capacity (decision making) which can lead to an increased incidence of workplace accidents.

Dehydration of just 1-2% can result in a 6-7% reduction in physical work capacity while fluid deficits of 3-4% can reduce performance by over 22%. Cognitive capacity has been shown to decline at just 2% dehydration.

Chronic long-term dehydration can also lead to health-related illnesses such as kidney stones.

With average sweat rates of between 400-600 ml per hour in a moderate environment, over a 10-hour shift workers may need to replace up to 6 litres of fluid. This can be significantly more in harsh hot conditions when working hard physically or if the worker has a high sweat rate.

Many people may think that drinking water is enough to prevent dehydration, but it isn't.

Water lacks taste so it doesn't encourage workers to drink sufficient volumes of fluid, it doesn't replace the key electrolytes lost in sweat, is slow to be absorbed into the body and does not help prevent fatigue.

After years of research in the Australian mining industry, Aqualyte was established and formulated based on peer-reviewed, published research that looked at the composition of sweat, sweat rate, thermoregulation and their effects on the health and performance of workers.

Aqualyte has been supplying Australian mining and construction companies since 1998 and is now used across multiple industries as well as by elite and professional athletes and sport teams. **AMR**

For more information visit **Aqualyte.com.au** or call **08 9418 8514**.

Aqualyte

Hydration Health Performance

W: aqualyte.com.au

P: 08 9418 8514

High Performance Hydration

Beat the heat with Aqualyte, designed for use by workers to prevent heat-related illnesses caused by dehydration.

Whether you're in the mining industry or are an elite sports person, Aqualyte is a quality solution for the prevention of dehydration.



KEEPING AUSSIE MINERS COOL AND HYDRATED

Hydration is critical when you're undertaking physically demanding jobs in the hot and harsh conditions synonymous with mine sites. High temperatures, dusty environments, and fluctuating humidity, the threat of dehydration is real, and can result in life threatening illnesses such as heatstroke, and an increased risk of other preventable accidents such as falls or equipment related injury.

Workers therefore need convenient access to water dispensers and ice machines that help them keep safe and productive while performing day-to-day duties out in the field.

Best Ice Machines is a company that truly understands the hydration requirements of major mining, industrial and commercial operations. As a renowned distributor of ice makers, water coolers, and ice dispensers for hydration stations, the

company offers a complete range to suit different worksite environments.

"Whether it's supplying large-scale mines or pubs and clubs, we have a full range of ice makers, water dispensers, and storage solutions to suit any customer needs," said company director, Chris Hockings.

"Our water chillers are Australian made in WA and along with our ice dispensers, both have become increasingly popular in

mines over recent years, particularly when the Covid-19 pandemic hit, and new health and safety regulations were implemented."

Available in sizes ranging from 55 kilograms with storage capacities up to 455 kilograms, the company's commercial ice dispensers help sites avoid ice contamination. This is achieved through a purpose-built design that minimises contact with fresh ice, removing the need to scoop ice by hand.

Best Ice Machines' water coolers are also an ideal hydration solution for mines, workshops and crib kitchenettes, which come in storage sizes from 5 Litres up to 474 Litres. These are complemented by a range of modular ice makers and ice storage bins to support stringent site hydration programs and ensure workers

have readily accessible ice and water when and where they need it.

Mr Hockings added that their ice makers ensure operations are stocked with a constant and reliable supply of fresh, crystal clear ice cubes.

"We offer a number of options including countertop, under counter, self-contained and modular models. Our customers can opt for portable ice makers, or a modular ice machine for storing large amounts of ice cubes for future use in an ice storage bin. From a hygiene perspective, our ice dispensers allow workers to dispense ice at the push of a button or lever, which offers a completely hands off approach." **AMR**

For more information, visit www.besticemachines.com.au





BEST ICE MACHINES

Australia's premier independant ice maker distributor

Large range of ice makers and water chillers

Ice dispensers for hydration stations

Fast delivery throughout Australia

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AUSTRALIA'S FIRST CHOICE FOR MINING AND CONSTRUCTION TRAINING

In the mining and construction industry, proper training and certification is integral in preparing individuals for the demands of the modern worksite and the unique applications faced within their respective trades.

Whether it's maintaining plant equipment, crane operation, drilling and blasting activities, surface extraction, resource processing, engineering or geological surveying, the right skills and qualifications are a must.

Australian Training Management (ATM) is a West Australian owned and operated Registered Training Organisation that specialises in the design and delivery of quality, flexible and cost-effective training solutions for the mining and civil construction industries.

With a passion for training, and a 'learner first' approach, the company has broken the mould when it comes to delivering training packages to meet the skills required to perform confidently, safely, and productively in heavy industrial environments.

Initially starting out as Earthmoving Industry Training Services in 1989, ATM was incorporated as a company on 1 July 2000 to provide training for the unique needs of the earthmoving industry where little private

training existed at the time.

34 years later, ATM has become a proven specialist in the provision of high-risk work licensing, construction safety, Main Roads Accreditation, plant operator training, apprenticeships and traineeships.

They are also experts in providing nationally recognised training qualifications, including Recognition of Prior Learning (RPL) and Verification of Competencies (VOC).

The company's training courses are not only contextualised for these industries, but they are developed with the flexibility that mining and construction demand.

According to ATM General Manager, Aaron Leafe, whether you are up-skilling, changing career path, trying to break into a new industry, or wanting to challenge and develop your professional skills, the company offers a full suite of training solutions.

"We offer a flexible training schedule of short courses that are fully integrated into the mining and civil industries," Mr Leafe said.

"Our trainers are well equipped to provide the necessary skills and knowledge required

to perform your specific trade correctly, safely and compliantly.

"Additionally, if you're looking for a highly professional, motivated RTO with best-in-class trainers, industry experience, and intellectual capital, ATM is the obvious choice."

The delivery of high quality training programs and enhancing clients' capability and business operations remains the core focus of ATM.

At ATM, safety training isn't a job. It's about reputation, one that was built on quality training above all else.

Mr Leafe commented that the company continues to evolve its product offer in accordance with changes in Workplace Health and Safety legislation, as well as progression in mining and construction techniques.

"We achieve this through active consultation with clients, listening and taking onboard their valuable input, and in-turn creating an inclusive, fun and safe learning environment.

"Our clients can be assured that the training that they, or their staff receive, will not only equip them with the skills required to

work safely and productively, but students will also be able to work with the confidence that they can apply their learnings as a valued team member." **AMR**

For more information, visit www.australiantraining.com.au

ATM provide clients with a suite of training courses

- On-site training and assessment Australia-wide
- Mobile Assessment Platform (APP based tool to conduct on-site assessments for ATM partners)
- Traineeship and Apprenticeship Delivery, including Skills Recognition
- Government Funded Training (Construction Training Fund Bulk Billing)
- Training Course Design and Development
- Training Centre and Venue Hire

Quality, flexible and cost-effective training solutions across a range of specialist areas

ATM have 50+ short courses available across multiple categories, that can be delivered at either of their training centres, or on-site to reduce workplace disruption.

General Safety Training

- Whitecard
- Tilt Up Construction
- Supervise Tilt Up Construction
- Carry Out Basic Demolition
- Provide First Aid
- Provide CPR
- Low Voltage Rescue and Provide CPR
- Fire Equipment Test & Tag
- Fire Extinguisher
- Fire Warden (Inc. Fire Extinguisher)
- + MANY MORE

High-Risk Work

- Operate a Forklift
- Elevating Work Platform
- Scaffolding (Intermediate Level)
- Dogging
- Rigging Basic Level
- Rigging Intermediate Level + MANY MORE
- CN Crane
- Slewing Crane (up to 20 tonnes)
- Slewing Crane (up to 60 tonnes)
- Slewing Crane (up to 100 tonnes)

Plant Operator Training

- Package Deals
- Roller
- Water Truck
- Articulating Haul Truck
- Skid Steer Loader
- Front End Loader
- Materials Handler
- Excavator
- Grader
- Dozer
- + MANY MORE

Keen to start upskilling?

Reach out to Australian Training Management to find out more and book your course today.

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www.australiantraining.com.au

Locations



West Swan Training Centre
52 Harrow St,
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Jandakot Training Centre
2/35 Biscayne Way,
Jandakot, WA 6164



Albany Training Centre
30 Graham Street,
Albany, WA 6330





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IMS have added the new BP1200-48TB track electric twin power blender to its impressive collection of blenders and pugmills, the new BP1200-48TB has four separate feed hopper each five meters long holding 12m³ each. All feed hopper conveyors are fitted with belt scales and controlled by a PLC control and recording system that can be operated from an iPad or phone from its own Wi-Fi system from a loader or site office. A Cat C7 Generator powers the Nord electric motors all fitted with invertors offering variable speed to each feed hopper conveyor. The generator can be connected to mains power and could power an extra 24-meter radial stacker increasing the stockpile capacity.



A new IMS-PM1200-20TB Track Pugmill with twin 10m³ feed hoppers has just commissioned to Braeside Quarry on the New England Highway Warrick in Qld, the options the PM1200-20TB offered Braeside improved product management with the twin feed hoppers blending fines into roadbase to make spec or having two different products available ready for moisture control and CTB. The PLC control and recording system can be operated from an iPad in a loader managing all aspects of the operation including loading trucks and multiple trailers stopping when the required weight has been reached for each unit and recording the ID number of each load.



John Andersen +61(0)424 181 056 | Chris Wong +61(0)424 180 860

info@crusherscreen.com | www.crusherscreen.com | Unit 4, 181 Sandy Creek Road Yatala QLD 4207

Crusher and Screen Sales PTY Ltd | ABN: 55 150 600 418 Gold Coast QLD 4220 | PO Box 144 Southport QLD 4215



CRUSHER & SCREEN SALES PTY LTD
IMS DISTRIBUTOR
 for Australia, Papua New Guinea
 and South East Asia



Crusher & Screen Sales Pty Ltd (CSSH) are the Australian distributors for IMS from Ireland who manufacture a range of plant including mobile and modular high production pugmills and blenders offering up to four full size feed hoppers, two powders and liquids fully PLC automated from an iPad.



IMS – PM1050-16TB Track Pugmill with adding Powder and liquids options, fully automated with production of up to 500 tonnes per hour.



