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PILLARS OF THE CONCRETE INDUSTRY

STANDING THE TEST OF TIME

(Image source: Pilbara Ports)

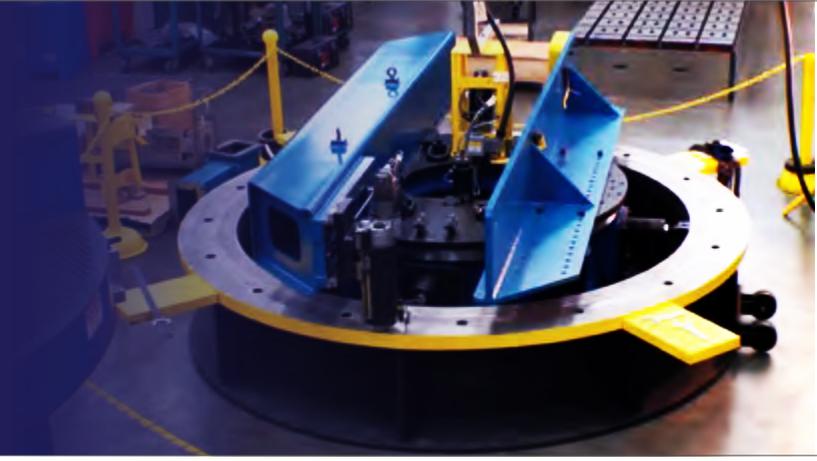
In a win for the Port of Port Hedland's Utah Point project, concrete progress was made to protect the marine structures of the jetty during its construction.

The Port of Port Hedland is the world's largest bulk export port by tonnage. Annual throughput reached 566.5mt in FY23, with iron ore making up more than 90% of the commodities.

Utah Point, a predominantly bulk loading facility, opened in 2010, stretching over 272m in length and 22m wide.

Where traditional methods of using cement and regular applications of maintenance coatings fail in a marine environment, the 5,500m³ of Caltite concrete used in the Utah Point jetty construction continues to withstand the test of time.

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EVOLUTION TO ACQUIRE CMOC'S 80% INTEREST IN NORTH PARKES MINE

Evolution Mining is going for gold.

In the next big news for the Australian gold mining sector, Evolution Mining (ASX: EVN) has agreed to buy an 80% interest in the Northparkes copper-gold mine in NSW from CMOC Group Limited for a total cash consideration up to \$722m (US\$475m), with Sumitomo Metal Mining and Sumitomo Corporation retaining their 20% interest in the JV.

Evolution has also agreed to enter into an offtake agreement with IXM S.A., a subsidiary of CMOC, under which IXM will purchase from Evolution copper concentrates produced from the Northparkes mine equal to Evolution's 80% attributable interest over the life of mine's existing ore reserves.

In addition, Evolution will assume the obligations of CMOC Limited as guarantor under the Triple Flag Metal purchase and sale agreement, under which Evolution will deliver a percentage of its attributable gold

and silver production from Northparkes to Triple Flag over the operation.

The transaction will be funded by a \$525m fully underwritten institutional placement and a new \$200m five-year term debt facility, with completion of the transaction expected to occur before the end of December 2023.

Evolution Mining executive chair Jake Klein says the Northparkes acquisition represents a unique opportunity to add another quality asset to the company's portfolio.

"Northparkes is a 'day one' cashflow producing asset with an approximate 30-year mine life, considerable upside and a well-established team that has a great track record and technical experience at the operation," he said.

"Following a long period of a successful

ownership, CMOC has decided to exit the asset in pursuit of other strategic initiatives more aligned to CMOC's objectives.

"Ultimately, this is a mutually beneficial outcome for both parties and an opportunity for Evolution to continue delivering on the successful track record of the operation."

Evolution Mining managing director and chief executive Lawrie Conway commented on the acquisition agreement.

"Positioned in the Lachlan Fold Belt, one of Australia's most prospective copper-gold belts, Northparkes has a long history of ore reserve replenishment and growth, increasing reserves by 49% since 1994, with a current ore reserve of 101mt," he said.

"In addition, the asset is favourably located close to well-capitalised infrastructure, featuring concentrated mining options with five deposits situated within a 2km radius.

"Following a period of higher capital investment, the asset is now entering a cash flow generation phase, aligned with our strategy to continue to deleverage our balance sheet while delivering returns to our shareholders.

"Notably, the transaction funding structure reflects our commitment to balance sheet management with no debt repayments due under this facility until the third quarter of FY25."

Northparkes is a copper-gold mine 27km northwest of Parkes, in central west NSW.

The mine has been in operation since 1994 and was the first mine to use the block cave mining method in Australia.

The asset's underground mining operations are highly automated with E48 block cave achieving 100% mining automation in 2015.

Mining production is currently sourced from the E48 block cave, which is nearing completion, the E26 lift 1 block cave and the E26 sub level cave supplemented by stockpile ore feed and open pit mining.

The onsite processing plant at Northparkes produces a copper-gold-silver concentrate that is trucked and railed to the Port of Newcastle before being shipped to international clients.

On 10 July 2020, an affiliate of CMOC entered into a streaming agreement with Triple Flag Precious Metals Corp.

Under the terms of that agreement, TFCM is entitled to both gold and silver production from CMOC's attributable share of payable production from Northparkes.

In H2 FY24, Northparkes is expected to produce 19,000oz of gold and 12,500t of copper, bringing Evolution's FY24 guidance to a total of 789,000oz of gold and 62,500t of copper. **AMR**

MINRES MAJOR MILESTONE: FIRST FULLY AUTONOMOUS ROAD TRAINS

Mineral Resources' (MinRes) has handed over the first custom off-road triple road train to Hexagon AB for conversion to autonomous operation.

Delivered one month ahead of schedule, the handover represents a significant milestone in the development of a fully autonomous fleet of road trains.

This world-first technology was designed and developed by MinRes and Hexagon for Mineral Resources' Onslow iron project which is situated in the Pilbara region of WA.

MinRes director of technology and innovation David Geraghty presented the keys to a customised Kenworth C509 prime mover at Hexagon AB's Perth workshop.

Hexagon AB chief synergy officer autonomous solutions Gordon Dale, executive vice president core autonomy Mike Ver-

hey and vice president core autonomy engineering John Buszek were in Perth for the milestone.

Mr Geraghty says the autonomous trucks are a milestone for MinRes and the Onslow project.

"This is a significant milestone for Onslow Iron, with autonomous trucks forming an essential part of the project's supply chain," he said.

"Automation brings many benefits, including enhancing road safety, increasing operational efficiencies and reducing emissions."

The road trains will be converted to autonomous operation by Hexagon AB using technology developed by the company's engineering team. The vehicles will then be tested at MinRes sites by check drivers.

From January 2024, 10 vehicles a month

will be converted over the next year to meet Onslow Iron's requirements. Once deployed, MinRes will have a fleet of 120 fully autonomous road trains.

Each triple trailer road train will carry 330t of iron ore 150km on a private sealed haul road from the Ken's Bore mine site to the Port of Ashburton.

With safety at the forefront of the design, grade separation ensures there is no interaction between the road trains on the haul road and vehicles using public roads.

Mr Dale says Hexagon AB is excited to begin installing the technology.

"This is a complementary partnership, with MinRes

leading the way in mining services and Hexagon leading the way in autonomous technical capability," he said.

"We are excited to commence installing the autonomous technology in our Perth workshop, with the aim to complete a fit out of a truck in just two-to-three days."

AMR



(Image source: Mineral Resources) Mineral Resources director of technology and innovation David Geraghty (left) with Hexagon chief synergy officer autonomous solutions Gordon Dale (right).

Complete support from the ground up



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(Image source: Rio Tinto) Truck preparing to load scrap steel onto the first 10 shipments from the Gove demolition.



RIO TINTO BEGINS AUSTRALIA'S LARGEST DEMOLITION PROJECT AT GOVE

Rio Tinto (ASX:RIO) is undertaking the largest demolition project in Australia's history at its Gove alumina refinery where the equivalent of three Sydney Harbour bridges in steel will be shipped and recycled.

This demolition is part of the broader closure program at Rio's Gove operations where bauxite mining is expected to stop later this decade.

The first shipment, which contains around 15kt of scrap steel, recently left the Gove

wharf for Asia to be converted into new steel wire, bar and beam products.

All up, 142kt of steel in 10 shipments will be exported to Asia while 300kt of concrete will also be recycled for road construction and other projects.

Rio Tinto Gove closure general manager James Low says it is exciting the site Gove sits on can be returned to Traditional Owners.

"This iconic site holds a lot of memories for

the thousands of people who worked here over the last five decades. But even more significant is the immemorial connection that the Gumatj Traditional Owners have with the land," he said.

"The Gumatj are integral to what we are doing at the refinery. They are the key decision-makers for how the site will be left in the future, including whether infrastructure like the wharfs and warehouses will be handed over for ongoing use."

Gove has been supplying the global alu-

minium industry for more than 40 years with bauxite shipped internationally and domestically to supply Queensland Alumina and Yarwun refineries in Queensland.

These refineries produce alumina smelting operations and for sale on the international market.

As well as being Australia's largest demolition project, it's also one of the largest underway around the world. Liberty Industrial is leading the demolition works.

AMR

RENEWABLE BIOCARBON PRODUCT TRIAL



Rio has partnered with Aymium to develop and trial a renewable biocarbon product for use as an alternative resource to reduce emissions in large scale industrial processes.

This product has been successfully trialled as a replacement for anthracite used in ilmenite smelting processes at Rio's metallurgical complex in Sorel-Tracy, Quebec.

The complex is a world-leading producer of high-grade titanium dioxide feedstock plus iron and steel for specialised applications.

Rio Tinto minerals chief executive Sinead Kaufman says the company is delighted to work with Aymium.

"We are delighted to work with Aymium to develop and trial this renewable

biocarbon product that has real potential as an alternative, low carbon resource for our processes," she said.

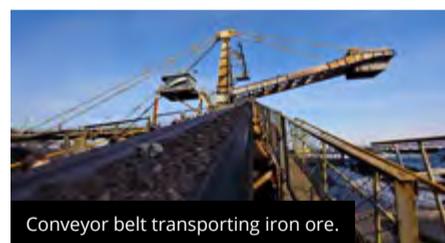
"We are investing to deepen our partnerships, as part of our commitment to finding better ways to decarbonise our operations and the supply chains we are part of."

To strengthen the partnership, Rio has made an additional equity investment in Aymium following its participation in a funding round in 2022.

This second investment is part of Rio's support for innovations needed to meet its 2030 emission reduction targets.

Aymium provides produces high value biocarbon and biohydrogen products and solutions that reduce that can be used to replace fossil fuels.

The products are produced using a combustion-free thermochemical process that separates the components of biomass into biocarbon, hydrogen and water. This process creates excess energy and water which is recycled back into the system. AMR



Conveyor belt transporting iron ore.

A \$110m pre-feasibility study (PFS) has been approved by Rio to progress development of one of the world's best undeveloped iron ore deposits — the Rhodes Ridge project.

The start of the PFS follows the completion of an order of magnitude study that considered development of an operation with initial capacity of up to 40mtpa.

The PFS is expected to be completed by the end of 2025 and will be followed by a feasibility study with first ore from the initial development expected by the end of this decade.

Over the five-year period from 2024 to 2028, Rio is planning to spend more than \$400m on exploration as part of the ongoing study phases. Study work to date has indicated a staged development with an initial hub likely to be in the northern part of the project.

Rhodes Ridge contains 6.8bt of mineral

\$110M PFS APPROVED FOR RHODES RIDGE

resources at an average grade of 61.6% iron, including 5.3bt at 62.2% iron and 600mt at 63.9% iron.

Rio Tinto iron ore chief executive Simon Trott commented on the development.

"The size and quality of the resource base at Rhodes Ridge has the potential to underpin our iron ore business in the Pilbara for decades to come," he said.

"Longer term, the resource could support a world-class mining hub with a potential capacity of more than 100mt of high-quality iron ore a year.