IMS – BP1200-9TB Track Blender with two 5.5 meter long feed hoppers with mixer and production up to 1000 tonnes per hour.

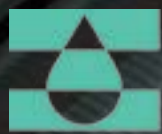


IMS electric modular Pugmill & twin hopper Blender with and 24-meter radial conveyor with auto radial return and auto lift as the stockpile height increases, fully automated and in stock. Option of four hoppers.

John Andersen +61(0)424 181 056 | Chris Wong +61(0)424 180 860

Email: info@crusherscreen.com | www.crusherscreen.com

Crusher and Screen Sales PTY Ltd | ABN: 55 150 600 418 Gold Coast QLD 4220 | PO Box 144 Southport QLD 4215



**Johnson
Screens**

Invention **Powered** by Tradition

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RHINO TRAILERS & LOW LOADERS

DONT CUT CORNERS WHEN IT COMES TO QUALITY

It takes an Australian born and bred trailer manufacturer to understand the tough operating conditions heavy haulage can endure in the Lucky Country and after 50-years in the business, they are continuing to improve and learn about how to better serve the road transport industry.

More recently The Davey Group, which is proudly 100% Family and Australian owned, has turned its focus on clearing supply chain hurdles that arose from the Covid-19 pandemic.

The company took the decision to increase

production capabilities by extending the production line at its 40,000m² Toowoomba base in Queensland, which was bought in 2007 and constantly redesigned to produce a range of trailers meeting the highest standards, with the addition of 22 new overhead cranes to maintain the highest design and manufacturing standards.

Engineering capacity has also expanded with the addition of two dedicated draftsmen with extensive design experience and mechanical trade qualifications. Several low-loader designs are being refined and re-engineered for improved strength, qual-

ity, operation and manufacturing efficiency. The emphasis on continued striving for better efficiency and service has also seen the company starting up new and fulltime school-based apprenticeships and upskilling tradesmen and labourers on a continual basis.

It's some journey from Kempsey, NSW, three decades ago. A seminal moment in the Davey Group's story occurred in 2004 when Lusty Low Loaders moved to the Sunshine State, was acquired by The Davey Group and relocated to Toowoomba in 2007.

As part of the company's modus operandi, Low Loader's original trailers have subsequently undergone an extensive design review to ensure the entire range subscribes to the highest standards set by the parent company.

The purpose-built division of the Davey Group focuses on custom-built road transport equipment, low loaders and purpose-built heavy haulage equipment all designed and built by skilled Australian craftspeople for Australian conditions.

Rhino Trailers carry a long-standing reputation for quality custom built semi-trailers with a reputation for superior strength synonymous with the company logo 'Strength in Design'. Take your pick between Single Units, B Doubles and Road Transport Configurations also include dollies, 2 rows of 4 and 2 rows of 8, 4 Rows of 4 Deck Wideners and Suspension Wideners, 4 Rows of 4 Deck Wideners and Suspension Wideners and 3 Rows of 8 and 4 Rows of 8 Full Wideners. Deck Wideners are also available in an Extendible Model.

The company's Toowoomba hub is a one-stop shop offering full repair and maintenance services including its own foundry, CNC precision engineering, sandblast, protective coatings and modifications if desired.

The Davey Group doesn't cut corners when it comes to its proud reputation for creating and manufacturing a diverse fleet of tough trailers built to deliver in the harshest Australian conditions.

These trailers have gone beyond the call of duty and distinguished themselves on mining terrain, transporting livestock and a mul-

titude of heavy haulage tasks. The drop-bed bulk tubs are made in alloy and high-tensile light weight steel to work with light weight, high volume loads

If you're after a model in the tipper range, you're spoilt for choice from high-tensile, light-weight steel and aluminium trailers that include their hybrid range.

Quality & ISO certification

You won't find the Davey Group running any red lights when it comes to quality, which is why two years ago the Group made a commitment to developing and implementing an Integrated Management System (IMS) to achieve certification in: ISO 9001:2015 Quality Management Systems; ISO 45001:2018 Safety Management Systems; and ISO 14001:2015 Environmental Management Systems.

This gives clients and customers a vote of confidence that trailers are continually evolving on an upward trajectory when it comes to quality at the Davey Group as a result of standards and controls that are raising the bar to the highest tier when it comes to performance and reliability.

The Rhino division, sings off the same hymn sheet with an onus on customer satisfaction derived from a no compromise ethos when it comes to quality and a focus on satisfying customer specifications, constantly delivering and improving certified ISO 9001:2015 Quality Management System and conducting in process and final quality test inspections.

You can't beat over 50 years of industry specific experience, not to mention the knowledge and expertise Lusty Low Loader and AFM-O'Phee Trailers derived after joining forces under the shelter of one dynamic, parent company umbrella.

At the moment there's a focus on growth and production output capability. Across the industry, lead times to manufacture new trailers are excessive - customers having to wait extended periods to obtain new equipment. We're working on ways to improve lead times. **AMR**



RHINO

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MOVING TO THE CUSTOMER'S BEAT

Tranz Logistics provides both wet and dry hire of its fleet of transport equipment with a focus on high level client service.



Its fleet is used in mining, oil and gas, infrastructure, road construction and major civil projects across Australia and includes oversize and over-dimensional loads with its high capacity and high performance Palfinger cranes.

Tranz is committed to finding the best solutions to meet any industries specific requirements. The company collaborates directly with its customers to ensure all equipment meets the required industry standards for the job including the provision of customised equipment to meet specialised conditions.

Always putting safety-first, all hire equipment includes advanced technology such as in-vehicle monitoring systems (IVMS), GPS tracking and fatigue management systems for high level safety performance. All technology

can be integrated where required for individualised job conditions.

Safety features include fire suppression systems, five-way camera and motion sensors on its fleet of crane trucks. The motion sensors detect objects and will halt the movement of the crane to prevent the possibility of damage. The Fire control system Fog Maker installed in tunnel vehicles to minimise injuries, along with the proximity detection device for collision avoidance.

We offer a specialist Tunnel Logistics service with customised supply chain solutions, a deep extensive knowledge requirement and needs built on long term partnerships with clients.

Tranz Logistics works together with projects to offer safe and reliable equipment and

operators to deliver the results customers rely on and expect from us.

Our considerable experience in tunnelling services includes the hire of all equipment as well as supplying operators should it be a requirement, which have the experience and expertise to work productively and safely in underground environments.

We have operated on major tunnelling projects across the eastern seaboard including North Connex and West Connex in Sydney, Melbourne Metro, West Gate Tunnel in Melbourne, Narrows crossing pipe tunnel and Brisbane and Airport Link in Queensland.

Tranz Logistics also offer a specialised service to manage chemical, dangerous goods, hard rock mining and other industries that deal in dangerous

chemicals and toxic waste.

Our service focussed providers include Tranz Logistics, Tranz Renewables, Tranz Warehousing and Tranz Moves. Tranz Renewables seeks to meet all the requirements for providing equipment in the construction and maintenance of hybrid renewable technologies, combining expertise in stevedoring, logistics and renewable solar handling, with an unequalled expertise in crane hire, heavy haulage, component transportation and logistics.

The company has been established in Australia Nationally for over 20 years and is now keen to expand into Southeast Asia, the Middle East and Europe.

AMR

Service is our Success

We design and implement innovative supply chain solutions across the tunnelling, rail, road, civil, mining, renewable energy, infrastructure and oil & gas sectors.

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HAULAGE REVOLUTION

Optimising the operation of trucks on mine haulage routes in remote places is a pressing business need for the global mining industry facing rising cost pressures.

Fuel, maintenance and operational costs for mining haulage trucks can squeeze mining company profit margins and companies are looking for ways to control these unpredictable expenses.

Queensland-based mining consultancy Smith Global has developed a software solution aimed at addressing these haulage issues which can be critical at mine sites in remote locations with challenging weather conditions and difficult terrain.

Smith Global managing director Kerren Smith said its specialist haulage software,

called Optimizer, can unlock savings for miners seeking to trim their haulage costs.

The software has delivered extensive savings in fuel, maintenance and time for its clients that include top tier mining companies.

“What we have as a value proposition, is that we are a design house, particularly focused around transport,” Mr Smith said.

Smith Global offers mining companies and mine site operations the opportunity to evaluate their mine site haulage operation options through feasibility studies, cost-benefit analysis, project management and the implementation of haulage solutions.

Whether clients have existing haulage fleet or are just starting the process, the company provides expert advice on ways to improve productivity and efficiency outcomes.

The Optimizer software is customised for each client and is capable of quickly analysing a miner's haulage operations to highlight areas for efficiency improvements leading to greater productivity.

The package can provide what-if scenarios to allow the modelling of different haulage routes and comparison of different vehicle combinations.

PROJECT IMPLEMENTATION

There are three distinct phases to implementing a project using Optimizer: assess; analyse and outcomes.



The Optimizer process starts with defining project goals and the needs of a client including, auditing a trucking fleet's performance and equipment used in the handling process to establish a baseline, before moving on to a comprehensive analysis of various haulage routes.

The second stage is to carry out a methodical comparison of potentially viable options collaboratively with client staff, from workshop personnel to senior managers.

When initial baseline performance data is gathered into the Optimizer system and client objectives set, an in-depth analysis can begin on evaluating different haulage options.

This next step involves using the software's proprietary specialist tools to process data and produce findings within the scope of the client's project requirements.

The third stage of the process is the evaluation of these haulage route options and findings to identify areas of cost savings and efficiency improvements such

as clearing bottlenecks.

This final stage covers many different aspects, including, gradients, road surface conditions, speed restrictions, corner radii, and obstacles such as bridges.

The Optimizer process is key to the Smith Global Whole-of-Life cost modelling system, which allows clients to accurately assess the relative cost options for replacing or extending the life of mining equipment. **AMR**



The REVS software package allows the input of data such as specific GPS coordinates to build up a simulation of haulage routes for individual mine sites.

WE OPTIMIZE MINE SITE HAULAGE




OPTIMIZER

Whether you are at an early stage of evaluating your mine site haulage options or have an existing road train fleet that could benefit from productivity improvements, we'll help you develop the optimal solution.

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REDUCE NOISE POLLUTION WITH MINETEK

Mining operations face significant challenges posed by noise pollution, due to the use of heavy machinery. Subsequently, this results in community complaints, tighter noise regulations, limited production hours, fines and even shutdowns.

Minetek offers innovative sound solutions utilising advanced technology and acoustic engineering capabilities to address noise concerns. Depending on the specific needs of the client, Minetek can effectively reduce noise levels on individual mobile or fixed assets or throughout an entire fleet of machinery.

This is achieved through Minetek's sound suppression packages with componentry determined through detailed testing and analyses, targeting the dominant frequencies that contribute the most to noise emissions.

By implementing these solutions, Minetek can achieve noise reduction of up to 50% in accumulated noise produced by mining operations, resulting in significant benefits for nearby communities.

These sound reduction solutions enable mining operations to meet regulatory and community noise expectation while minimising the harmful impacts of noise on operators.

Minetek's solutions can enable mine sites to continuously operate up to 24-hours per day, minimising downtime and ensure compliance with noise limits. Additionally, the reduction in mobile asset noise levels often enables machines to operate closer to boundary noise monitors, thus expanding the scope of operations.

The ability to customise solutions to address the unique noise problem at

each mining site is what sets Minetek apart. Services range from implementing a whole fleet turn-key system to providing attenuation on one or two machines.

From initial consultation and ISO testing to asset assessment, supply and site installation of sound kits, Minetek offers comprehensive services to resolve the noise challenges present in mining.

CASE STUDY

Over the past 11 years, New Hope Group faced pressure to meet strict noise requirements at its Queensland New Acland mine site.

Initial work under the partnership saw Minetek undertake a detailed analysis of the entire site and its operations, including all fixed and mobile machinery, and plant equipment. This analysis included detailed discussions with the maintenance, environmental and management groups.

"The Minetek engineering team were very accommodating and would travel to site to understand our specific needs and tailor a solution to suit," New Acland Mine Maintenance Planner Robert Trapp said.

Minetek strategically targeted the most dominant noise sources and frequencies, providing an acoustically engineered solution, designed to OEM specifications without compromising machine integrity, airflow, maintenance, and accessibility.

They solved the site's sound concerns by treating noise at the source across 85 mobile and fixed assets and machinery.

Our solution helped to increase the site operating hours by 56%, as stated by New Acland's Maintenance Manager, "we were limited to operating 9 hours daily. We were losing money hand over fist". The completion of this project saw New Acland's overall sound emissions reduced by 50%, enabling an additional 327,300 hours of operation, with the ability to extract an additional 2.1 million tonnes of additional coal annually at the value of \$354.3 million.

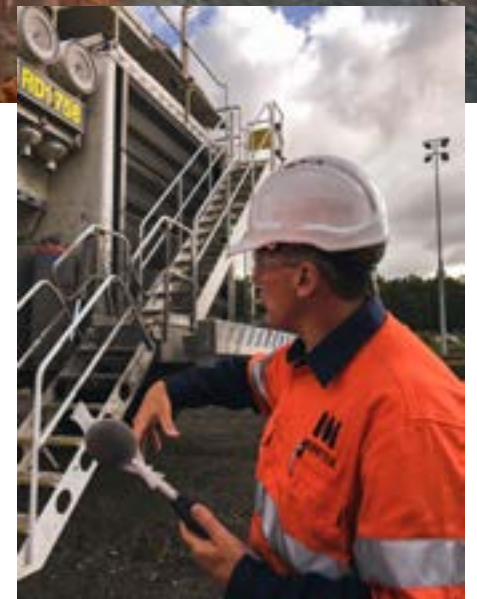
With effective noise level monitoring and sound attenuation, Minetek enabled New Acland to run sustainably day and night throughout its mine life. According to New Acland's Maintenance Manager, "If it wasn't for Minetek, this mine would not be viable."

Minetek has provided cutting edge sound solutions to companies like Rio Tinto, Glencore and Theiss, with over 1,500+ machines attenuated worldwide, across

leading OEM's including Caterpillar, Liebherr, Komatsu, Hitachi and more. **AMR**

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Is your site struggling to meet noise regulations?



Minetek reduced noise by 50% & doubled production at this mine site.

Minetek has reduced accumulated site noise by over 50% at this Australian open-cut mine. This QLD mine site can now operate 24/7 whilst adhering to strict noise requirements, in turn improving community and mine site relationships. Attenuated vehicles can often operate closer to the boundary or sound receiver, allowing for maximum mineral extraction and increased profitability.

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ENHANCING MOTOR SYSTEM RELIABILITY THROUGH PROACTIVE TESTING AND COMMISSIONING

This article focuses on enhancing motor system reliability through proactive testing and commissioning techniques. It introduces two primary methods for motor testing: Motor Circuit Analysis (MCA) and Electrical Signature Analysis (ESA).



APT Group GM Geoff Soper explained the difference between MCA and ESA.

"MCA is a comprehensive method that encompasses offline testing. It employs a hand-held, portable instrument, equipped with the capacity to utilise low-voltage, non-destructive, sinusoidal signals for the purpose of thoroughly evaluating the overall health of the motor. This thorough examination ensures that the motor's condition is meticulously assessed, providing valuable insights into its performance and reliability," he said.

"ESA is an online technique. It employs either a hand-held, portable instrument or permanently installed modules and is designed to pinpoint faults within the motor system. It achieves this by scrutinising the motor's supply voltage and operational current, allowing it to



detect both existing and emerging issues throughout the entire motor system. The measurements obtained from these parameters serve as transducers and any anomalies within the motor system lead to variations or modulations in the motor supply current. By meticulously examining these modulations, it becomes feasible to pinpoint the origins of disruptions within the motor system."

This publication highlights the significance of commissioning motor systems before production begins and discusses the value of both de-energised (MCA) and energised (ESA) testing, not only for predictive maintenance but also for incoming inspections of new or rebuilt motors and troubleshooting non-functional or poorly performing systems.

THE VALUE OF COMMISSIONING IN MOTOR SYSTEM RELIABILITY

A study conducted in 1978 by Nolan & Heap revealed that motor failures in complex systems are not solely age-related. This reference is used to emphasise the importance of commissioning motor systems before production. New and repaired motors may experience initial defects, and testing can help identify these issues. Some motors are delivered with defects, and environmental factors



like temperature and humidity can lead to insulation degradation over time. Additionally, testing motors before sending them for repair and after repair to ensure they are correctly repaired and unchanged in terms of design and performance is recommended. Traditional testing methods like meg-ohm meters or digital multi-meters may not detect certain issues that MCA and ESA can identify.

MITIGATING COSTLY DOWNTIME

Significant financial implications of machine downtime can be the result of motor failure, suggesting that investing in MCA or ESA solutions can be justified by the avoidance of costly downtime. In fact, saving a single motor failure, will pay for the investment in test equipment and it's worth noting, the testing process is quick, taking only a few minutes and considered essential, for proactive motor maintenance.

ENSURING MOTOR QUALITY

The importance of testing is not only conducted for maintenance purposes but also for ensuring the quality of the motor. It is highlighted that motor quality can be critical, especially in applications with high labour costs, life safety, environmental concerns, or those impacting production. MCA testing can help evaluate the motor's electrical balance, which is crucial for energy efficiency and reliability. An unbalanced motor can consume more energy and be less reliable due to impedance unbalance, which occurs when the rotor is not in the magnetic centre of the stator field. This is something that traditional testing methods cannot detect.



DIFFERENTIATING MOTOR TESTING METHODS

It is also worth differentiating between motor testing methods, stating that Meg-ohm, DC High Potential, and Polarisation of Index testing primarily evaluate the condition of the motor or cable to the ground. On the other hand, MCA assesses the motor's condition and its immediate connections but does not provide insights into the overall motor system. ESA, however, allows a comprehensive evaluation of the entire motor system, including incoming power, electrical and mechanical aspects of the motor, and the driven load.



CONCLUSION

"In conclusion, seasoned practitioners advocate the use of MCA and ESA testing techniques to improve motor system reliability," Mr Soper said.

This article highlights the benefits of commissioning motor systems before production, it identifies the financial implications of motor failures, and stresses the importance of ensuring motor quality for various applications. It also clarifies the limitations of traditional testing methods and underscores the comprehensive nature of Electrical Signature Analysis. Ultimately, a proactive approach to motor maintenance is promoted, which can lead to cost savings, improved product quality, and increased equipment availability, thereby benefiting a company's bottom line. **AMR**

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Because fasteners and rivets are an important part of any industrial project, Profast services clients across the mining, transport, traybody, maritime and renewable energy industries.

"At Profast, we understand the unique challenges faced by the mining sector. Our mission is to provide solutions that not only meet but exceed industry expectations," Profast General Manager David Slykerman said.

As Profast has been operating for over two decades, they've developed strong ties with suppliers, guaranteeing a steady supply of stock, even during times of supply chain hardship.

SUBSTANTIAL STOCK HOLDING

In an industry where time is money, Profast prides itself on maintaining an extensive inventory of fasteners and associated tooling, meaning Profast can supply customers with what they need, when they need it.

Their warehouses are stocked with a wide range of fasteners including large diameter lockbolts, structural rivets, slogging hammers, general fasteners and threaded inserts in all sizes and materials.

When you need a critical component, you won't face downtime waiting for essential parts to arrive.

"We understand that in mining every minute counts. That's why we maintain a substantial stock of fasteners and related products in our warehouses," Mr Slykerman said. "We're here to keep your operations running smoothly."

SPECIALITY PRODUCTS SOURCED QUICKLY

Mining operations typically require unique and specialised components that aren't readily available and require time to get. Profast's extensive network and industry knowledge allows the company to source these unique items promptly.

"We take pride in our ability to adapt to the ever-evolving needs of the mining industry. Our team is dedicated to providing tailored solutions and outstanding service, every step of the way," Mr Slykerman affirms.

WIDE PRODUCT RANGE

Profast doesn't stop at fasteners and speciality products, with the company understanding customers need reliable tooling to get a job done. From large diameter lockbolts to threaded fasteners, Profast has an extensive range of structural rivets and lockbolts alongside the standard nuts, bolts and washers if required.