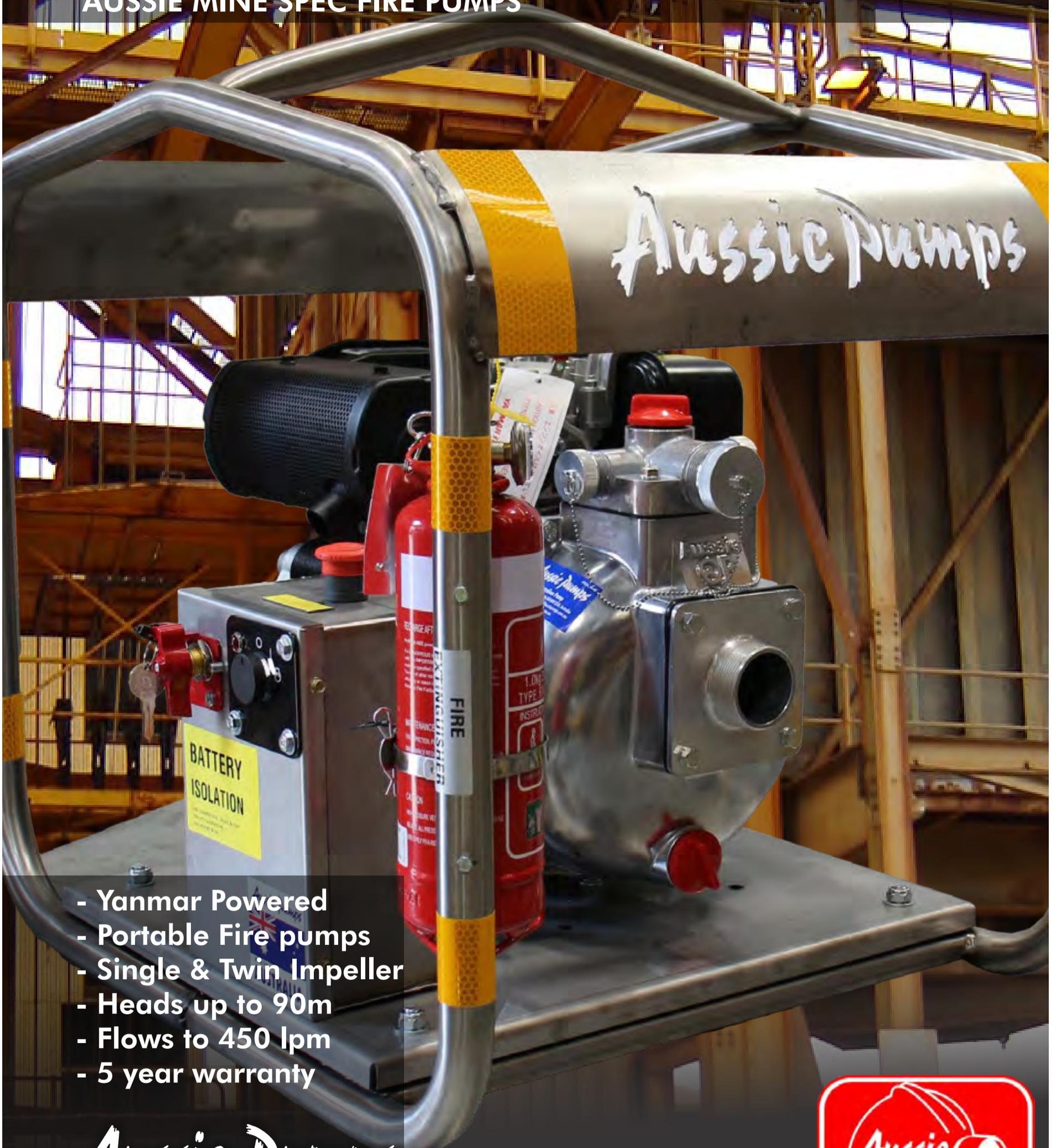
"We are committed to working closely with the Traditional Owners, the Nyiyaparli and Ngarlawangga People, as we progress this project."

Last year, Rio Tinto and Wright Prospecting agreed to modernise the joint venture covering Rhodes Ridge. The joint venture split is 50:50. AMR

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FORTESCUE LAUNCHES POSITIVE POWER PLAN

At the 2023 Asia-Pacific Cooperation (APEC) Summit in San Francisco, Fortescue (ASX:FMG) launched the positive power plan.

The plan was developed by Fortescue in response to global research and a lecture tour that escalating atmosphere heat is accelerating global humidity levels to a level that can be lethal.

In response to this, Fortescue formed the Lethal Humidity Global Council of scientists from Oxford, Cambridge, NASA, MIT, Harvard, CSIRO, Sydney University, Melbourne University, IIT Delhi, Peking University and Tsinghua University.

These scientists warned that lethal humidity — which is currently responsible for thousands of deaths worldwide — could be responsible for millions of deaths if left unchecked.

The plan is a practical response devised in consultation with global businesses and scientists for leaders to replace fossil fuels with green energy in a fair and seamless transition.

Fortescue chairman Andrew Forrest commented on the plan.

“The plan is a significant suite of initiatives to slow and eventually stop global warming in order to protect mammalian species from heat and humidity levels that extend beyond the limits of human survival,” he said.

“This APEC is a major opportunity for global business to pursue green energy and decarbonisation in what will be seen as a massive economic accelerator for nations who are building higher standards of living, employment and economic growth.

“The official launch of the plan at Australia House recognises the enormous potential that Australia has as a renewable energy superpower.”

The plan outlines the steps that can be taken to prevent the impacts of rising global temperatures through dismantling cost distortions in energy markets and outlining how industry can be best supported to go green.

Fortescue chief climate scientist Shanta Barley says there has already been a significant rise in humidity levels.

“For every degree our planet warms, global humidity rises approximately 7% and we have already seen a significant rise in humidity levels since the 1850s,” she said.

“If we can’t cool ourselves, our internal body temperatures can quickly rise to a level that is deadly. Now, more than ever,

policy makers must show leadership and accelerate action on the climate crisis.” **AMR**

HISTORICAL AFRICAN IRON ORE SHIPMENT



(Image source: FMG.)

Less than a year after Fortescue signed a Mining Convention with the Government of Gabon, the mining giant’s first product from its Belinga iron ore project is ready for shipment.

This marks the first time the company has exported iron ore from a port outside of Australia.

Fortescue Metals chief executive Dino Otranto is pleased with the progress following the signing of the Mining Convention on 8 February 2023.

“This is a truly remarkable achievement by the team in such a short period of time and marks a key milestone in the early-stage mine development in Gabon,” he said.

“This project has the potential to revolutionise our portfolio and ultimately create a product that will be the envy of our peers.

“It will also open growth opportunities for Fortescue throughout Africa.

Ivindo Iron is the operating entity for the Belinga project and Fortescue has a 72% indirect interest in the company.

Mr Otranto was joined by Ivindo Iron chief executive Eric Epee and Gabon Minister of Mines M. Hervé Patrick Opiangah in Libreville to celebrate the milestone.

“This initial project phase is providing important insights that will help ensure we set this project up for future success,” Mr Otranto said.

“A major exploration drilling campaign is underway with the results continuing to show that this project has the potential to be significant scale and high-grade.”

More than 400 Gabonese (including contractors) have been employed as part of

the project to date with more than 50% employed from villages around the project area.

As part of Fortescue’s commitment to support communities where it operates, more than \$45m (US\$30m) in goods and services have been sourced in Gabon so far for the project.

Studies continue to advance potential designs of a large-scale development.

AMR

FORTESCUE CAPITAL IS FORMED

Headquartered in New York, Fortescue formed Fortescue Capital and named Robert Tichio as chief executive and managing partner.

An integral part of Fortescue’s commitment to deliver green energy projects and decarbonisation investments, Fortescue Capital is a new green energy investment accelerator platform tasked with delivering greater returns for shareholders.

Fortescue Energy chief executive Mark Hutchinson commented on Fortescue Capital.

“Fortescue is taking its global pipeline of green hydrogen and green ammonia projects to final investment decision, and in doing so has communicated our intention and desire to bring additional equity investor onboard,” he said.

“Further, Fortescue has previously communicated its planned investment to decarbonise its Pilbara operations, and we see Fortescue Capital as an essential tool of engagement as we embark on both emissions.”

Prior to joining Fortescue, Mr Tichio spent 17 years at New York-based private equity firm Riverstone Holdings.

Mr Tichio will be joined by a senior leadership team comprising of Nathan Craig, Rael McNally and Jennifer Zarrilli with each serving as managing directors.

Mr Tichio said he is thrilled to be joining Fortescue in this new role.

“Fortescue has demonstrated unmatched leadership in calling for capital formation to support large scale, industrial solutions that can provide durable and high-impact decarbonisation pathways for difficult-to-decarbonise emitting categories,” he said. **AMR**

ADVANCED MANUFACTURING CENTRE

Fortescue will be expanding its global manufacturing capabilities, investing \$53.23m (US\$35m) to kickstart a US advanced manufacturing centre in Michigan.

This facility has the potential to create up to 600 jobs and it’s expected to become a major hub in Fortescue’s production of automotive and heavy industry batteries, hydrogen generators, fast chargers and electrolyzers.

Fortescue executive chairman Andrew Forrest says the centre will help the automotive industry.

“Fortescue’s advanced manufacturing centre will breathe fresh life into the birthplace of the automotive industry,” he said.

“We are committed to investing in the next generation of green manufacturing projects that will help decarbonise business and heavy industry, and in turn create a strong future for manufacturing jobs in the United States.” **AMR**

(Image source: FMG) Fortescue chairman Andrew Forrest speaking at APEC.



(Image source: FMG) Fortescue Energy chief executive Mark Hutchinson (left) and Fortescue Capital chief executive and managing partner Robert Tichio (right).



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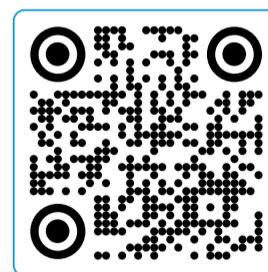
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Aerial view of solar panels.



BHP SWITCHES ON NORTHERN GOLDFIELDS SOLAR FARM

A new solar farm in the Northern Goldfields has been switched online thanks to a partnership between BHP (ASX:BHP) and renewable energy provider TransAlta.

This partnership will help BHP reduce scope two emissions at its Nickel West northern operations by 12%.

TransAlta president and chief executive John Kousiniotis says the company is excited to flick the switch on a ground-breaking project.

"This facility represents a first for both companies — it's BHP's first on-site, large-scale renewable project globally, and it's TransAlta's first renewable energy facility in Australia," he said.

"It's also the first time we have combined solar and battery storage to offer a hybrid solution.

"This unique project enabled us to apply the extensive capability and technical

knowledge we have to the development of a large-scale facility in a remote part of WA."

One of the world's largest off-grid mining solar and battery energy storage systems, the Northern Goldfields solar and battery storage facility features about 70,000 solar panels across 90ha of land.

The initiative, which will replace power currently generated from diesel and gas, will mark a significant step towards BHP's plans to decarbonise its operations by 30% by FY30.

It includes a 27.4MW solar farm at Mt Keith plus a 10.7MW solar farm and 10.1MW battery at Leinster which is integrated into TransAlta's Northern Goldfields remote power grid.

Construction of the facility began in 2022 and created more than 100 direct and indirect jobs in both the Perth and Goldfields regions.

BHP Partners with HBIS Group to Lower Carbon Emissions

BHP signed an agreement with one of the world's largest steelmakers — China's HBIS Group — to lower blast furnace carbon emissions.

The partnership will see the companies trial direct reduced iron (DRI) production and utilisation of BHP iron ores in blends and progress a separate enhanced lump stage two trial.

To support the development of alternate steel production, the companies will trial commercial-scale DRI production using BHP iron ores in blends at HBIS's newly commissioned DRI plant.

The DRI plant uses hydrogen-rich gas byproducts in the steelworks to convert ore into a metallic iron product that is further refined for steel.

Additionally, the enhanced lump stage two trial will focus on the existing blast

furnace steelmaking route, with the aim of reducing carbon emissions by increasing the use of direct charge lump and reducing the need for agglomerated feed which requires fossil fuels.

BHP chief executive Mike Henry commented on the partnership.

"HBIS Group is a key partner to BHP and an industry leader in assessing and demonstrating a range of potential pathways to reduce greenhouse gases in steelmaking," he said.

"Our work with customers like HBIS Group, together with our own actions, aims to accelerate progress in reducing greenhouse gas emissions right along the value chain."

The partnership expands on the work streams outlined in the 2021 memorandum of understanding between BHP and HBIS Group. **AMR**



(Image source: Sandvik) AutoMine drill.

SANDVIK INTRODUCES AUTOMINE FOR UNDERGROUND DRILLS

Sandvik Mining and Rock Solutions has introduced AutoMine for underground drills, becoming the first original equipment manufacturer to introduce a unified traffic management system for drills, loaders and trucks.

AutoMine for underground drills is a cutting-edge tele-remote solution that enables operators to remotely and simultaneously control and supervise multiple automated Sandvik underground drills, increase efficiency, productivity and safety.

It includes ring-to-ring tramming capabilities, allowing seamless control and coordination of drills, loaders and trucks operating in the same area with sophisticated traffic management.

This new offering is available for Sandvik longhole drills i-series machines with three levels of tele-remote operations available, including single drill, drill fleet and machine fleet.

Operators also have the flexibility to choose between operating from an AutoMine chair or console station.

Sandvik product line manager, underground drills, Jouni Koppanen says this system will set a new standard for underground mining operations.

"Sandvik's holistic approach to integrate drills, loaders and trucks into the AutoMine system will set a new standard for underground mining efficiency," he said.

"AutoMine for underground drills is another milestone in our commitment to revolutionising our customers' mining operations.

"This tele-remote system redefines underground drilling autonomy and safety standards."

Prioritising safety, AutoMine incorporates an enhanced access protector system designed to prevent personnel from entering the machine area while the system is in use.

Additionally, it also features an advanced traffic management system that enables operators to easily control the flow of multi-machine operations as well as handle complex situations.

Sandvik product manager, longhole production drilling, Sami Anttila commented on the solution.

"We have developed this system to offer our customers a deeper integration and cooperation in between the underground drills, the loading and hauling machines and especially the AutoMine environment," he said.

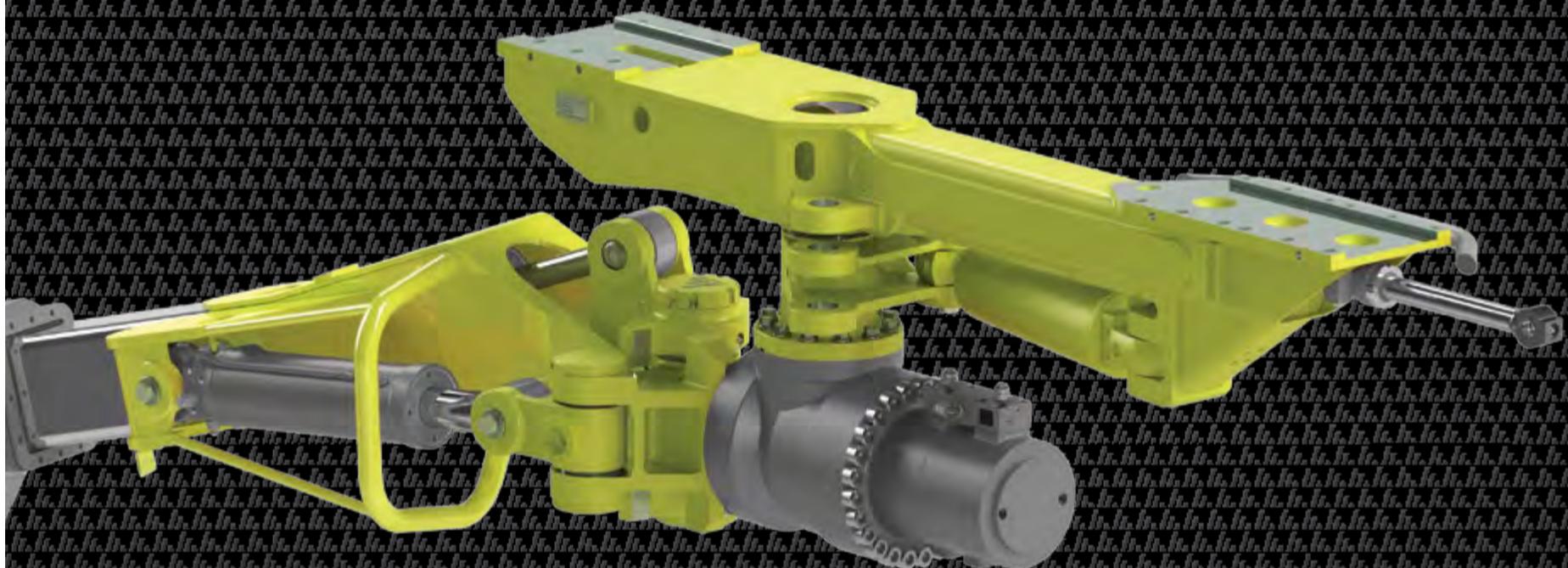
"This means added value through improvements in machine and fleet flexible utilisation in remote operation."

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WESTGOLD

BOARD APPROVES BIG BELL EXPANSION

The board of Westgold Resources Limited (ASX: WGX) has approved the expansion of the Big Bell project in Cue, WA, and its immediate commencement.

The expansion involves a new long-hole open stoping (LHOS) operation below the existing sub level cave.

Westgold managing director Wayne Bramwell says Big Bell has a long and profitable life ahead of it now.

"This expansion underwrites the future of our Murchison operations and provides Westgold with further optionality to leverage our existing processing capital," he said.

"The economics of making our biggest mine bigger is compelling.

"Big Bell will provide baseload feed for our Tuckabianna and Bluebird processing hubs across its planned 16-year mine life and its ore will be supplemented with high-grade, high-margin ores from the Bluebird mine at Meekatharra, and the recently announced Great Fingall mine near Cue.

"There are very few mines in the Australian gold sector that can boast a 16-year mine life.

"Big Bell has delivered nearly 3moz of gold production to-date and with this expansion now approved, the mine is set to ring true to its name."

The base case for the expanded Big Bell includes:

- 15.7mt of ore production for 1.5moz of gold;
- mine grades lifting from about 2.5g/t to about 3g/t Au;
- mine life of 16 years, with LHOS development commencing immediately and first ore from the LHOS operation in H1 FY25;
- 93kozpa of gold annualised production at an All-In Cost (AIC) of about \$2388/oz, with peak production rate of 134kozpa of gold in FY30.

Westgold expects to be cashflow positive in the first year due to significant upside at current gold spot prices.

A third-party provider is currently being considered to build, own and operate the proposed paste fill infrastructure during the initial years of the LHOS operation.

Westgold forecasts \$24m of capital expenditure in FY24, predominantly towards the paste fill system and associated infrastructure. **AMR**



The Remote Operations Centre (ROC) for Aquila mine.



Underground at AngloAmerican's Aquila mine.

AQUILA MINE

WINS OUTSTANDING MINE PERFORMANCE GONG

Aquila Mine has taken home a top mining award for groundbreaking technology advancements to minimise human presence in underground areas.

The mine in Middlemount won the Outstanding Mine Performance category at the Australian Mining Prospect Awards 2023 on Thursday night.

The mine – one of five Anglo American steelmaking coal mines in Queensland's Bowen Basin – was also a finalist in the Excellence in Mine Safety category.

The mine features two longwall systems ensuring production continuity.

Both longwalls are fully remote capable from the site-based Remote Operations Centre (ROC) on the surface of the mine.

This pivotal transformation has reduced operational exposure to underground areas by about 15,000 hours a year.

Aquila Mine general manager Shane McDowall says transitioning to remote longwall operations set the stage for impressive production performance and established an unparalleled model of safety and stability.

Mr McDowall added that Aquila Mine had achieved unprecedented levels of consistent remote autonomous longwall production.

"Currently achieving 100% of remote-operated longwall shears per week from its ROC, the mine boasts an industry-first suite of automation systems and an intricate camera network," he said.

"These components harmonise seamlessly

to guide coal cutting with unparalleled precision and efficiency.

"This strategic move eliminates the need for human presence in hazardous environments, marking a significant step toward minimising potential exposure."

Anglo American Australia chief executive Dan van der Westhuizen says safety, innovation and sustainability are critical to the future of mining in Queensland.

"Aquila Mine stands out as a pinnacle of technological advancement among Australia's longwall operations, capitalising on Anglo American's groundbreaking strides in longwall automation, remote management, and data analytics," he said.

"The primary aim of implementing remote operations in the context of longwall mining is minimising personnel exposure

on the longwall, preferencing operations from surface based control rooms.

"This strategic move aligns with our unwavering commitment to safety.

"Aquila Mine's exceptional achievements stand as a testament to its dedication to innovation, safety, and collaboration.

"By combining state-of-the-art technologies with a collaborative approach, the mine has emerged as a leader in the industry, reshaping the future of underground coal mining on a global scale."

In Australia, Anglo American operates five steelmaking coal mines in Queensland's Bowen Basin, along with additional joint venture interests in steelmaking coal and manganese, and base metals exploration projects in Queensland and Western Australia. **AMR**

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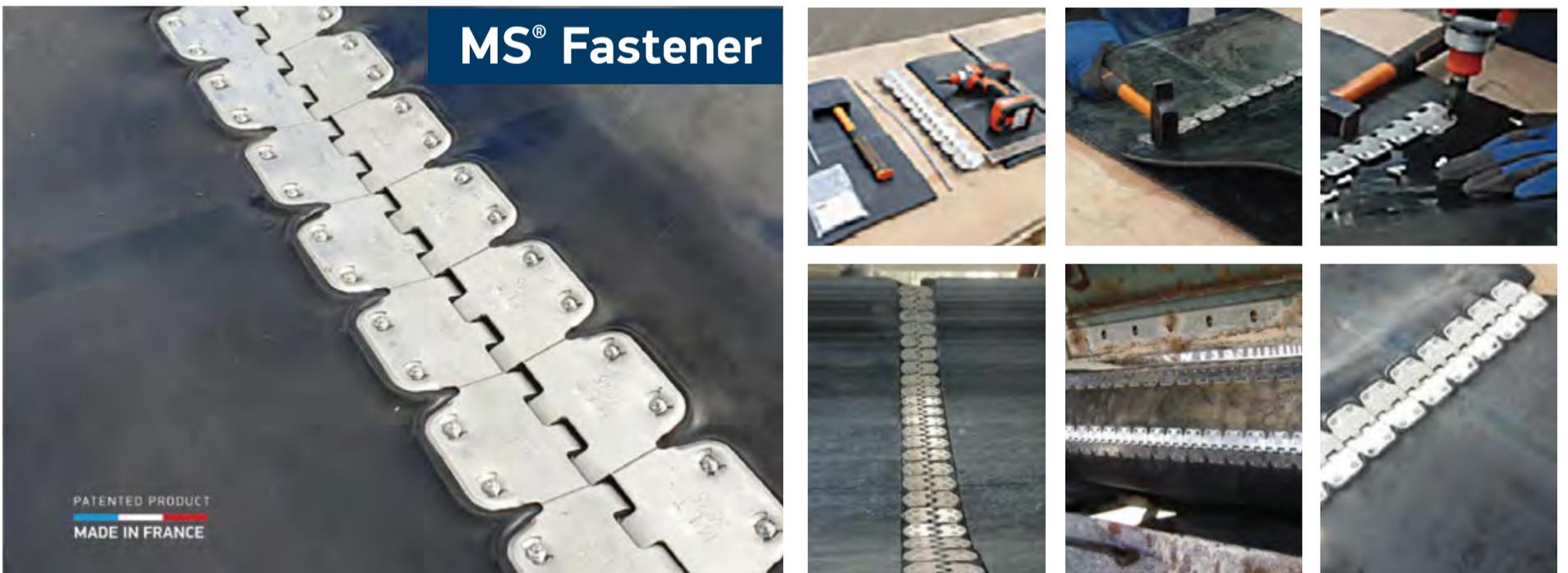


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GOLD, NICKEL & RARE EARTHS CONFIRMED AT DINGO ROCKS

Significant gold, nickel and rare earth potential has been confirmed at Minerals 260's (ASX:MI6) Dingo Rocks project in WA.

These findings come from a 144-hole air core drilling program that targeted previously untested coincident magnetic and gravity anomalies interpreted to indicate possible intrusions prospective for nickel, copper and platinum group element mineralisation.

This drilling program also assessed the potential for clay-hosted rare earth element (REE) mineralisation.

Overall, this drilling intersected up to 6030 parts per million (ppm) nickel, 128 parts per billion gold and 4506ppm total rare earth oxides.

Minerals 260 managing director Luke McFayden says the results are very positive for the company.

"The results announced are very positive, particularly for early-stage air core drilling and support further investment in the next phase of exploration," he said.

"The potential for a multi-commodity exploration opportunity, including nickel, gold and rare earths, is really attractive for Minerals 260 and aligns with our strategy to explore for critical minerals."

Planning is now underway for the next

phase of exploration at Dingo Rocks which includes air core drilling in the southwest to target further gold and base metal mineralisation, and ground electromagnetic surveys across mafic and ultramafic units.

The drill chips will also undergo petrographic analysis to assist in the understanding of the bedrock geology.

All this work is expected to begin early 2024. **AMR**

Gold nuggets spilling out of a bowl.



Reverse circulation drill rig.

Augustus Minerals (ASX:AUG) has completed the maiden drilling program at its Ti-Tree project in the Gascoyne region of WA.

All up, 78 reverse circulation holes, for 9086m, were drilled to confirm historical results and test near surface mineralisation at depth and along strike.

Visible disseminated mineralisation in the

form of pyrite, malachite and chalcopyrite were intersected in the Crawfords, Copper Ridge and Nic's Core areas with assays pending.

Drilling at Minnie Springs also intersected multiple zones of copper sulphide mineralisation co-incident with chlorite-epidote alteration.