These items can be supplied in steel, stainless steel, aluminium and other materials including marine-grade materials.

If you have an urgent job that requires further resources or the job doesn't warrant purchasing a new tool, Profast also offers tools for hire.

"We believe in offering our customers the full package. This includes not only fasteners but also the tools to use them effectively," Mr Slykerman states. "Our commit-

ment to maintaining spare parts at each location showcases our dedication to delivering exceptional service."

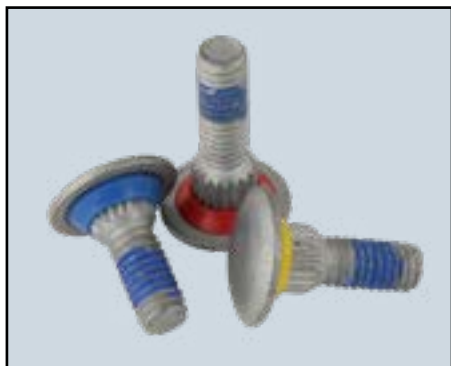
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Profast's extensive capabilities and wide product range makes them the ideal partner for the mining, rail, transport and other heavy industries. With its unwavering commitment to quality and service, Profast is a trusted partner for all your fastener needs.

"At Profast, we aim to be more than just a supplier; we want to be a partner in your success. Our expertise, extensive inventory and strategic locations set us apart," Mr Slykerman concludes.

Visit www.profast.com.au to explore the extensive product range and get in touch on **07 3265 2267** or **08 9456 5537** for any questions.

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FIXING AND FASTENING THE MINING INDUSTRY

Australian mines are part of a vital and thriving industry that contributes significantly to the country's economy. Creating jobs, driving innovation, and generating revenue helping to make this country a leading global supplier of minerals.

Mining sites in Australia ensure sustainable and responsible resource extraction in an industry driven by a skilled and diverse workforce. It is that very workforce that relies on cutting-edge equipment and technology to be active and operational day-in and day-out.

Your crew faces day-to-day challenges that can affect uptime and bring smooth operation to a halt.

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ed Fasteners can ensure that your process operation continues to run smoothly through the reliable supply of high-quality Fasteners, Fixings and Industrial supplies.

We're Australia's largest independent distributor of fastening products and industrial supplies.

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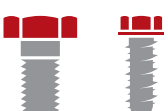
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LEADERS IN INDUSTRIAL AND WASTE MANAGEMENT SERVICES

As specialists in the mining and industrial services industry, KingKira is fast becoming a leader in non-process and process infrastructure, and on-site industrial services.

Non-process infrastructure includes the delivery and supply of potable water, the removal and disposal of liquid water, oily water and sludge, plus oily water sumps and general waste sumps.

"KingKira offers a broad spectrum of specialised environmental service solutions to various sectors, including mining, oil & gas, utility organisations, refineries, civil construction, and government authorities," KingKira General Manager of Environmental Services Michael Garkaklis said.

"With a strong commitment to delivering professional and competitive services, KingKira has assembled a skilled and dependable workforce alongside a management team dedicated to finding tailored solutions for its customers."

INDUSTRIAL SERVICES

Playing a critical role in supporting the efficient and effective functioning of industrial business, industrial services refer to a wide range of specialised services that support operations, maintenance and production.

KingKira offers a wide range of specialised industrial solutions that cater to both light and heavy industry, utility organisations and government authorities.

"Our bespoke industrial services solutions include services such as non-destructive digging, hydro-demolition, concrete cutting, high pressure cleaning, vacuum loading and specialised boom equipment for high pressure cleaning activities," Mr Garkaklis said.

WASTE MANAGEMENT

KingKira provides an extensive array of waste management solutions to a variety of industries across the country with services including waste management guidance, bins and the transportation of vari-

ous waste types from clients' premises to treatment or disposal facilities. Additionally, the company also offers on-site treatment, transfer, remediation and recycling of waste materials.

"Our comprehensive waste management packages are designed to deliver a professional and prompt service, focusing on recovery, recycling, and responsible treatment or disposal in line with both our clients' business goals and the ever-stricter legislative requirements," Mr Garkaklis said.

OPERATIONAL / PRODUCTION

Using their best in industry robotic units, KingKira can clean operational spillage in hard to access areas including beneath conveyors and transfer stations whilst they are still operating.

Ahead of inspections on process plant structure and stockyard rail, structural integrity maintenance preparation is undertaken.



OTHER SERVICES INCLUDE:

- Heavy vacuum services for wet and dry clean-up of operational spillage using the KingVac fleet
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- Ultra-high-pressure water blasting and descaling
- Non-destructive digging
- Low pressure water blasting
- Tank dredging and cleaning
- Thickener, clarifier and washer rake de-bogging
- Rock picking, removal and cutting
- Under conveyor cleaning
- Rail cleans
- SIMS inspection
- Emergency response spill clean-up

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MANAGING EXTREME WEATHER IMPACTS ON MINING OPERATIONS

Unprecedented has become the buzzword when discussing the weather, and for mining companies the world over, unprecedented climate extremes have been creating chaos.

In early March 2023, operations were suspended throughout the North West Minerals Province in Queensland, Australia, due to record-breaking rainfall. One site recorded over 600 mm in just two days — more than the annual average. Globally, severe storms and heavy rainfall continue to cause operational delays and revenue losses, compromising equipment and mine infrastructure. Flooded supply chain networks delay shipments and delivery, driving up unit costs.

At the other end of the spectrum, drought causes a complete rethink of water management on-site. The mining sectors in Mexico and Chile, and their vital lithium and copper production, have been impacted by crippling drought — for more than a decade in Chile alone. Water shortages challenge output and can create tension with local communities as severe scarcity affects everyone across struggling regions.

Utilising meteorological consultancy and the decision-support interface Miningzone provides an opportunity to fine-tune existing systems of management for each mining project.

Gaining situational awareness of extreme weather events

Preparation and hyperlocal monitoring are integral when confronting unprecedented climate risk. Weatherzone Business, a DTN company deploys robust solutions delivering invaluable foresight: improving safety, reducing profit loss, and modelling what lies beyond the horizon.

Utilising meteorological consultancy and the decision-support interface Miningzone provides an opportunity to fine-tune existing systems of management for each mining project, optimising each site's unique preparation for and response to adverse weather conditions.

When storms threaten safety and operations

Lightning creates potentially fatal conditions on-site. There is a misconception that mining vehicles create a perfect Faraday cage, providing adequate physical protection. Large windscreens and side windows still enable lightning and side flash to penetrate the cabin, creating a dangerous environment for operators. Pyrolysis — the mixture of volatile compounds within the air chamber of tires that can potentially ignite — creates tire rupture or explosion. This process is sometimes delayed, posing a lying threat to workers within the vicinity of the vehicle post-strike.

Reducing the physical risks of lightning for mining companies

Stopping operations during storms when the lightning is within an unsafe radius is the best way to safeguard staff and mitigate damage to assets.

Accurate detection of local strikes identifies when lightning penetrates this radius. It supports the efficiency of Trigger Action Response Plans (TARPs) and reduces costly and unnecessary downtime caused by hyper-sensitive on-site sensors.

Weatherzone offers the Weather and Lightning Alerting Solution (WLAS), which operates in over 400 mines across the globe. Drawing on data from 1,800 sensors in more than 100 countries, WLAS delivers precise warnings of lightning proximity, configured to each mine's thresholds.

Each site receives clear guidance on when to halt and restart production. When WLAS is used in conjunction with WZBob Onsite Alerting, conspicuous, site-wide audible and visual alerts provide enhanced safety outcomes for mining personnel.

Monitoring weather conditions to protect mining infrastructure

Preparing a site by ensuring mobile mining equipment and operators are undercover takes time. Having the ability to visualise potentially damaging systems before they hit maximises the time needed to safely shut down.

Stormtracker is the solution that allows a mine's control room operator to chart the progress of incoming weather and mount a targeted response. A Geographic Information System (GIS), Stormtracker displays multiple weather layers mapped over each geofenced mining site. All infrastructure is visible, providing a clear picture of what and who needs to be prepared and protected.

Mining projects vulnerable to tropical cyclones

Tropical cyclones and hurricanes pose a growing threat to mines globally. Weatherzone offers a 7-Day Tropical Cyclone Service that's completely customised to each mine's site and infrastructure. Conditions are remotely monitored 365 days a year. When a system develops within 600 nautical miles of a mine site, our meteorologists begin communicating vital data to operators.

Tailored risk assessments are provided to enhance site preparation. Meteorologists are on call 24/7 throughout the impact, and visualisation via the Miningzone interface improves spatial awareness of its track.

Warm oceans and humid, volatile air influence the development and strength of these systems. It's widely accepted that their intensity will increase with time. For vulnerable mines, accurate monitoring provides time to secure a site and evacuate personnel to reduce loss across the board.

Close consultation with our industry meteorologists drives the capacity to respond to climate impacts with confidence.

Supporting the mining industry to manage climate risks

Utilising meteorological modelling and consultancy creates added layers of protection and situational awareness for mine operators. Close consultation with our industry meteorologists drives the capacity to respond to climate impacts with confidence.

Seasonal outlooks are the key to analysing the possibilities that weather has in store and underpins considered preparation. Foresight regarding potential drought, high rainfall, and tropical cyclone activity guides effective risk mitigation. The success of planning water management, electricity storage, TARPs, and evacuation procedures is influenced by a detailed awareness of the potentiality of extreme conditions.

The urgent need for detailed risk communication

For the day-to-day management of immediate weather threats, quality risk communication is paramount. Our meteorologists dissect complex data and deliver tailored briefings and analytics around the clock. This support drives confident, rapid decision-making when severe weather is imminent.

Audits of current weather management systems provide profitable opportunities to improve preparations and response, well before the storm inflicts its wrath.

It is indisputable that now is the time for companies to think ahead, strategising to mitigate the effects of increasingly volatile weather patterns.

DTN supports mining sector plans for climate variability

Top-tier weather and environmental data and analytics drive adaptability and preparation within the mining industry. It is indisputable that now is the time for companies to think ahead, strategizing to mitigate the effects of increasingly volatile weather patterns. Only the most robust and trusted weather and data systems will deliver a dependable foundation for this kind of recalibration. Weatherzone offers advanced solutions built on years of collaboration with the resources sector and will continually innovate as each new challenge arises.