Augustus managing director Andrew

AUGUSTUS MINERALS COMPLETES MAIDEN TI-TREE DRILL PROGRAM

Reid says the company's maiden drilling program was a great success.

"Our maiden drilling campaign following the IPO in May 2023 is now completed and has been a great success," he said.

"The campaign was designed to test for mineralisation both at near surface and at depth and resulted in visually identifying mineralisation/veining in the majority of drill holes at our Minnie Springs copper-molybdenum-gold project.

"Minnie Springs could represent a sizeable porphyry hosted copper deposit with the next step to be the completion of drilling in the remaining 50% of the copper-in-soil anomaly yet to be tested during the next drilling campaign in Q1 2024."

Assays are progressively expected over the coming weeks with exploration and drilling activities to restart early next year. **AMR**

LINCOLN MINERALS INCREASES KOOKABURRA GULLY MRE 87%

Lincoln Minerals (ASX:LML) has increased the mineral resource estimate (MRE) by 87% at the Kookaburra Gully graphite project (KGGP) in South Australia.

The mineral resource has increased to 12.26mt at 7.31% total graphitic carbon (TGC) for 896,000t of contained graphite with the KGGP now having the second largest known resource on South Australia's Eyre Peninsula.

This upgrade was driven by the inaugural MRE for Kookaburra Gully SW Extended deposit of 5.12mt at 4.86% TGC (inferred)

and 580kt at 7.73% TGC (indicated) for 293,900t of contained graphite.

The indicated and inferred resources, which were completed by GeoSupport FX, are based on results from 144 holes for 8489 metres of drilling.

A significant portion of the strike remains untested, highlighting the potential for resource growth.

Lincoln Minerals chief executive Jonathon Trewartha says the increased MRE demonstrates the significant potential of the Kookaburra project.



(Image source: Lincoln Minerals) Aircore drill rig at Kookaburra.

"This significant MRE upgrade now positions Lincoln Minerals with the second largest known graphite resource on South Australia's Eyre Peninsula, underscoring the region's strategic characteristics as Australia's premier graphite province," he said.

"The resource upgrade provides strong momentum for our plans to commence

an update to the feasibility study expected to commence mid-2024 and is scheduled for delivery in the second half of 2024."

A three-month drill program will now be undertaken with a focus on increasing the confidence at the Kookaburra Gully and Koppio deposits. **AMR**

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Wagerup refinery employee Simon Downs volunteering at River Wren Rescue.



Team members from Alcoa's Willowdale bauxite mine volunteering at Yarloop Volunteer Bushfire Brigade.



Employees from Portland Aluminium volunteering at Great South West Walk.

ALCOA VOLUNTEERS MAKE A LASTING IMPACT

Throughout 2023, more than 1,100 Alcoa employees have provided 4,700 volunteer hours to 98 community groups and charities that provide essential assistance in communities near the company's operations in Western Australia and Victoria.

Many of these activities formed part of the Alcoans Coming Together in Our Neighbourhoods (ACTION) program, which sees the company match employees' volunteering efforts with a \$3,000 grant.

Through ACTION, Alcoa contributed \$192,000 of critical funding to local community organisations of personal importance to its employees during this year.

Employee volunteers supported the organisations in many ways including sporting and community group busy bees, food preparation and tree planting.

Alcoa corporate affairs director Jodie Read says the company has a long and proud history of supporting the communities it is a part of – and it is a fitting time to recognise employees' efforts alongside International Volunteer Day, celebrated on 5 December.

"Our employee volunteer program unites the collective effort and generosity of our employees to help strengthen local communities – and support the causes they're most passionate about," she said.

"Giving back to community is a big part of our culture at Alcoa and we're aiming to make an even greater impact as we con-



Alcoa's Kwinana Refinery manager David Feast and HR manager Domenic Boni volunteering at Feed it Forward Inc.

tinue to grow our programs that support employees to be active contributors to the community."

Alcoa places a significant focus on helping build stronger, more sustainable communities.

In 2022, the company contributed nearly \$5m to community initiatives in Australia.

Alcoa's WA employees also support the community through the Personnel Employed at

Alcoa Charity Help (PEACH) payroll donation program.

Since its inception 40 years ago, PEACH has contributed more than \$4.4m to community and charitable activities.

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ALCOA CONTINUES JARRAH FOREST REHABILITATION SUCCESS

More than 75% of the areas cleared for bauxite mining in WA have been rehabilitated with the ultimate goal of the rehabilitation to restore a self-sustaining jarrah forest ecosystem.

To date, Alcoa has handed back two areas – totalling 1355ha – at the Jarrahdale mine and has received two Certificates of Acceptance from the State stating the areas met appropriate criteria for completed rehabilitation.

Notably, this was the first significant mining area to be submitted for and receive a Certificate of Acceptance in Australia.

Many of the rehabilitated areas that are yet to be handed back to the State support self-sustaining forest ecosystems and some also provide valuable forest recreation areas.

As natural growth processes take many years, this is why only limited areas have been formally handed back, however, many more are nearing this point.

Rehabilitation is delivered in accordance with the government's required criteria

which has evolved in line with scientific advances over the years. Before 1988, the requirement was to plant introduced trees such as Eastern States eucalypt species to support the local timber industry.

Since the 1970s, Alcoa has undertaken significant research and development work to enable successful reestablishment of northern jarrah forest native species.

In 1988, the company moved to using entirely native species in the rehabilitation.

Alcoa's goal is to return, on average, the same number of plant species in rehabilitated areas when compared to the surrounding forest.

The rehabilitated areas contain a rich mix of plant species, including ground, canopy and mid-strata layers that are important to the function of the jarrah forest.

To progress plans to accelerate future handback, Alcoa works closely with the WA Department of Biodiversity, Conservation and Attractions on appropriate forest management.



(Image source: Alcoa) Rehabilitated forest at Alcoa's Huntly bauxite mine.

Published peer-reviewed research on fauna recolonisation of the rehabilitated areas has reported the return of 100% of

mammals and around 90% of birds and reptile species, including several endangered and threatened species. AMR



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(Image source: Atlas Iron) Birds eye view of Atlas Iron's Sanjiv Ridge site.

World-first WELL Health-Safety Rating for Atlas Iron

In a world-first for the mining industry, Atlas Iron's Sanjiv Ridge iron ore mine site has been awarded the WELL Health-Safety Rating.

Atlas is a subsidiary of Gina Rinehart's Hancock Prospecting and its Sanjiv Ridge mining operation is located 240km from Port Hedland in the Pilbara, northwest WA.

Hancock Operations chief executive Gerhard Veldsman says WELL Health-Safety Rating reinforces the company's commitment to prioritising the health, safety and comfort of its staff.

"Championed by our executive chairman Mrs Gina Rinehart AO, and previous Atlas chief executive, now Atlas board member, Sanjiv Manchanda, achieving this certification demonstrates that we are putting the

wellbeing of our people first, both on site and within the village facilities," he said.

The WELL Health-Safety rating is a subset of the WELL Building Standard, pioneered by Delos and administered by the International WELL Building Institute (IWBI).

"We are proud to be leading the charge on implementing this in a non-urban and remote location," Mr Veldsman said.

"A world first which we are excited to soon extend across Atlas' other sites."

The WELL Health-Safety Rating for Facility Operations and Management is made up of six action areas: cleaning and sanitation procedures; emergency preparedness programs; health service resources; air and water quality management; stake-

holder engagement and communication; and, innovation.

Atlas Iron's Sanjiv Ridge mine site has implemented the following best practices to protect the health and safety of its workforce include:

- cleaning contractors use products that contain less hazardous ingredients, significantly reducing the risk of respiratory and dermal symptoms;
- annual training on CPR, first aid and the correct use of the AED defibrillators;
- access to free flu vaccinations;
- skin cancer checks; and
- healthy heart assessments.

All Atlas also staff receive financial reimbursement to offset their private health

insurance, giving them greater access to comprehensive medical assistance.

Atlas non-executive chairman Spiro Pappas commented on the certification.

"Achieving the WELL Health Safety Rating means a safer, healthier, and more satisfying work environment for employees, with clear benefits such as reduced health risks, improved wellbeing, and a positive workplace culture," he said.

"It reinforces our commitment to our employees' health and safety. We are proud of Atlas, and proud of the efforts of our employees.

"Larger corporations tend to treat their projects and even staff, as numbers. Here at Atlas, we don't." **AMR**

MINERAL RESOURCES RECEIVES HAT-TRICK OF AWARDS



(Image source: Mineral Resources) Mineral Resources head of mental health and wellbeing Chris Harris accepting the Happiness Co and Happiness Foundation Mentally Healthy Workplace Award.

Mineral Resources (ASX:MIN) received three awards from two industry events.

At the 2023 WA Mental Health Awards, Mineral Resources was named the winner of the Happiness Co and Happiness Foundation Mentally Healthy Workplace Award.

This award recognised the company's efforts to encourage excellent mental health for both staff and volunteers.

Mineral Resources head of mental health and wellbeing Chris Harris accepted the award on behalf of the company.

"We're proud to be recognised for the investment we have made in the mental wellbeing of our people," he said.

"At MinRes, we acknowledge that our people are our greatest resource, and we believe everyone deserves to go home well to their families."

At the 2023 AIM WA Pinnacle Awards, Mineral Resources received the Hawaiian Corporate Social Responsibility Excellence Award and the Marketforce Group Marketing Excellence Awards.

Every Pinnacle award winner receives \$20,000 worth of training to donate to a charity of their choice, with MinRes donating to Youth Focus and McGovern Foundation.

The Hawaiian Corporate Social Responsibility Excellence Award recognises initiatives that demonstrate leadership and commitment to excellence in corporate social responsibility with MinRes partnership manager Lian Staltari accepting the award.

"We believe deeply in partnering with incredible organisations that make a difference in the communities we operate in, and it's an honour to be recognised for our contribution to the wider community," he said.

"We are proud to have contributed more than \$22m to worthy organisations and initiatives across WA in the past five years — a track record we are committed to continuing."

The Marketforce Group Marketing Excellence Award recognises initiative that demonstrate leadership and commitment to excellence in public relations and marketing. **AMR**

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QMEA

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(Image source: Queensland Minerals and Energy Academy) QRC director of skills, education and diversity Katrina-Lee Jones (left), Queensland Minister for Training and Skills Development Di Farmer (centre) and QRC chief executive Ian Macfarlane (right) with STEM students.

The Queensland Minerals and Energy Academy (QMEA) is now in 100 schools across the State.

The education arm of the Queensland Resources Council (QRC), the QMEA is Australia's largest and most successful industry-led education and schools initiative.

Brisbane Boy's College became the 100th school to partner, joining 46 other South-East Queensland schools and 53 regional schools.

Queensland Resources Council chief executive Ian Macfarlane says reaching 100 schools is a milestone to the QMEA.

"The QMEA is having a profound impact on shaping the future leaders of Queensland's

resource and energy sector and building up our pipeline of future talent," he said.

"Young people will play a crucial role in driving forward the changes needed for our industry to decarbonise our operations and we welcome their value-driven motivation to make a difference in the world."

Queensland Training and Skills Development Minister Di Farmer says the QMEA plays an important role in the Queensland Government's gateway to Industry Schools Program.

"Our partnership with the Queensland Resources Council provides a talent pipeline of employees into the resources sector and other supporting science, technology,

engineering and mathematics (STEM) industries," she said.

"By engaging students in projects like the STEM Big Days, new 'Future Hy-Way' workshops, and the successful QMEA/WIMARQ Girls Mentoring Program, QMEA is helping to grow and diversify our future resources workforce."

Mining Careers Materialised at STEM Workshops

Delivered by the QMEA, South-East Queensland students explored the intersection of STEM with the endless career opportunities across the resources and energy sectors.

The Queensland Resources Council helped the State's next generation connect STEM

concepts and real-world applications in mining, minerals and energy.

More than 750 students from years seven, eight, nine and 10 were immersed in educational programs while over 70 geology enthusiasts also participated in a series of 'Watch it Cool' workshops where they discovered how the rate of cooling affects rock size and structure.

As Australia's largest and most successful industry-led education and schools initiative, the QMEA aims to broaden student and teacher knowledge of career opportunities in resources.

It encourages a talent pipeline of employees into vocational and professional careers. **AMR**



SCHOLARSHIPS FOR WOMEN TO CHASE THEIR DREAM CAREER

Applications are open for the Women in Non-Traditional Trades Scholarships (WiNTT) — a program to help women get into typically male-dominated industries and train for their dream career.

From 2024, the program will provide 400 women with a one-off \$5,000 payment to support them to undertake eligible vocational education and training (VET) qualifications at WA TAFE colleges.

The WiNTT is part of the WA State Government's \$3m four-year investment to help reduce barriers to training and support increased workforce participation in typically male-dominated industries such as mining, engineering, construction, building, electrical and automotive.

WA Women's Interests Minister Sue Ellery said despite significant shifts in women's

workforce participation, there's still a long way to go to reach gender equality.

"Research shows that organisations with gender diversity are more profitable and productive and have improved employee satisfaction and decision-making," she said.

"By helping women to overcome barriers to participating in training, we're encouraging more women to pursue their dream career and break down stereotypes about certain traditional jobs being 'just for men'."

Currently, there are around 2,500 women enrolled in courses eligible for the program — less than 12% — and it's hoped the WiNTT scholarships will help drive increased participation.

WiNTT will provide 400 scholarships to women, with 100 to be provided in 2024,

to undertake training at WA TAFE colleges in non-traditional trades over the next four years.

These scholarships will help reduce the financial barriers women often face in training and upskilling with the \$5k to help cover costs such as student fees, learning resources, transport, personal protective equipment, tools, work clothes, accommodation and licences.

Recipients will also benefit from tailored mentoring and support services to help them complete their qualification and successfully transition into employment.

Scholarships will be available for women enrolling in an eligible qualification — either part time or full time — or an apprenticeship or traineeship. In total, 20 scholarships will be available through each WA TAFE.

WA Training Minister Simone McGurk commented on the program.

"Women are underrepresented in many industries in our workforce, particularly those that have long been considered male-dominated, where less than 25% of the workforce are women," she said.

"The \$5,000 one-off payment will make a genuine difference in breaking down the barriers many women face in pursuing their dream career.

"We want women to hear the message — there are good opportunities in many of the traditionally male-dominated industries, and we want you to get access to them." **AMR**



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Dehydration poses a significant threat to workers in Australian mines, with heightened risks during the summer months, but it remains a year-round safety concern. It is imperative that employees grasp the indicators of dehydration, comprehend its associated dangers, and learn how to avert it. Employers, too, have a pivotal role to play in preventing dehydration by educating and supplying employees with effective hydration and wellness strategies.

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Produced in the US, the FlangeLock Tool is an easy-to-use cap which slides over the flange and is sealed by tightening the bottom plug by hand, keeping oil in and contaminants out.

CKC Equipment imports the FlangeLock Tool into Australia and sells it nationwide through the company's extensive network of distributors.

Greg Molloy, inventor of the FlangeLock Tool, needed a solution to using plastic bags and rags when preventing contamination and leaks, and so created a prototype which eventually led to manufacturing what is now known as the FlangeLock Tool.

With an easy on, easy off process the FlangeLock Tool offers a leakproof solution to hydraulic system and environmental cleanliness that is guaranteed to stop the mess and reduce the need for expensive clean ups.

The reduction in oil leaking from hoses also

drastically reduces the risks associated with slip and fall hazards, resulting in a large benefit to staff safety as well as a decreased chance of environmental contamination.

The FlangeLock Tool can be used across a breadth of industries including construction, mining, oil fields, dredging applications, wind turbines and large machine tools.

Currently manufactured in lightweight aluminium, it is produced in 12 sizes for 8, 10, 12, 16, 20, 24, 32, 40, 48, 56 and 64 in SAE Code 61, 62 and CAT.

Other advantages of the FlangeLock Tool are that no tools or expensive hardware are required while rags stuffed into hoses and messy plastic caps are a thing of the past.

Installation and use is quick and easy, requiring just one hand, with no additional equipment required. **AMR**

GET YOUR FLANGELOCK TOOL NOW BY CLICKING HERE!



**SAVE TIME
SAVE MONEY
IMPROVE SAFETY
REDUCE CONTAMINATION**



A leakproof solution to hydraulic system and environmental cleanliness.

The FlangeLock Tool allows for the simple sealing of open SAE Code 61, 62 & 62 CAT-Style hydraulic flanges without tools. Constructed out of lightweight high tensile strength T2200 anodized aluminium. Easy on, easy off.



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(Image source: Sheffield Resources) First feed through the DMU.



THUNDERBIRD PRODUCTION IS

The first significant heavy minerals sand deposit to be discovered in the Canning Basin, Sheffield Resources' (ASX:SFX) Thunderbird mineral sand project is one of the largest and highest-grade mineral sands deposits in the world.

Hosted by highly weathered Broome sandstone, Thunderbird is a zircon and ilmenite rich valuable heavy mineral deposit.

Progressing from an exploration project to a substantial development project, a large high-grade maiden mineral resource of 1.37bt at 6.1% heavy mineral was declared for Thunderbird in December 2012.

A scoping study was completed in 2014 and a pre-feasibility study and pre-feasibility study update was released in 2015, leading to the announcement of a maiden ore reserve of 683mt at 11.3% heavy mineral in January 2016.

A bankable feasibility study was completed on Thunderbird in 2017 which demonstrated it could produce and market high-quality zircon and ilmenite at large volumes.

Sheffield executive chair Bruce Griffin gave some insight into the history of Thunderbird.

"The discovery was made in 2012. This was while the area had previously been explored by Rio [Tinto] but Rio hadn't actually discovered the Thunderbird deposit when they relinquished the ground," Mr Griffin told the *Australian Mining Review*.

"Fairly early in Sheffield's drilling Thunderbird was discovered and it had to go through the various early stages of normal project maturation and by 2016 it was ready for funding."

In Sheffield's first round of Thunderbird funding in 2017, the company was unable to raise sufficient funding for full project development, which included all the downstream processing.

When Mr Griffin joined Sheffield in 2020, Thunderbird was reconfigured and all the downstream processing was taken out.

Yansteel and Sheffield then executed binding agreements in January 2021 to form a 50:50 joint venture called Kimberley Mineral Sands.

"Yansteel came along as a potential partner and we effectively agreed to a joint venture transaction with them in 2020 with approval in late 2020 and the joint venture was formally formed in March 2021," Mr Griffin said.

"With their [Yansteel's] funds, we were able to keep progressing the project in parallel with financing the project, so we were able to use their equity to keep the project moving forward."

By October 2022, Sheffield had the full funding package agreed and the company was approximately 45% complete on construction of the project.

Production began in October 2023.

Start of Production

Sheffield is right at the start of its production journey at Thunderbird and is aiming to get to stable operations with 24/7 continuous work.

"It's one of those things where startup is a journey not an event. I think sometimes people sort of imagine that there's a button and you press it and it starts running," Mr Griffin said.

There are hundreds of buttons and there's lots of individual pieces of equipment.

"The process of startups is that typically you'll inevitably have a piece of equipment that won't run as exactly as you expect it to. You also have early life failures on equipment, and you work your way through that."

At full production, Sheffield is targeting to mine about 10mtpa of ore and then processing that to recover about 1.1mtpa of concentrate.

Of that, around 700kt is ilmenite concentrate which Yansteel is using as a source for their downstream pigment processing facilities.

Then there's 200ktpa of zircon concentrate which contains between 110kt and 120kt of zircon, and 200ktpa of paramag (paramagnetic) concentrate that contains lower qualities of zircon and other minerals such as monazite.

Project Construction

Whilst a portion of the construction was largely self-executed by the Kimberley Mineral Sands joint venture, construction



(Image source: Sheffield Resources) Sheffield Resources executive chair Bruce Griffin.

of the wet concentrate plant and concentrate upgrade plant was completed by GR Engineering Services Limited (GRES), with work completed on time and on budget.

"The construction of the process plants was the core of what GRES were doing for us, using largely standard mineral sands processing equipment including spirals for the wet concentrate plant and wet magnetic separators for the concentrate upgrade plant," Mr Griffin said.

"On time and on budget is a good outcome. It's quite an unusual outcome in the resources sector.

"That was the core process contract which was quite mature engineering-wise and had been studied a couple of times and to the extent the design changed, we were removing things.

"So, the core plant hadn't been changed significantly during the various studies

and so it was pretty mature and that's why I think GRES were able to deliver it on time and on budget."

Other construction work included the tailings storage facility, the storm surge water pond, a 30km mine access road and adjacent works to an acceleration lane on the main Great Northern Highway, the accommodation village, a power plant and borefields.

"So the main construction activities are truly done," Mr Griffin said.

As well as being on time and on budget, construction went over a million-man hours lost time injury (LTI) free.

"We went a million-man hours LTI free. Obviously, that's something we wish to continue in operations," Mr Griffin said.

Future Operations

Thunderbird is now in the ramp up period of stage one operations and Sheffield and their joint venture partner Yansteel will now get a sense of full throughput and recoveries with a potential expansion on the horizon.

Through its joint venture, Sheffield and Yansteel agreed on a development concept for stage one consisting of a 10.4mtpa mine production and 1085 tph process plant feed rate, producing zircon-rich non-magnetic concentrate and magnetic (ilmenite) concentrate.

Stage two sees the doubling the wet concentrator plant feed rate to 2170tph targeted later this decade.

"Stage two would be expanding the mine and the process plant, but what it really does is fully utilise the reserves," Mr Griffin said.

"So, with stage one alone, there's an attributable

grade decline over the life of the mine. You don't ultimately keep the process plant full and by doing stage two, you expand the mining capacity without having to expand the process plant by the same amount, and that allows us to fully utilise the plant for longer."

Under stage one Thunderbird has a mine life of 33 years which will increase to 36 years under stage two. **AMR**

sa GO! By Ashleigh Dorrell



(Image source: Sheffield Resources) Aerial view of Thunderbird.




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HELPING TO SMOOTH MINING OPERATIONS ACROSS AUSTRALIA

When a mining operator's original hopper liner was wearing, causing efficiency issues during production, it prompted an immediate need for replacement.

The decision was taken to upgrade the failing liner with 20 mm TIVAR 88 for added wear resistance and rapid release technology.

For this solution TIVAR 88 liner was produced with oversize welded panels to eliminate seams and increase flow and production speeds.

For that customer, TIVAR 88 was again the perfect solution to bulk handling issues. Enabling reduction or elimination arching, ratholing and erratic material flow challenges in bins, bunkers, hoppers and chutes, railcars, etc. Although every application is unique, some have specific environmental challenges.

TIVAR 88 is used in mining and mineral processing for dealing with sticky bulk materials such as coal, bauxite, copper concentrates, potash, clay, overburden.

These and other such cohesive materials require a slippery surface to permit bulk materials to move from point A to point B. TIVAR 88 has a low coefficient of friction

that permits materials to move freely and discharge without hang-up.

State-of-the-art

TIVAR polymers are produced using state-of-the-art compression moulding technology and ram extrusion. The TIVAR range of specialised UHMW-PE products are a diverse group of high performing plastics. Designed to provide specific solutions to tough problems in demanding applications, with superior wear resistance and part life in both wet and dry environments.

For more than 50 years, Mitsubishi Chemicals Advanced Materials (MCAM) has been the world's largest developer and producer of engineering polymers based on UHMW-PE. Modification and innovation of materials based on individual customer requirements and applications are a focus of their business.

E-Plas the TIVAR authority

E-Plas, Australia's engineering and performance plastics specialists, has been leaders in providing solutions through plastic material innovation and development to a diverse range of industry in Australia for 40+ years and is a local authority on the TIVAR product range.

With lot of material on mine sites contain-



ing significant moisture content, using any sort of metal can become a hang-up issue.

The Mitsubishi Chemicals Advanced Materials produced UHMW-PE product is also glass-filled and cross-linked, making it more robust and water resistant.

"When a product comes in contact with Tivar 88 Lining material, it actually doesn't penetrate through which makes it harder wearing with longer life, compared to Standard UHMWPE product," Rupin Joshi, National Technical Sales Specialist for E-Plas, said.

"We have been supporting and selling TIVAR 88 for a long time," Mr Joshi said.

"There is some 50 plus years of history with the product itself, so you know it must be good if it is still so popular all over the world."

Mr Joshi says TIVAR 88 is mostly used by the local mining sector on hoppers and chutes to help ensure the smooth movement of product.

Being a national company with branches all over the country, E-Plas has been selling and helping to install TIVAR products to miners in every State and Territory for many years.

Customised fittings

E-Plas can custom supply TIVAR 88 to meet a variety of customer needs.

"There are a few ways you can buy the product. You can actually purchase it as a semi finished sheet, which has been manufactured by Mitsubishi. At E-Plas, we can either sell the product as is, or we can fabricate it into different shapes if needed.

"We can undertake different types of machining and fabrication prior to supplying the customer in order to meet their specific requirement. For example, different customers have different hoppers and we can customise their purchase to fit their needs."

E-Plas and TIVAR have been making things smoother for miners around Australia for many years and will continue to do so for many more to come. **AMR**



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Advanced road stabilising technologies developed by Reynolds Soil Technologies (RST Solutions) were used at Thunderbird Mineral Sands mine to assist in constructing 34km of high performing roads that withstand the extreme heat and humidity of the Kimberly Region in Western Australia.