**Learn more about
Weatherzone Business, a DTN
company Mining Solutions today.**

AMR

Give your enterprise the best chance to protect personnel and profit

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Access customised weather and environmental intelligence trusted by mines worldwide.

Weatherzone Business, a DTN company, is your industry leader in mining weather solutions and analytics. With precise monitoring and alerting you can respond rapidly, safeguarding your uptime and output. **Utilise valuable foresight and decision-making tools to enhance your efficiency.**



Miningzone's Actionable Insights

Miningzone is your **customisable, IP-secure interface** centralising all your key meteorological and environmental solutions. Your teams can utilise concise insights and alerting to drive their confident decision-making.



Powerful Operational Forecasts

Visualise weather threats in real-time, and out to 7+ days. Your onsite parameters are ingested into our **Operational Forecast System**, which then delivers **targeted risk forecasts with meteorologist commentary**.



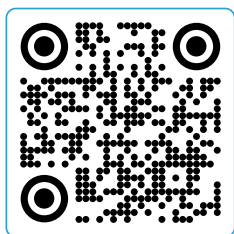
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HYDRATORQUE HAS HYDRAULICS COVERED

Hydraulic systems and their components are the lifeblood of any industrial plant equipment and earthmoving machinery. They are essentially required to shift heavier loads and generate higher forces. That's why they are common in complex systems where industrial valves, pumps, cylinders and motors exist such as excavators, front-end loaders, dump truck trays, scissor lifts, gearboxes, drill rigs, conveyors and crushing systems.

The tough conditions associated with surface and underground mining applications mean that more power is required. The larger the system, the higher the pressure or torque needed. This inevitably leads to component wear and machine breakdown. Therefore, maximising performance of these systems and protecting their critical parts requires regular repair and maintenance to prevent breakdown and reduce downtime.

Aussie owned Hydratorque has a wealth of experience in the world of hydraulics. For over 25 years, the company has provided sales, service, technical support and system engineering for the industrial mining, exploration, construction, agricultural, transport and marine sectors.

Hydratorque managing director Matt Buldo said the company's in-depth understanding of the mining industry, combined with the technical aspects of how hydraulic systems function, makes them a unique service provider.

"The application and support of hydraulic systems and components requires a high level of experience and know-how," he said.

"That's why we only work with the best fluid power manufacturers globally to deliver proven, high performance hydraulic products to meet the demands of the toughest worksites. We've partnered with brands such as Parker Hannifin, Denison, Voac, Commercial, Rexroth, Sun, Hydraforce, and Racor Filtration, to name a few."

HYDRAULIC SERVICES

A fully equipped hydraulic service centre in Brisbane enables Hydratorque to provide quality testing and repair for a wide range of hydraulic equipment. This is backed by a team of experienced technicians that undertake continuous in-house training to keep them at the forefront of their field.

In order to achieve the highest industry standards, Hydratorque's purpose-built facility features a variable drive test bench, a cylinder repair bench with high torque and long-stroke capacity, and in-house machining capabilities.

"Supported by a comprehensive service program, our service centre specialises in the repair and servicing of all hydraulic components" said Buldo.

"From piston pumps and motors, cylinders, power units and valves, to final drive, top drive and pump drive gearboxes. We have built a reputation for the repair of piston pumps and motors, providing access to genuine parts. All repairs comply with strict quality control procedures and in accordance with manufacturer's tolerances. Our technicians can also provide full inspection and root cause analysis reports as required."

When it comes to onsite diagnostics and technical support, Hydratorque supports all hydraulic systems from start to finish. With approved business partners and 24/7 field service, quick response times and emergency breakdown support, customers have unique access to services when and where they need them.

In conjunction with an in-house system design team, the company helps customers transition their projects from the design stage to full-scale operation. This involves installation and commissioning of hydraulic components and complete systems, turnkey installation of projects, as well as engineering, technical support and consultation at every stage of the process.

PERSONALISED DRILL SUPPORT

Hydratorque offers a drill support program that aims to provide drilling partners with an elite service solution tailored to their machines and site requirements. The range of solutions are designed to suit all major drilling equipment brands including



CAT, Terex, Bucyrus, Reedrill, Atlas Copco and Sandvik.

Buldo highlighted a core service the company provides is machine diagnostics, fault troubleshooting, and failure analysis.

"Whether you're running hydraulic, pneumatic, or mechanical systems, our technicians offer an unmatched level of diagnostics and testing for rotary and top hammer machines, and Cubex equipment including CANBUS based automation ready systems, and the Australian built Vigilante PLC systems.

"Additionally, we supply a full range of components, filtration audit and analysis,

component repair and rebuild, testing in either our workshop or on your site, as well as a service exchange program for popular units.

Customers also benefit from Hydratorque's detailed machine auditing and assessments. By partnering with production, maintenance and planning personnel, the company can develop deep insights of specific project and site requirements, and offer a solution that best aligns. **AMR**

For more information, visit
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Adhering to strict requirements regarding facility, engineering, manufacturing, training and inventory standards, Hydraulic & Pneumatic are an appointed Parker Pump and Motor Distribution and Build Centre.

As industrial leaders in hydraulic application and engineering, Hydraulic & Pneumatic offer a range of pumps and motors including:

- Comprehensive range of P1 Piston Pumps
- Comprehensive range of Denison Vane Pumps and Motors
- PGP511 Aluminium Gear Pumps with Integrated Relief Valve
- QPM3 Gerotor Pumps
- F11/F12 Fixed Displacement Hydraulic Motors and Pumps

In addition to a large stock of complete units, they offer rapid build and delivery of complete P1, Denison Vane and F11/F12 hydraulic pumps and motors.

Hydraulic & Pneumatic's Pump Testing Rig can be used for single, double and even triple pumps. With the system able to handle up to 420Bar and 500L/min, they can test the smallest to biggest pumps with ease.

Their test branch is equipped with a range of advanced sensor equipment which monitors the health of the pump, allowing them to give a detailed report on the performance.

The experienced operators know how to safely test the full range and functionality of the pump, giving the best picture of how it performs so there's no wondering if the pump will be able to operate as required.

The operators can test and set simple to advanced pump controls, they have experience setting electronically and hydraulically actuated closed loop variable speed systems, ensuring the pump will operate exactly how it's meant to.

Hydraulic & Pneumatic's drive-through workshop facility contains overhead cranes and specialised equipment for testing, calibration, manufacture and repair. With fully prepared on-site vehicles, they can respond to call-outs under breakdown and emergency situations.



To minimise downtime, they stock considerable inventory and can source components quickly. **AMR**

For more information, visit www.hydraulicpneumatic.com.au or email info@hydraulicpneumatic.com.au.



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COLEMAN HYDRAULICS & ENGINEERING

PROVIDING EACH CUSTOMER WITH QUALITY SERVICE.

Since 2008, Coleman Hydraulics & Engineering has been supporting the mining, oil and gas, construction, piling, tunnelling, industrial, agricultural industries as a reputable repairer and parts supplier.

The company's mantra is to provide each customer with a quality service at a competitive price.

Thanks to its highly experienced and flexible team, Coleman Hydraulics & Engineering has earned a reputation for its capacity to provide a variety of specialist machining services from turning to milling to grinding.

The company is particularly recognised for its full machining capabilities and for providing unique, one-off, and urgent sealing components, with a fast turnaround service.

Having built up its expertise working with various industries, Coleman is also able to offer innovative solutions that are proven to help reduce the overall operating costs of equipment and assets.

As a full-service provider, Coleman can offer sealing solutions for a wide variety of market segments such as the mining, heavy industry, railway, and earthmoving industries and many more.

Along with its capacity to provide general mechanical repairs/servicing including troubleshooting to all makes and models of equipment, the company is also available for major rebuilds on mobile equipment, mining development/production drills, exploration drills, trucks, loaders, and light vehicles.

We are able to carry out repairs, overhauls, rebuilds to all types of rockdrills and carry a large range of parts in stock.

The company's history of reliability has seen it earn a role as a preferred partner/distributor for organisations such as Freudenberg Sealing Technologies.

It is also available to travel nationally as well as internationally and has a good deal of experience in international travel and work.

Coleman Hydraulics & Engineering is your solution for all hydraulic repairs, service, sales, and engineering works. **AMR**

COLEMAN HYDRAULICS AND ENGINEERING

Your solution for all hydraulic repairs, service, sales, and engineering works

- At our Lawnton workshop we provide professional facilities to help you with all your hydraulic repairs and services.
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- We can repair all types of hydraulic motors, pumps, valves etc. With all repaired items being tested prior to leaving the workshop.
- Onsite servicing of hydraulic systems, troubleshooting of hydraulic systems, auditing of hydraulic systems.
- We supply hydraulic parts, seals, pumps, valves, and motors. As well as many components like filters, piston seals and O-rings.
- Hydraulic Nutcracker, On Site Service 24/7, Excavators, bobcats, motors, pumps, valves, cylinders, power units.
- We are authorized distributors for Hallite sealing products and Larzep high pressure hydraulic jacking cylinders, pumps, and tools, in addition to a range of vehicle jacks and the largest range of aluminium cylinders in the world.
- We stock a large range of rockdrill parts and can carry out overhauls, machining and rebuilding of all types of rockdrills.



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DELONIX SOLUTIONS DRIVES MINING SUCCESS WITH



◀ **Philippe Vatin,**
Delonix Solutions
founding engineer



The Delonix team at their office in Perth, WA.

...CONTINUED FROM FRONT COVER

The high degree of precision offered by 3D scanning, combined with the ability to handle large-scale projects quickly and efficiently, makes it a valuable tool for the mining and resources industry.

The **Australian Mining Review** spoke with Delonix Solutions founding engineer Philippe Vatin about how mining majors are now using 3D scanning and reality capture to improve safety, productivity and data accuracy.

"You can get the centreline of two bolts, or the diameter of a hole, or you can get all the finer details of any surface, even curvature, and damage... everything basically," he said.

"What used to take about half-an-hour, as well as logistical challenges involving elevated work platforms and staff abseiling down the side of the building, now only takes a few seconds with a 3D scanner on a tripod or on the ground.