Another major challenge RST Solutions overcame with its advanced polymer soil stabilisers was crushed road base over pindan subgrade layer, known for being

soft and moisture sensitive with high potential for collapse.

Temperatures rising to 50 degrees at the mine site and red Pindan soils cause major issues for haul roads that need to be in excellent condition to support road trains carting high volumes of mined product from the site 24/7.

RST Solutions advanced technologies, soil stabiliser Titan and dust suppressant Guardian, were utilised by the mine's

RST MINING & CIVIL SOLUTIONS

PROVIDING ADVANCED SERVICES TO THUNDERBIRD MINERAL SANDS MINE

developer Kimberly Mineral Sands (KMS) to build a 30km haul road and 4km of roads servicing the mine, saving the company significant resources in the process.

Titan, designed to achieve greater levels of compaction in the subbase layer (road base material) layers of roads and other infrastructure, was applied to the base course layer to form high quality roads in a third of the time and a fraction of the cost. Advanced dust suppressant Guardian was added to the top layer for greater dust and erosion control and further stabilise the road.

Instead of deteriorating over time or washing away, Titan and Guardian work down through the road's surface layers when it rains, tightening up road structure through particle slippage and aggregation to lower roll resistance and improve road quality, in turn reducing road maintenance and road recovery time.

Dosage levels used were tailored by RST Solutions for ultimate compatibility to the Thunderbird site, to increase thickness and flexibility and improve the CBR.

KMS Senior Project Engineer Claudio Marone said a new approach for building roads at the mine needed to be taken due to the unique conditions.

"The common method of sealing the roads is with a chipseal bitumen that would have bubbled and peeled off in the intense heat, leaving sharper, harder holes requiring specialise contractors to repair," Mr Marone said.

"We needed to take a new approach to road building and the benefits of using RST Solutions' products have been outstanding. We saved millions of dollars and now have flexible, weather resistant roads with sufficient dust control.

"Titan enabled our team to carry out all the earthworks and finish off the roads without having to bring in a specialised team and their machinery to lay the chipseal. The ongoing maintenance for us now is less risky, more cost effective and a lot easier to carry out with the equipment we already have on site.

"We initially went with RST Solutions because of their success with similar projects and the wealth of knowledge and experience they have from working in this field for 30 years. They really know what they are doing."

RST Solutions is an Australian business operating internationally. For more information, contact (+61 7) 5522 0244 or visit www.rstsolutions.com.au.

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29 YEARS OF SUPPLYING THE HIGHEST QUALITY VALVES IN AUSTRALIA

Built on a history of reliable global manufacturers and quality brands, The Valve Company's (TVC) longevity in the mining industry is largely due to its experienced staff well-stocked warehouses, fast quote turnaround times, project scoping and other repair and overhaul services.



Established in 1994 with a team of two in a Perth office, TVC has expanded its business from Perth and Kalgoorlie, Bunbury, and Brisbane.

Specialising in valves, actuation, controls, and associated pipeline equipment, TVC has tailored its services for some of the biggest names in the mining, maritime and water industries. TVC has been servicing the mining industry with their own TVC branded butterfly, ball and check valves, as well as well-known international brands.

TVC is also the exclusive distributor of DeZURIK products for Australia, a high quality, long-established international name,

proven and trusted internationally. As such Knife Gate Valves were chosen for the Thunderbird Mineral Sands Project. The design is produced for one-off applications of abrasive slurry and dry abrasive materials having the distinct advantage of being a non-discharge design. TVC's DeZURIK Knife Gate range is widely used in the mining industry, especially for isolating slurry.

As for plant operational support, being a stockist is an important aspect of the company. TVC's planning process and stock ordering model enables it to hold more of the needed stock in Australia.

As a stockist, you need to ensure you have

products and range available and be able to deliver it. Having that available stock ensures there is less plant downtime, which improves productivity for the customer.

TVC's staff across Australia enables the company to understand the capabilities, limitations, and workarounds in flow control technology, so it responds with practical solutions.

Plus, the company always strives to ensure that its staff are locals with experience in their regions where they are appointed.

TVC emphasises that selecting the correct valve for mining operations is paramount for efficient, productive, and reliable plant

operations. The right product helps automate processes and extend plant life cycles, reducing downtime and improving return of investment.

They assist in providing solutions to improve safety and efficiency, and ensure compliance with environmental and quality standards. Recently, TVC increased their capabilities to manage large scale projects, providing products with experience, expertise and solutions.

With years of experience sourcing and supplying valves, TVC has become a premier stockist and supplier for a variety of high-quality standard and custom-made products to Australia's heavy industry. **AMR**

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CAMPBELL TRANSPORT

WORKING WITH KMS FOR THUNDERBIRD MINERAL SANDS PROJECT



Family-owned Campbell Transport is a leading and growing logistics company providing its services to a range of industries, including mining, agriculture, industrial, machinery, food and transport.

With a fleet of over 100 trucks, Campbell Transport can assist with a wide range of road transportation needs, allowing for both normal loads and those that exceed normal dimensions in length, width and weight.

Campbell Transport has provided its services to multiple mining companies, with the company currently working at the Thunderbird mineral sands project for Kimberley Mineral Sands (KMS).

Campbell Transport will use Performance Based Standard (PBS) 60-metre road trains to transport product from Thunderbird to the storage area near the port. Compared to the standard 53.5-metre triple and quad

road trains, PBS 60-metre road trains have many additional safety mechanisms.

"We have been tasked with the pit-to-port logistics for KMS. This involves a fleet of 60-metre PBS quad-road trains with custom designed skel trailers," Campbell Transport managing director, David Campbell said.

"We will load and haul the sealed containers to our laydown facility in the Broome Port area and unload/stack containers whilst waiting for incoming vessels".

"We will then shuttle the containers to the KPA's Broome Port and lift them off the trucks and into the vessels with Campbell's custom designed 'Container Revolvers'.

"Currently, we have already mobilised some of the truck combinations to site and are in the midst of carting 2600 containers from the Port Hedland Port to the Broome laydown areas."

Once the containers are craned off, the lids are automatically lifted by the revolver then opened and tipped while inside the ship's hull.

Campbell Transport has also mobilised a fleet of CAT loaders and operators to site that are currently assisting KMS with the ramp-up in mineral sand production.

Thanks to previous work and happy customers, Campbell Transport was recommended to the KMS joint venture.

"We were recommended to Sheffield and the KMS team through our existing clientele given we have several operations across WA that offer full pit-to-port logistics solutions including container and bulk shed storage facilities at WA port locations," Mr Campbell said.

"After meeting with KMS early in the project planning stage, we were able to add

valuable insight and advice on the logistics component that through those efficiencies saved millions of dollars on their project's bottom line."

While Campbell Transport is still providing its services to Thunderbird, the company's biggest milestone to date is seeing the machinery coming right off the production line.

"We've been lucky to fly to both China and America to watch the containers and Revolver attachments literally come off the production line which was a huge milestone for the logistics side of the project," Mr Campbell said.

"These sort of trips to monitor quality control are all the worthwhile when you see the pieces of equipment picked up from the wharf on our trucks and hauled to site with a great sense of pride." **AMR**

CAMPBELL Transport



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MV Aburri at the Bing Bong Loading Facility, associated with the McArthur River zinc mine, Gulf of Carpentaria, Northern Territory, Australia.

UPSTREAM ZINCING FOR ENERGY TRANSITION

One of the world's largest zinc mine is located in the Northern Territory at Glencore's McArthur River Mine, about 700km southeast of Darwin.

Along with zinc, the mine also produces lead and silver, both in concentrates.

Zinc produced there is used in steel products, such as white goods, to preserve and extend the life of steel products, and also in renewable technologies like solar panels and wind turbines for steel and corrosion protection.

McArthur River Mine was originally an underground mining operation, with the mine converting to open cut in 2006.

In 2012, Glencore took full ownership of the mine and, in 2013, the Northern Territory Government approved a major expansion to double size and production.

The expansion involves PBOX Technology, which was invented at the McArthur River Mine, to separate lead and zinc from bulk concentrate, thereby extending the mine life to 2038.

A survey done in 1955 discovered the Here's Your Chance (HYC) deposit consisting of eight zinc and lead ore zones over 2km² and is 55m thick.

But it wasn't until 1995 that the mine went into viable commercial production, thanks to the Glencore-owned IsaMill technology, which enables fine-grained ore to be ground down so that it releases precious metals.

McArthur River Mine is an open pit mine, with mining methods including drill and blast as well as excavation used in the removal of ore for processing.

Excavators up to 550t load 175-220t haul trucks with ore.

There is an onsite processing plant where the ore is subsequently crushed and overburden rock is trucked to a waste pile where it is shaped for later rehabilitation. The ore is ground into a fine dust or 45 microns.

After crushing and grinding, the zinc-lead is separated from waste rock through a flotation process.

At the end of the flotation process, froth is skimmed off the top of the slurry, leaving valuable zinc and lead concentrates, with small traces of silver.

The recovered concentrate is further reground and passed through conditioner tanks.

Particles are now as tiny as seven microns. Further processes involving acid, heat, air and flotation separate the zinc from the lead.

Processed product and concentrates are then ready to transport offsite to be smelted into zinc and lead metals.

McArthur River Mine's lead concentrate is transported 800km by road train to Glencore's Mount Isa Mines lead smelter in Queensland for further processing.

Its zinc concentrates, which also contains silver, is trucked 120km north to the Bing Bong Loading Facility at the southern end of the Gulf of Carpentaria.

At the facility, zinc concentrate is stored in a 90,000t storage shed.

A purpose-built barge, the MV Aburri, transfers the concentrate 28km north of the Bing Bong Loading Facility, from which covered conveyors transfer the concentrate on to ships for export to refineries around the world.

Economic Contribution

In CY2022, Glencore contributed a total of \$611m to the Northern Territory and national economy through its McArthur River Mine.

The company supported up to 1,250 direct jobs and paid \$70m in wages.

A total of 980 suppliers benefited from \$436m in annual spend on goods and services.

Glencore also paid \$105m in taxes and royalties from its NT operations.

These figures are up from CY2021 where a report compiled by Ernst & Young showed the mine contributed \$477m back then.

Glencore says about one in four of its McArthur River Mine employees are Aboriginal or Torres Strait Islander, with most coming from local communities including Borroloola and Robinson River.

Glencore chief operating officer of the zinc business in Australia Matt O'Neil says the company is committed to the welfare of the communities and families in the Roper Gulf.

"We continue to provide funding for community initiatives that will make a difference to people's livelihoods," he said.

McArthur River Mine acting general manager Adam Hatfield says the operation remains committed to providing increased opportunity for Territorians while helping building the long-term social and economic prosperity of local indigenous communities across the Gulf region.

"We're proud of the significant contribution we make to the Territory, and we look forward to increasing our 25% Indigenous employment and working closely with Traditional Owners for an Indigenous Land Use Agreement (ILUA)."

Production

Glencore chief executive Gary Nagle

says the third quarter of CY2023 was a solid production performance from the company's underlying base business over the first nine months of the year.

The McArthur River mine produced 196.4kt of zinc in concentrates year-to-date for Q3 CY2023.

This was marginally down from the 203.3kt zinc in concentrates same time last year. Lead in concentrates production for YTD 2023 was 36.8kt, while silver in concentrates production was 889koz for the same period.

Both of these metals were also slightly down from last year – lead in concentrates by 1.5kt and silver in concentrates by 207koz from YTD 2022.

Northern Territory Exploration Jumps

The Northern Territory also hosts the world's largest producer of manganese, the Groote Eylandt Mining Company (GEMCO) and Australia's only producing lithium mine outside of WA at the Core Lithium Finnis project.

Figures released by the Northern Territory Government shows mineral exploration expenditure in Q3 CY2023 was the highest ever recorded at \$74.4m, representing a 30% jump compared to the same quarter last year.

Demand for critical minerals is driving this growth in exploration in the Territory, accounting for \$37.8m in exploration expenditure.

NT Mining Minister Nicole Manison says these latest figures show "the world is quickly transitioning to renewable energy – and the Territory's critical minerals are in high demand".

Glencore continues to be a leading producer of key transition metals, including zinc, as the world transitions to a low-carbon economy.

The key role for energy transition commodities could become substantially more given their role in technologies and infrastructure that underpin low or no carbon energy sources. **AMR**

McArthur River Mine 2022 Production

> 273,765t zinc in concentrates > 51,447t lead in concentrates

> 1,467,207oz silver in concentrates

POWERING MCARTHUR RIVER MINE RELIABLY & EFFICIENTLY



With over 30 years' experience supplying power to remote mining operations, EDL is the trusted energy provider to Glencore's McArthur River Mine.

The mine is located near the Gulf of Carpentaria in the Northern Territory in one of the most environmentally challenging regions in Australia, where temperatures can hit 45°C and significant cyclones can track from the west and the east.

EDL has owned and operated the McArthur River Mine power station since operations began in 1995.

General Manager Remote Energy, Geoff Hopley, says EDL has been powering the mine site reliably and efficiently since operations began.

"We've engaged very closely with McArthur River through the development of their mine expansion and built a power

station designed to safely and reliably supply their operations with power," he said.

"It's been well maintained through its life - and continues to be so.

"When you put all those things together, you end up with good outcomes, for safety, reliability and efficiency of the power station.

"EDL has significant experience in how to operate and maintain power stations and deal with all sorts of supply risks - from fuel to cyclones - to ensure efficient, reliable power supply."

The power station at McArthur River is the largest for EDL, with a 77MW generating capacity.

The original station comprised six gas turbine gensets and two reciprocating gas engine gensets.

In 2012, EDL expanded the station and installed six 9.7MW Wartsila gas reciprocating engines.

The need for high fuel efficiency and a low levelised cost of electricity made reciprocating gas engines a natural choice as they did not suffer significant derating at high ambient temperatures.

Multiple units allow the plant to adjust load variations while maintaining maximum overall efficiency.

Mr Hopley adds that EDL Energy is continually looking at options for renewable hybrid solutions and technologies to help customers reduce their carbon footprint.

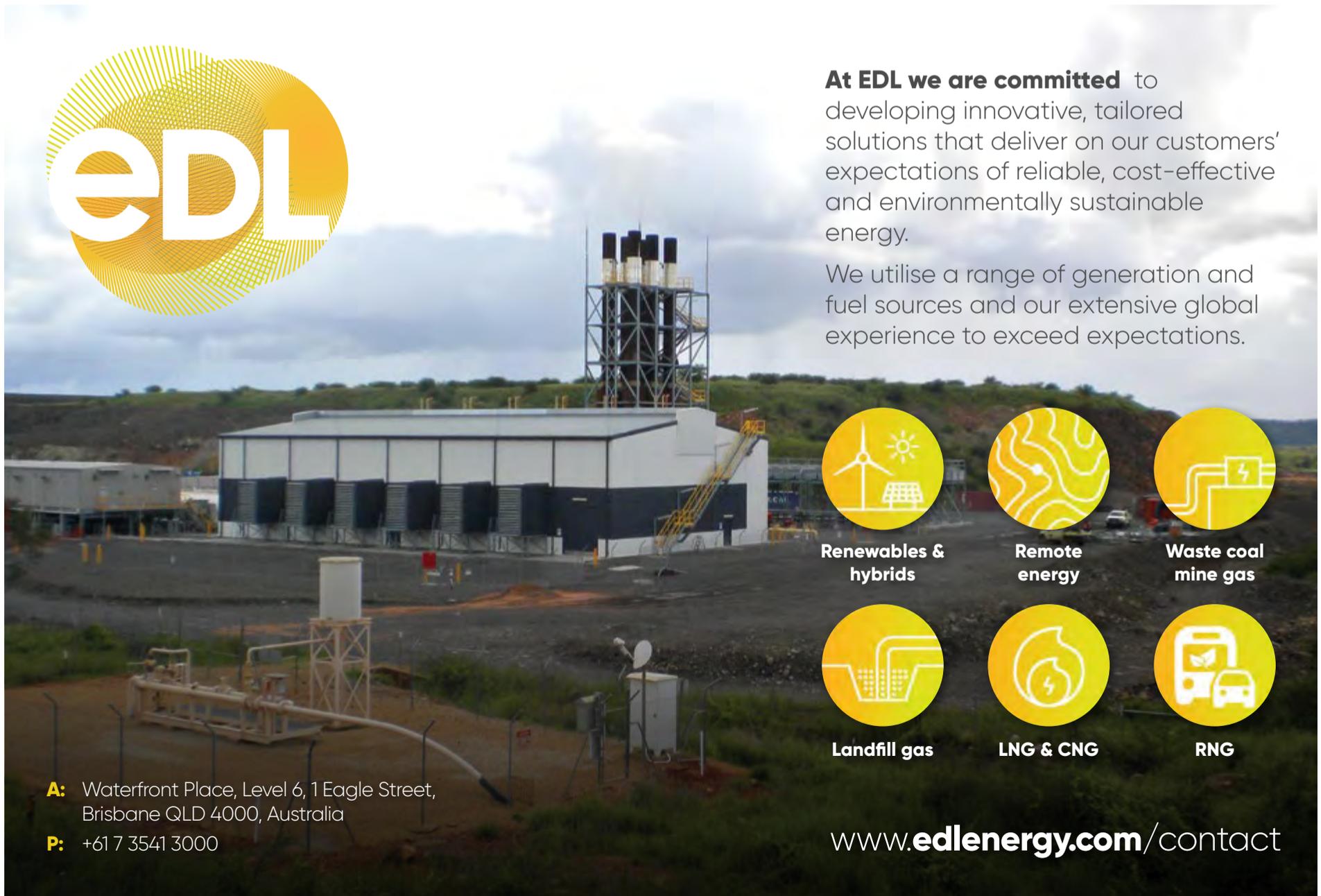
"A renewable hybrid solution is where a power station has a renewable energy source from wind and/or solar, coupled with gas or diesel fired generation to maintain reliability," he said.

"Batteries and complex control systems manage the interface between the renewable and fossil fuel generation."

EDL is a leading global producer of sustainable distributed energy with expertise supplying mine sites, as well as landfill gas, renewables and hybrids, LNG/CNG, remote energy, waste coal mine gas, renewable natural gas.

The company owns and operates 88 power stations and gas processing plants, across five countries and three continents, with over 1GW of clean, reliable power sold into 16 different markets, abating approximately 3.8mt of CO2 each year.

Its operations include 15 remote energy power stations across WA and the Northern Territory in Australia. **AMR**



At EDL we are committed to developing innovative, tailored solutions that deliver on our customers' expectations of reliable, cost-effective and environmentally sustainable energy.

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PETRO INDUSTRIAL REVOLUTIONISES MCARTHUR RIVER MINE

WITH CUTTING-EDGE LUBRICATION SOLUTIONS

In the ever-evolving landscape of industrial technology, PETRO Industrial has emerged as a beacon of innovation, transforming the Mining industry with state-of-the-art fuel & lubrication solutions.

At the core of this pioneering endeavour lies a revolutionary 330,000-liter bulk fuel facility designed specifically for the McArthur River mine.

This cutting-edge facility features interconnecting tanks, linking kits, HME and LV refuelling modules, and the iPETRO Auto Fuel auto vehicle recognition system, complete with both low flow and high-flow dispensing points.

This marks the dawn of a new era, promoting enhanced efficiency and sustainability, enabling haul truck refuelling in close proximity to mining operations, and providing precision for in-pit fuel management at one of the world's foremost mining sites.

PETRO Industrial's contribution can also be seen in the 200,000-litre bulk lubrication storage farm, a colossal infrastructure that redefines the scale and sophistication of lubrication systems in the mining industry.

The closely coupled tanks with the dispensing module allows lubricants to be stored and dispensed into service trucks plus connecting to custom build hose reel stands within the workshop, ensuring a continuous supply of lubricates where required.

This approach not only minimises the duration of servicing but also optimises

equipment downtime during refilling, thereby enhancing productivity and diminishing operational costs.

The implementation of automated PLC pump start and stop functions effectively prevents unnecessary operation of pumps when not in use.

Furthermore, the cutting-edge iPETRO fluids management systems meticulously track the distribution of oils, including details such as the location, time of dispensing, and the responsible dispenser.

An integral aspect of PETRO Industrial's solution lies in the incorporation of waste oil tanks, enabling the direct extraction of waste oil from equipment to waste storage without the need for manual handling of products.

This underscores a steadfast commitment to environmental responsibility.

Effectively managing waste oil is crucial in industrial operations, and PETRO has seamlessly integrated purpose-built tanks designed to handle this by-product with precision and efficiency.

PETRO's dedication to user-friendly solutions is evident in the design of the control modules.

These dispensing points allow for rapid and precise distribution of lubricants, catering to the demands of heavy machinery in a mining setting.

The systems capability ensures quick and effective lubrication dispensing, contributing to extended equipment life and reduced maintenance requirements.

Such precision in dispensing is paramount in the mining industry, where equipment operates under extreme conditions and demands optimal performance.

PETRO Industrial has not only set a new standard for bulk fuel and lubrication farms but has also demonstrated versatility in addressing unique challenges.

The company has successfully undertaken multiple custom-designed lubrication management systems at the McArthur River Mine, showcasing a depth of engineering expertise.

These bespoke solutions are tailored to the specific needs of the mine, ensuring that the lubrication infrastructure aligns seamlessly with the operational requirements.

One of the hallmarks of PETRO Industrial's approach is its ability to offer end-to-end solutions.

The company not only designs and manufactures these sophisticated systems but also undertakes **onsite Commissioning**.

This turnkey approach ensures a seamless integration of the lubrication infrastructure into the existing operational framework of the McArthur River Mine.

It reflects PETRO's commitment to delivering not just products but complete solutions that add value to the client's operations.

The commitment to longevity extends beyond the initial installation, with PETRO Industrial's dedicated **Service department**. This department is equipped to provide

ongoing maintenance and support, extending the lifetime of the investment made by the McArthur River Mine.

The availability of onsite service further minimises downtime, ensuring that the lubrication systems consistently operate at peak efficiency.

A standout offering from PETRO Industrial is the **iPETRO Fluid Management Systems**, providing advanced monitoring and reporting capabilities.

These systems are installed to measure the quantities dispensed, offering real-time insights into stock levels and usage patterns from any location worldwide.

This data-driven approach empowers the mine's management with valuable information, facilitating informed decision-making and optimising inventory management.

In conclusion, PETRO Industrial's transformative impact on the McArthur River Mine is a testament to its commitment to innovation, efficiency, and sustainability.

The integration of cutting-edge technology, from the colossal bulk lubrication farm to the air-conditioned solar-powered control modules, demonstrates a holistic and forward-thinking approach.

As the mining industry continues to evolve, PETRO Industrial stands at the forefront, driving change and setting new benchmarks for fuel & lubrication management systems. **AMR**



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AI'S BIG IMPACT

ON AUTOMATION & EXPLORATION IN AUSTRALIAN MINING



While the use of Artificial Intelligence (AI) and Machine Learning has been relatively slow in being taken up by some sectors of the Australian mining industry, a leading local advocate for the technology believes it is about to be taken up in a significant way.

WA Data Science Innovation Hub director Alex Jenkins says there is growing interest in the benefits AI can provide, particularly in providing automation and exploration solutions.

"I think that we will see increasing uses of Artificial Intelligence driving automation within the mining industry, as we will see in other places," Mr Jenkins told the *Australian Mining Review*.

He said there are a number of economic drivers that will see mining companies continue to increase their adoption of AI into their automation operations.

"There is the potential to improve productivity and profitability and also safety," Mr Jenkins said.

"For many of these processes, if we can remove the human element then we can make these operations much safer.

"I have already seen that trend increasing over the last decade, particularly in terms of remote operations and those trends continue.

"What is exciting to me is the use of Artificial Intelligence to drive more holistic operations, or optimisation of mine site and processing plant operations.

"I think what has happened in the past is that we have had very discrete parts of a mining operation that have been automated.

"That might be haulage, for example, and we have not moved very far in terms of automated haulage.

"Now, what is interesting to me is how

this can be extended into the operation of a processing plant, so that we can optimise recovery and throughput, and create a global kind of optimisation of a mining operation."

Mr Jenkins says an example of how AI can improve operations is in its use to assess the impact of a delay caused by unplanned downtime on the haulage fleet and in turn the productivity of the downstream operations.

"AI may be able to assess how other operations in a mine need to be adjusted," he said.

"For our big iron ore miners and people with sophisticated supply chains, figuring out how to manage these operations holistically, using Artificial Intelligence I think, will drive significant outcomes."

Predictive Maintenance A Real Opportunity

Mr Jenkins says an area where the advantages of AI and Machine Learning are being used is in Predictive Maintenance.

"Predictive Maintenance allows us to obtain more uptime out of our assets, by only taking them offline for maintenance when required," he said.

"We are moving to what I would call just-in-time maintenance, which is probably the end goal there.

"I think there will also be big advantage through improved safety, by creating the ability to remove humans from potentially dangerous situations and the other big advantage, I think, is that we'll see productivity increases."

The prerequisites for including AI are a very solid set of data about existing operations.

"A lot of infrastructure has to be in place to ensure that the data related to operations is in place," Mr Jenkins said.

"Without data, Artificial Intelligence will be useless.

"So that's a key point that I would make, that without that underlying infrastructure and the technology to support it, the use of AI will be limited.