"Few surveying companies have the ability to capture full-size plants in detail, with the technology being used on a smaller scale in other fields, but Delonix has bucked this

trend to make this available for all mining clients."

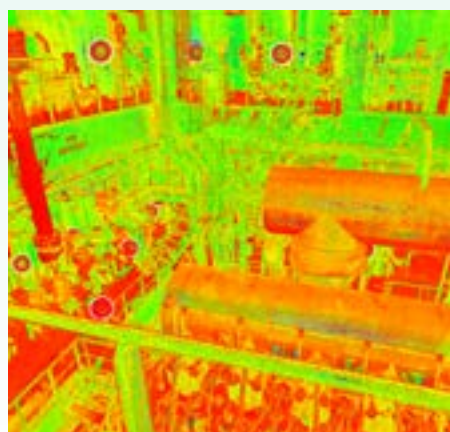
The process of 3D scanning involves capturing three-dimensional attributes of a physical object, including its shape and texture, through methods such as laser scanning, structured light and photogrammetry.

Data is recorded from the surface of the object using a 2D scanner, which creates a "point cloud" of data, or a photorealistic cloud of points, from the object's surface, with the information then processed to construct a digital 3D model from its 3D mesh of points.

Using the combination of laser-based and photo-based tools, this laser technology provides a more accurate and precise outcome than traditional surveying.

"Delonix uses predominantly Leica equipment and technology as we believe they are the best in LiDAR scanning at the moment," Mr Vatin said.

"We are able to scan from an accuracy of 50-micron, useful for reverse engineering a mechanical part, all the way up to a few millimetres, as well as capturing full site and ground topography for plant design."



Laser scanners can capture more than one million three-dimensional measurements per second, with entire plants and mine sites scanned in days or weeks, creating a "digital twin" of the infrastructure.

Reality capture, as it is called, provides better visualisation and faster modelling on to a computer or handheld device through the cloud.

"The data can be very heavy so we built a cloud system called RealClouds which our clients can log in to from any portable device, through a cost-effective subscription service, thereby removing their need to maintain the data while also keeping the platform user-friendly," Mr Vatin said.

"It provides data streaming to workstations or hand-held mobile devices, allowing clients to visualise or add notes, photos or models to their digital twin on-the-go.

"Delonix handles the data and platform for a number of clients, which is typically well over a few terabytes for most large clients, therefore we have the economies of scale."

While engineering services is its core business, Delonix Solutions brought in the 3D scanning arm of its business to support this.

"Every plant or operation needs a scan or survey for an upgrade, whether it be the installation of a new pump on site or modification of existing fixed equipment," Mr Vatin said.

"In a couple of years, there is a potential that the entire 3D scanning process can be done by robots, or robotic dogs, but at this stage, the option is yet to be proven economically viable."

DELONIX'S MAGICAL 'M' IN EPCM CONTRACTS

There is increasing global pressure to fast-track the delivery of mining projects due to net zero targets, the continuing mineral shortages and rising commodity prices, increasing size and complexity of mining projects, as well as shortage of experienced contractors.

The need to have an engineering firm on side that embodies the systems and processes of larger firms but also the agility and responsiveness of smaller firms is paramount to bringing a mining project into operation on time and on budget.

Mr Vatin commented about the company's engineering, procurement and construction management (EPCM) capability across a whole range of commodities.

"We consider ourselves a collaborator in this space," he said.

"Recent mergers & acquisitions in WA meant there are not many engineering companies left our size that focus on the \$50m and upward worth of projects.

"There are many large engineering companies that have a few thousand employees but, from our side, we currently have 60 staff members, which gives us a competitive edge against the bigger firms due to the agility and flexibility that we offer, as well as the ability to hire and retain a high performing, high calibre team.

"In addition to running our own project and, given how cost effect we are, Delonix collaborates with larger engineering firms, the likes of Wood, Primero, GR Engineering and CPC Engineering, across all commodities such as copper, nickel, lithium, rare earths and gold."

Drone scan of the Northern Star Resources' KCGM processing plant.

EPCM EXPERTISE

Delonix's multidisciplinary engineering team is the foundation of its EPCM capability to create real value for its clients in the mining sector.

From designing processing plants, equipment and facilities to integrating all engineering aspects of a project, including structural, mechanical, civil, electrical and process, Delonix ensures all areas work coherently and seamlessly.

Its highly experienced team execute engineering projects to tight schedules effectively and efficiently, aided by the use of the best innovative technology, for the benefit of its clients.

Along with key engineering disciplines, Delonix also offers the following services: project management; procurement and supply; construction management; cost estimating; scheduling; and cost control.

"What would take 4-5 years to get into commercial operation can be accomplished in only 2-3 years with the right EPCM," Mr Vatin said.

"EPCM style contracts enable the full project team to work cohesively and consistently following the completion of the feasibility study phase to the completion of the construction phase."

In a world that is hungry for raw materials to reach net zero ambitions, the trend towards EPCM contractors, rather than EPC contracts that are defined by fixed term and time, means that there is a greater reliance on the expertise of reputable and experienced contractors to manage project delivery.

"We solve engineering problems from the bottom up, such as checking dimensions in engineering and fabrication drawings, and from there we start tackling the bigger issues," Mr Vatin said.

"As an agile engineering firm, we address all the minute and implementation details that the larger firms may gloss over.

"We've adopted advanced technology like Finite Element Analysis (FEA) using ANSYS Mechanical, Discrete Element Modelling (DEM) using ANSYS Rocky, and Computational Fluid Dynamic (CFD) using ANSYS Fluent, as well as other models that come from the automotive and aerospace industries, but we apply them to the current engineering problem that we face.

"This is the niche that Delonix establishes itself on and, from there, we tackle broader systems.

"What we do is value creation – we are engineers at heart and we are focused on our clients."

With big name projects under its belt, including Pilbara Minerals' Pilgangoora plant, Northern Star Resources' (for the KCGM Super Pit), Lynas Corporation's Mt Weld, Delonix has proven time and time again that it is trusted by the mining majors to deliver engineering project results.

"Delonix was engaged by Primero to do the structural, mechanical and civil engineering, including design, for the dry plant at the KCGM growth project," Mr Vatin said.

"The rough capital costs including equipment, construction and engineering is in the order of \$1.5b.

"We are doing the front part of the plant, which represents approximately a quarter of the project costs, so a significant portion has been allocated to us.

"We had the opportunity to capture this project two years ago when Northern Star Resources started the feasibility study and were estimating the capital costs for the upgrade.

"This was a significant survey project for Delonix as we scanned the whole client site to give broad level detail of the existing plant.

"At the time, 3D scanning wasn't very popular at this scale and our initial involvement included over 2000 scans into a single cloud.

"Out of the competitive tender stage, Primero proved to be the most suitable contractor to handle this size project with proposed solutions along with their track record.

"We also did the LIDAR scanning, using our drone, and we were fortunate enough to have a good relationship with Primero which enabled us to be part of the detailed design stage of the project and take on a significant responsibility for the dry plant."

Other big name projects to Delonix's name include:

- Pilbara Minerals' Pilgangoora project:** Delonix contributed 3D scanning, civil engineering, structural engineering and surveying to the lithium project by way of engineering design for the Stage 2 and Stage 3 major plant upgrades. This included full plant 3D scanning and surveying.
- Lynas Corporation's Kalgoorlie plant and Mt Weld project:** Delonix contributed to the development of the large processing facility for Lynas Rare Earths, near Kalgoorlie in WA's Goldfields region, by way of 3D-scanning, mechanical engineering, piping engineering and structural engineering. This included the concentrate feed system, roasting circuit, filtration circuit and concentrate storage. Delonix also contributed to engineering design for the Lynas Mt Weld rare earths project

through overall plant for civil and structural engineering, surveying and 3D scanning.

- Mineral Resources' Onslow project:** Delonix contributed civil engineering, mechanical engineering, structural engineering and piping engineering to this iron ore project in the Pilbara region of WA through engineering designs for the truck maintenance facility, truck unloading facility and Ken's Bore conveyor modules. The truck maintenance facility included road train workshop, warehouse, air services, road train washdown facility, lubrication storage and refuel facility.
- Evolution Mining's Cowal mine:** Delonix contributed structural engineering to this gold operation.

What does the future hold of Delonix?

"We are preparing to provide cost-effective solutions for large-scale 3D printing of the scans or designs," Mr Vatin said.

"This will be beneficial to critical equipment of processing plants.

"Delonix is currently leveraging the power of artificial intelligence (AI) to integrate 3D scanning data and continually improve the RealClouds platform."

The company is also using AI to review, compile and analyse tender information, while at the same time, building on its growth strategy by doubling the amount of staff in its two offices, Perth and Port Hedland, to 120 staff by the end of next year to better serve this growing EPCM market in WA's mining sector. **AMR**

For more information, visit
www.delonixsolutions.com
 or call +61 8 6383 7891
info@delonixsolutions.com

The role of LiDAR and VoidMapper in Convergence Analysis in Mining

Convergence Analysis in Mining: The Role of LiDAR

Convergence analysis is the process of tracking changes in the rock in underground mines. It is used to monitor the structural integrity of mines and tunnels, and to detect hazards before they become major problems.

There are a number of factors that can contribute to convergence in mines, including:

- The type of rock
- The mining method
- The stress on the rock
- The presence of water

When the rock in a mine starts to converge, it can cause a number of problems, including:

- Tunnel deformation
- Rock falls
- Pillar collapses

These problems can pose a serious hazard to miners and can also lead to production losses.

LiDAR is a valuable tool for convergence analysis because it can provide accurate and repeatable data. Mobile LiDAR is particularly useful for this application because it can be used to collect data quickly and easily without disrupting production.

LiDAR works by emitting a laser beam and

measuring the time it takes for the beam to return. This information is then used to create a 3D point cloud of the environment.

The 3D point cloud can be used to track changes in the rock over time. This information can be used to identify areas that are at risk of convergence and to take steps to mitigate these risks.

In addition to tracking changes in the rock, LiDAR can also be used to:

- Map the mine
- Identify hazards
- Plan mine operations

The Benefits of Using LiDAR for Convergence Analysis

There are a number of benefits to using LiDAR for convergence analysis, including:

- Accuracy: LiDAR data is highly accurate, which can help mines to identify and mitigate hazards early on.
- Repeatability: LiDAR scans can be repeated over time, which allows mines to track changes in the rock and to identify trends.
- Speed: LiDAR can be used to quickly collect data, which can help mines to save time and money.
- Safety: LiDAR can be used to collect data without sending personnel to inaccessible or unsafe areas and without disrupting production, which can help to improve safety in mines.

The Role of VoidMapper in LiDAR-based Convergence Analysis

VoidMapper is a software platform that can automate the process of processing LiDAR data for convergence analysis. This can save mines time and money, and it can also improve the accuracy and reliability of the data.

VoidMapper works by using a cloud-based processing pipeline to automatically extract features from LiDAR data. These features can then be used to create a 3D model of the mine, which can be used to track changes in the rock and to identify hazards.

VoidMapper is a powerful tool that can help mines to improve the efficiency and effectiveness of their convergence analysis.

Conclusions

LiDAR is a valuable tool for convergence analysis in mines. It can help mines to improve safety, to save time and money, and to make better decisions about the management of their assets.

In the future, LiDAR-based convergence analysis is likely to become more widespread and more sophisticated.

Mines will be able to use LiDAR to track changes in the rock in real time, and to identify hazards before they become ma-

ior problems. This will help to improve safety in mines and to reduce production losses.

VoidMapper is the software platform that can automate the process of processing LiDAR data for convergence analysis.

The future of LiDAR-based convergence analysis is bright. The technology has the potential to make mines safer and more efficient. As the technology continues to develop, LiDAR and VoidMapper will become an essential tool for the management of underground mines.

Mobile Mapping SLAM products come in many forms, including handheld systems, backpack-mounted scanners or mounting SLAM systems on drones. GeoSLAM, is the market leader in SLAM technology, and its flagship handheld scanner, ZEB Horizon, was designed with versatility in mind. The ZEB Horizon is typically used as a handheld scanner, however, can be quickly mounted to vehicles, drones, backpacks, and a variety of other accessories.

Caroni in Australia is the expert in selling GeoSLAM's hardware and software, especially in the mining sector. Caroni is also the developer of VoidMapper and will guide you through the data capturing process and analyse the data and extract the right information effectively.

AMR

UNDERSTAND THE WORLD AROUND YOU



At **Caroni**, we understand the importance of spatial information in safeguarding your people and assets. Our spatial solutions enable effortless data capture, helping you improve productivity, reduce costs, and make more informed decisions.

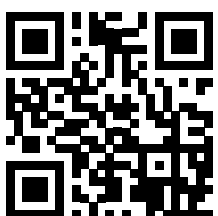
Caroni is the developer of VoidMapper and authorised distributor of GeoSLAM solutions for the mining industry.

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Convergence Analysis

Our VoidMapper solution provide mine operators with a quick and safe workflow to analyse changes in rock movement, highlighting potential rockface instability. Operators can capture data in dangerous areas much faster than previously possible, making it easier to repeat scans, and VoidMapper will process and analyse the data accurately and reliably.

Stockpile Volumes

With GeoSLAM Volumes, mine operators can calculate stockpile tonnage within a few minutes, and monitor change over time. Handheld laser scanners can determine accurate stockpile volumes, silo reserves or mining tempos, without the need for GPS.

Shaft Inspection

Combining hardware and advanced SLAM, the GeoSLAM Shaft Inspection solution collects data in dangerous vertical shafts and locations with difficult access. It's a proven solution for mining companies to secure data insights that support quick, cost-effective decisions, whilst keeping personnel safe.

Production Mapping

GeoSLAM Production Mapping allows companies to make quick, short-term operational decisions on newly mined production areas. Rapid data capture minimises downtime and reduces costs, keeping operations on track with the agility to make any necessary logistical changes.



NAVIGATING THE SKILLS GAP: HOW TECHNOLOGY IS REVOLUTIONISING THE MINING WORKFORCE

The Australian mining industry currently finds itself at a crossroads.

According to a recent report by Deloitte which tracks the trends for mining and metals in 2023, many mine workers are at least age 46 and nearly 50% of skilled engineers are reaching retirement age in the next decade.

A report by Engineering Australia estimates Australia has lost approximately \$3.8 billion of productivity and accrued \$3.9 million in avoidable recruitment costs due to the lack of the right talent.

The skills shortage is very apparent in Australia. Across 2021-22, engineering vacancies across the nation increased by 80 per cent, compared to 42 per cent for all averaged Australian occupation vacancies.

The engineering skills shortage is predicted to continue to rise. In 2023, Infrastructure Australia predicts labour demands to grow by 42,000 to a peak of 442,000 more than doubling the projected available supply. As a result of government investments in industries including public infrastructure, defence, and renewable energy, demand for engineers will continue to increase.

However, the skills shortage isn't only due to an ageing workforce. The mining industry also continues to face low recruitment numbers from the younger generation.

As a result, there is now fierce competition between mining companies over the limited pool of skilled professionals.

While large organisations are attractive to graduates due to their extensive graduate programs and international projects, smaller businesses can struggle to have a competitive edge.

Furthermore, there is an increased need for workers to upskill and increase their knowledge, due to the introduction of new technologies.

The labour shortage comes at a time when there is an increase in demand for minerals not only in Australia but worldwide.

With experienced miners reaching retirement age, the mining industry faces a formidable challenge. A significant knowledge gap is emerging and retraining the skills and wisdom of the retiring workforce is paramount.

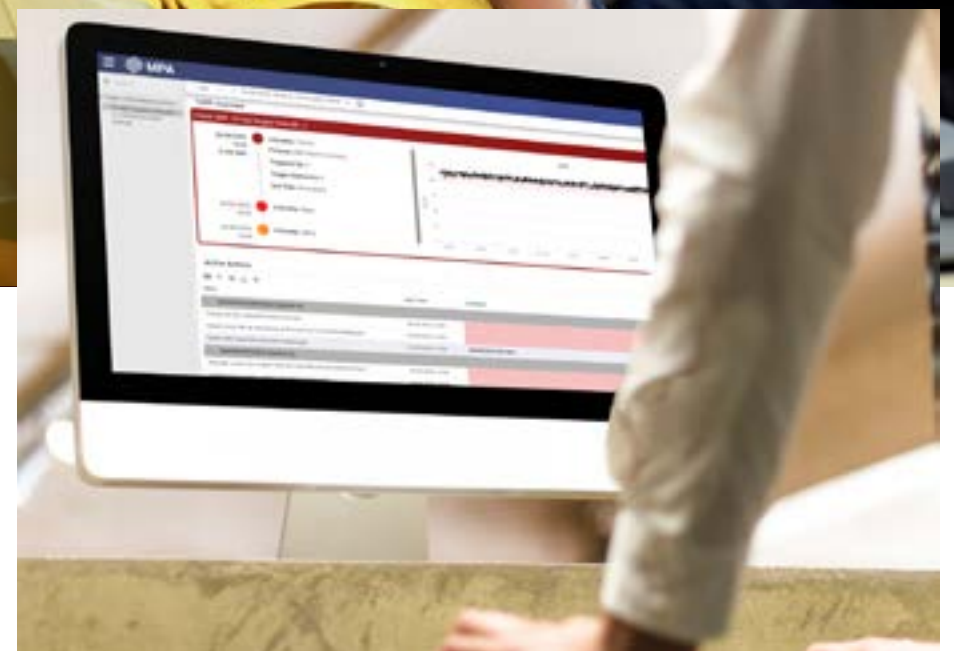
Considering Australia ranks 25th overall on the Global Innovation Index, there is a lot of room for improvement. The solution may very well lie in the innovative use of technology.

THE ROLE OF TECHNOLOGY

Technology, as Glen Johnson, Product Manager at Mipac, emphasises, is a game-changer in addressing these challenges.

"Technology offers us a host of solutions to bridge the skills gap," he explains.

"We are witnessing a shift towards a future



where automation, data-driven decision making and real-time insights are the norm. By adopting these technological advancements, we are not only addressing the challenge of the current skills shortage but also revolutionising how mining operations operate."

Automation, remote monitoring and artificial intelligence-driven systems are key players in enhancing safety and productivity, which reduces the industry's reliance on experienced workers.

COLLABORATING AND UPSKILLING

In the pursuit of a comprehensive solution to the mining industry's workforce challenges, collaboration and upskilling have taken centre stage.

Mipac's approach is to work with its clients to co-develop software solutions. Mipac's collaborative approach with clients to tailor solutions to their specific needs has been instrumental in ensuring that the

benefits of technology extend to all facets of mining.

Mipac had recent success with Northern Star Resources Limited's Pogo Operations in Alaska.

James Sweeny, Project Metallurgist, Northern Star Resources Limited, was able to experience the benefits of introducing new technology firsthand.

"I tried to calculate the benefit based on the per cent improvement in time savings, but it is not possible to divide by zero. With MPA Digital Logsheets, we no longer spend any time maintaining our Logsheets system," Sweeny says.

A VISION FOR THE FUTURE

As the mining industry confronts the challenges of an ageing workforce and the struggle to attract skilled resources, technology has emerged as a pivotal ally. Introducing technological advances allows mines to open the door to a more accessible and sustainable workforce.

Despite the current challenges the mining industry faces, Johnson paints an optimistic picture of the future.

"I believe that the right blend of technology, education and industry collaboration, can assist in addressing the current and future challenges posed by the skills shortage. The future of the Australian mining industry is full of opportunities for more innovative, safe and sustainable operations. Embracing technology will be pivotal in shaping a new era for the industry." **AMR**





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DRILLERS FIELD DAY

Contributed by Warrick Lorenz, Managing Director of Australian Pump Industries.



Hydraulic drive mud pumps in production

With the Albanese Government pledging to spend \$2 Billion on supporting the Australian mining industry as it does more exploration and development, we can see Australia's drilling industry will be flat out.

Albo's promised Mr Biden that Australia will do it's best to find Lithium, rare earths and similar products currently sourced for the world by China, will make for an exciting time.

HOW AUSSIE CAN HELP?

Australian Pump has focused a huge amount of its research and development work in the last 20-30 years on Australia's mining industry. It's no secret that most of the Australian population doesn't know that its mining that carries this country.

They aren't aware that only 260,000 people are doing the hard yards, from the original exploration work to the final shipping by huge bulk carriers for export to the world.

We know, and we devote substantial funds to product development. Right now our focus is on the drilling industry where we believe we can help!

AUSSIE'S EARLY DRILLING ADVENTURES

We didn't know much about drilling 15 years ago when drillers started calling us to buy engine drive pumps. We originally supplied lightweight aluminium engine drive pumps without understanding the unique conditions and issues of remote operation.

We moved to supplying heavy-duty cast-iron self-priming pumps. Available in everything from 2" to 4", these were built like tanks and used big open impellers, capable of handling some degree of solids in suspension. They were also capable of not only high flows but high pressures as well.

The first units we supplied were Honda petrol engine or Yanmar diesel engine drives. They were built into powder coated steel frames with sub bases and anti-vibration mounts.

Later, based on feedback from the field, we changed to a more heavy-duty stainless-steel frame with integrated lifting bar. We equipped the diesel engine drive pumps with E-stops and battery isolation. We even fitted a fire extinguisher.

Next drillers came to us wanting to know if these heavy-duty cast-iron pumps could be fitted with hydraulic drive motors. We already were supplying electric motor drive pumps 2", 3" and 4", with their big cast iron bodies and impellers and silicon carbide seals, to other industries like abattoirs, piggeries, effluent works and concrete batch plants.

All the applications have one thing in common. They are tough on equipment and there is an advantage in doing away with internal combustion engines as the prime power source.

AUSSIE'S LEARNING CURVE

We understand that drilling is a hard, tough business. Hard on equipment, hard

on people. The more we get to work with the industry, the more impressed we are about the resilience of the companies and their employees.

When cast iron impellers started wearing out regularly, we asked questions about the ingredients in the mud and tank sizes. We wanted to understand what impact these had on the sizes and qualities of the pumps being bought. That taught us an awful lot and we started offering stainless steel impellers for our hydraulic drive pumps. The field results have been impressive with the abrasion issues we'd been seeing with cast iron equivalents virtually eliminated. Our spare parts sales went down, but the reliability in the field went up, and that's what Aussie is all about!

ABRASION ISSUES

Putting 316 stainless steel impellers into the pump slowed down the wear factor dramatically. By the time we get to 2024, all our hydraulic drive mud pumps will have stainless steel impellers as standard equipment.

Coincidentally, we found that similar appreciation was given to that idea by people in other areas of the mining industry, i.e. concrete batch plants on mine sites and people doing gunite spraying.

The next step was to try to improve seal life. All seals will fail if they're run dry but, on the advice of the industry, we've started supplying tungsten carbide seals to replace the silicon carbide.

We'll wait and see what the life comparison is. It won't fix the dry running issue as that will destroy any seal, no matter what it's made of, but it is a harder material.

SERVICE KITS ON SITE

We understand the value of having service kits on the site where the drilling is taking place. If a mud pump goes down, the operation stops. We have witnessed this, been blamed for it and have taken it on the chin.

We didn't have enough application knowledge to realise how often seals burn out as a result of dry running and how often bearings fail due to overheating. We're in the process of packaging what we call 'Major Repair Kits'. The idea is to make it easy for the correct pump parts to be held on site, on standby when the drill rig goes into action.

When we started out with the rejuvenation kit idea, we thought it was just going to be components like mechanical seals, counterface, gaskets and O-rings. It didn't take us long to realise that with mud pumps, if the mechanical seal starts leaking, the next part to go is the bearing and possibly even the stainless-steel stub shaft between the pump's drive shaft and the hydraulic motor drive.

Requirements appear to be different from job to job. We're watching carefully and listening to the industry to get more feedback. Every conversation we have with a drilling operator is an additional opportunity to learn more about how to better serve the industry.

The slurry in mud tanks is abrasive and can cause excessive wear on cast iron impellers.





Traditionally engine drive mud pumps were used as a portable option

At this stage, we think a major repair kit, which includes check valve, elastomers, mechanical seals, bearings, should also include a stainless-steel impeller and stub shaft.

We don't see any problems with the cast iron bodies of the pumps, although one customer has asked if we could do a 316 stainless steel complete unit, so the body, impeller and shaft are all in 316 stainless steel. Since we do that for the Australian Army already (water for the troops), it wouldn't be an issue to provide that complete unit to the drilling industry.

Compared to the downtime involved, the additional costs of the material are minimal.

WHAT ABOUT THE FUTURE

Understanding how to keep drillers operating and minimising downtime are the key issues. We have moved on to thinking through the concepts of service exchange. It's not new, but understanding that every minute counts, it's been suggested that a "Mud Pump Swap Shop" could work. Standby mud pumps would be held on site ready to swap in the case of a failure.

Should the pump on the mud tank fail, instead of drama, it's simply replaced with one of the standby pumps. For a fixed price, the failed unit is shipped directly back to Australian Pump in Sydney. We would then immediately dispatch a fully refurbished replacement pump out to the site to go on standby. The failed pump

would then be repaired, refurbished and tested at the factory, ready for the next "swap out".

One of our team raised the subject of "what if the pump that comes back is scrap metal"? We trust that drillers will know that's a waste of everyone's time and that if the pump is beyond repair, they will replace it with a new one. If we don't have an equivalent, refurbished pump available we'll dispatch a brand-new unit instead.

Understanding how many mud pumps are out there, what size they are and what size tanks are being used will help us immeasurably to better service the market. Our only aim at Australian Pump Industries is to understand the market in a way that we become partners with the drilling industry.

We know mining depends on the drillers, who in turn have the right to depend on us!

MORE INFO PLEASE

We know there is lots more for us to learn about drilling. We are your students. Please share your knowledge with us. We've learnt a lot over the last couple of years but are painfully aware of how much more we have yet to understand about the vital industry. Whether it's water well, diamond, foundation boring or vertical drilling systems, we know we can be better. AMR

Further information on the Aussie Mud Pump range is available from Australian Pump Industries aussiepumps.com.au.



Fresh off the production line, a mud tank fitted with an Aussie GMP hydraulic drive pump.

Aussie's compact 2" mud pump, cast iron but now featuring a cast 316 impeller for improved wear resistance.



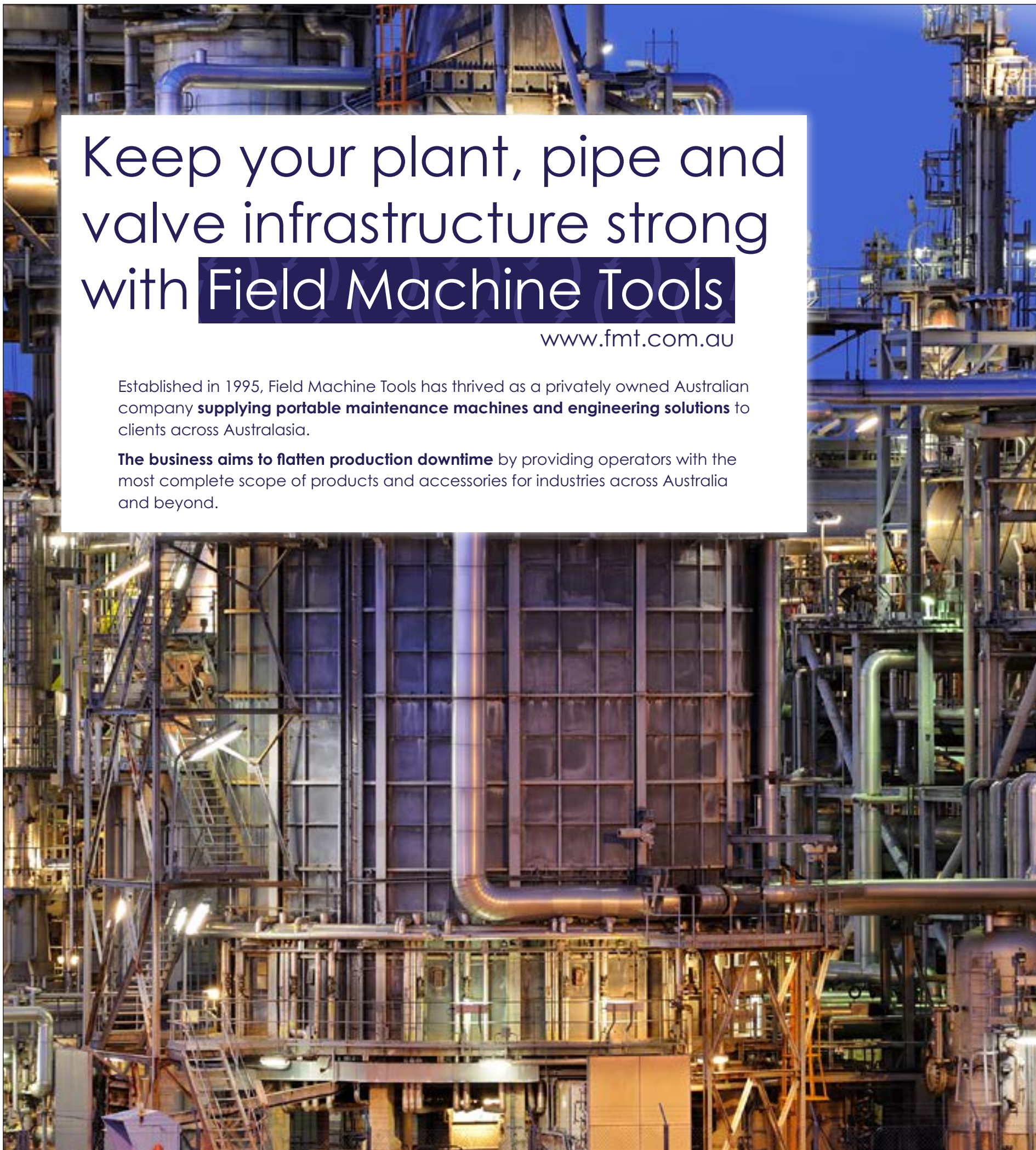
Hydraulic drive mud pumps are compact to install and eliminate the need for small engine refuelling and service.

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