"In a way, it is better to introduce AI into an operating project as you will have the necessary data to make it worthwhile.

"I think in the future, with the increased uptake of AI and Machine Learning, we will see mine sites being run completely autonomously, but that is likely to still be decades off."

Exploration A Huge Area of Opportunity

Mr Jenkins says the use of AI in the exploration space is a real area of opportunity for local miners which will be worth billions and billions of dollars.

"For Australia, in particular, if we can develop new ways to approach exploration, there is significant upside here because it will help us find new assets and new resources," he said.

"A lot of the techniques behind AI can be applied to examining statistics and geology in general to help us identify new assets.

"The resources that we are looking for now are more marginal than they used to be, deeper underground, harder to detect, you know, we have to use significantly more effort to find them."

He pointed to the use of AI and Machine Learning in a recent "Gawler Challenge" prize winning entry.

The entry highlighted the use of people utilising Machine Learning and other techniques related to Artificial Intelligence to help bring together different data sources.

A data-driven methodology proposed sys-

tematically tested the relative importance of a large number of geological factors on known deposits.

The approach integrated a mineral systems approach that emphasised and analysed the processes operative in the passage of ore fluids and metals to their eventual deposition sites.

The entry identified essential ingredients in the different crustal levels of the theoretical mineral system as 100 mappable criteria in the exploration data.

These criteria were input into the machine learning algorithm and were used to make predictions about the less known areas.

Additionally, an analogue-driven methodology to test geological processes (geo-mechanical modelling) was applied that simulates rock failure and ore fluid flow at potential metal trap sites in the upper crust to hone district-scale targeting further.

"I think that this is definitely the future of mining exploration where we combine data from different sources to help us identify regions and drill drilling targets, expression," Mr Jenkins said.

"Ultimately, these techniques are not a replacement for direct observation and drilling, like we do now, but what is interesting is what more we can infer about what is happening under the ground if we combine geochemistry, geophysical aerial survey, magnetic survey, and other detection techniques, in a kind of holistic way."

The AI future is definitely an exciting one with its potential to help identify new resources and then improve their production. **AMR**

NB: The WA Data Science Innovation Hub is a Western Australian Government initiative, and supported by Curtin University, which aims to ensure the State remains at the forefront of the digital revolution by increasing the uptake, education, training and awareness of data science in WA.

THE RAPID GROWTH OF THE MARDIE SALT AND POTASH PROJECT

(Image source: BCI Minerals) Jetty where SOP and salt is exported from.

By Ashleigh Dorrell

In April 2023, the *Australian Mining Review* spoke with BCI Minerals (ASX:BCI) managing director David Boshoff about the rapid growth and success of its Mardie salt and potash project on the West Pilbara coast in WA.

This month, we will look at the progress undertaken since then and what other developments are in the pipeline for the company.

Mardie Salt and Potash Project

100% owned by Mardie Minerals, a wholly owned subsidiary of BCI, the Mardie salt and potash project represents a rare and sustainable opportunity to develop a large-scale, multi-generational solar evaporation operation on the Pilbara coast.

Mardie has all the critical characteristics for establishing a large-scale solar evaporation operation, including optimum climate conditions, a large area, minimal environmental and heritage sensitivities and a coastal location for low-cost shipping.

The project is slated to become a tier one solar evaporative project that will supply high-purity salt and sulphate of potash (SOP) for generations.

Mr Boshoff spoke about the history of Mardie and its future operations.

"When complete, Mardie will be the first major salt project developed in Australia in two decades, as well as the only Australian operation to produce commercially saleable salt and SOP," he said.

"Salt is one of the most widely used substances on earth, and SOP is a crucial fertiliser containing essential macronutrients for plant growth, aligning the project with growing demand in the chemical and agricultural sectors, as well as the global demand for greater food security."

Production

Mardie was designed to produce around 5mtpa of high purity salt and 120-140ktpa

of SOP with the first shipment of salt expected in the next few years.

"We are scheduled to have our first salt on ship in mid-2026 and this timeline will signal the completion of a large part of the initial construction project." Mr Boshoff said.

"The first SOP on ship is expected 12-18 months later, and there will still be some construction works aligned with that milestone."

At Mardie, an unlimited seawater resource will be concentrated through solar and wind evaporation to produce 5.35mtpa of high purity sodium chloride salt and 140ktpa of sulphate of potash fertiliser over an operating life of at least 60 years.

The project comprises of nine large evaporation ponds, salt and kainite-type mixed salts (KTMS) crystallisers, a salt wash plant, port facilities and a SOP plant.

Seawater is pumped from the ocean into the first evaporation pond before it is progressively concentrated via sun and wind evaporation energy over an 18-month period throughout the nine evaporation ponds.

When it reaches sodium chloride saturation point in the ninth pond, concentrated brine is transferred to the salt crystallisers where salt precipitates in solid form.

The remaining liquid is drained and the raw salt is harvested and purified in a two-stage counter-current wash plant to produce 5.35mtpa salt with sodium chloride content of more than 99.5%.

What sets Mardie apart from WA's existing salt producers is that it will also produce SOP as a by-product. The brine liquid is then pumped to the SOP crystallisers where KTMS forms with around 1.1mtpa of KTMS harvested and converted to 140ktpa of granular SOP product.

Final salt and SOP products will then be exported from a purpose-built port facility at Mardie with salt to be conveyed at a rate of 3ktpa.

Construction

Construction of Mardie began at the beginning of last year, with many major construction milestones achieved since then. As of June 30, 2023, BCI had a total capital expenditure of \$369m which was spent on the primary seawater intake station, the accommodation village, ponds one to four, the North-West Coastal Highway Intersection and North South Road.

While this work has been completed, Mr Boshoff said there's still more that needs to be done.

"We still have significant construction works to complete, including the completion of the marine package, ponds and wash plants," he said.

"These works will continue as we start the process of growing salt in the completed ponds.

"As it takes about 18 to 24 months, depending on climatic conditions, to grow the salt to the quality levels required, we need to start this process as soon as possible to meet the strong demand we have for our product.

"As a result, we will be running our construction project and operations in parallel."

To date, BCI has received credit approvals from all key debt providers for the full \$981m of project finance needed for Mardie, while Export Development Canada has approved a \$150m project finance facility.

Additionally, two leading commercial banks have increased their credit approvals to a combined \$181m.

These approvals are in addition to a \$490m 15-year facility from Northern Australian

Infrastructure Fund and a \$160m 11-year facility from Export Finance Australia.

Future Work

Due to the Pilbara's proximity to Asia, Mr Boshoff says demand for product from Mardie is prominent from that country.

"The demand for the product is strong, particularly in Asia, which has BCI well placed, and as previously mentioned, we expect to be exporting salt by mid-2026," he said.

"Our focus is very much on salt and potash in the short to medium term, and we believe the Mardie project will become a tier one operation to meet known and future demand.

"We also expect this project will become a strong contributor to the Pilbara, Western Australian and Australian economies through its exports and employment/contract opportunities for decades to come."

BCI has already executed an offtake term sheet with one of Japan's largest trading and investment companies — Itochu Corporation.

Under the term sheet, Itochu is expected to purchase 500kt of salt in years one and two, 600kt in year three and 1mt in years four and five.

Subject to the executive of a formal offtake agreement, BCI intends to appoint Itochu as its preferred trading partner for Japan, Korea and Taiwan.

In FY24, BCI will focus on key areas of project development, including building mutually beneficial relationships with key offtake customers and completing the full funding package for project construction.

BCI will also look at implementing an updated economic performance objective.

AMR



Image source: BCI Minerals)
Managing director David Boshoff.



THE WORLD'S MOST DURABLE CONCRETE

...CONTINUED FROM FRONT COVER

"Cementaid Everdure Caltite System Hydrophobic Pore-blocking Ingredient (HPI) delivers time-proven effective protection against all of the 11 mechanisms of corrosion in reinforced concrete, including at the locations of cracks," **Anton Aldred, Director – Technical Service** said.

The Cementaid international group of companies, established in Perth in 1946, is a world leader in concrete corrosion-proofing solutions. In the mining industry, Cementaid's "Everdure CALTITE System, Hydrophobic Pore-blocking Ingredient (HPI)", sets the Gold Standard for concrete durability and long-term maintenance-free performance under aggressive or extremely severe service conditions.

Globally recognised and backed by independent research, the Everdure Caltite System has garnered acclaim from industry leaders worldwide. Without peer in severely corrosive environments, Everdure Caltite concrete boasts an unparalleled corrosion-free track record over real time, enduring 61+ years without significant deterioration despite prolonged extreme chloride and sulphate exposure, including at high temperatures — a true testament to its long-term durability and unrivalled sustainability.

Unlike past methods relying on membranes, coatings, or galvanised steel, Cementaid's approach creates an actively water-repelling, inherently dry interior concrete matrix, safeguarding assets throughout the concrete thickness.

But how is this achieved?

- Producing a Hydrophobic Matrix throughout the entire concrete section thickness, profoundly reducing water

and salt or acid ingress by capillary absorption or under wet/dry cycling.

- Reducing Permeable Pores – Caltite achieves up to a 30% or greater reduction in Volume of Permeable Voids (VPV), a profound reduction in water and salt/acid penetrability.
- Physical pre-blocking polymers deposited within the hydrophobic capillary tracts, profoundly restrict water and salt/acid ingress by both capillary absorption and hydrostatic pressure.
- Enhancing Bond Strength – A remarkable 28% improvement in bond strength to steel reinforcement ensures added resilience.
- Built-in Waterproofing, that cannot be damaged in-service; With a massive reduction in water uptake of up to 92.4%, Caltite ensures comprehensive integral waterproofing of concrete structures, without the requirement for membranes and tanking, saving significant material and construction time costs.
- Profoundly reduced chloride penetrability under wet/dry cycling saline washing-down water or inter-tidal and splash zones.
- Immunity to Corrosion at Cracks – At the location of a crack, the hydrophobic matrix prevents absorption and distribution of water and contained salts or acids through the crack wall or into the surrounding concrete. This restricts formation of corrosion-cells while keeping reinforcement and cement matrix dry and protected against corrosion.
- By eliminating the ingress of water and contained salts or acids, Caltite Concrete vastly prolongs maintenance-free service life, maintains asset profitability and value, and minimises environmental impact from unscheduled construction activities, maintenance and or replacement works.

CTI Consultants for Roads & Traffic Authority of New South Wales (Aust).

"The (Caltite) pore-blocking hydrophobic additive performed very well, especially at the deeper intervals where chloride reductions in excess of 97% were recorded. These results are better than those for the organo-silanes, probably due to the presence of the hydrophobic additive throughout the concrete, rather than only in the outer layer as is the case for the post-applied sealers."

SA WATER

"(EVERDURE CALTITE) can be of enormous benefit in sustaining and prolonging the life of a concrete structure."

Hardman Chemicals P/L, Australia

"Our EVERDURE CALTITE Joint-free acid proof floor is now 19 years old in constant use - which compares extremely well with the life of our ordinary (concrete) earliest floors...that were destroyed in less than 9 months each".

Coal Products Limited (UK)

"I can advise that your EVERDURE CALTITE SYSTEM concrete is still in a satisfactory condition... I would most certainly use Caltite again as it has performed up to all expectations and been a most cost-effective solution to the problem."



Sustaining concrete durability against corrosion from Hyper-Saline wash down water at Fimiston Gold Mine Processing Plant. Photo: Northern Star Resources.



Carrapateena SA

Protecting Mardie Jetty against chloride-induced corrosion in harsh marine environment. Photo: BCI Minerals

Real-world Applications

Utah Point Berth:

The Port Hedland Port Authority sought a concrete solution for their expansive jetty. Cementaid supplied 5500m³ of Caltite concrete, protecting the structure against cracking, wetting-drying cycles, and corrosion.

Fimiston Gold Mine:

Cementaid's Caltite admixture was chosen for the KCGM Fimiston Open Pit Mine, ensuring reinforced concrete durability amidst aggressive fluids in the washdown area.

Onslow Boat Ramp:

Advisian recommended Caltite for concrete in tidal zones, to deliver a design life of over 50 years, outperforming conventional additives against moisture and chloride ingress.

Kalium Lakes – Beyondie:

Catering to high brine levels, Cementaid's Caltite created self-desiccating, ultra-low penetrability concrete, surpassing conventional types in resistance to chlorides and sulphates.

Carrapateena:

Everdure Caltite, meeting stringent absorption limits, was the sole solution capable of withstanding extreme chloride and sulphate levels in ore washing at Carrapateena mine.

Cementaid's Everdure Caltite System stands as a beacon of Australian technological innovation, revolutionising concrete durability in mining and setting the Gold Standard for resilience and sustainability in the face of harsh conditions. **AMR**

For more information, visit www.cementaid.com



LEARN MORE

EVERDURE CALTITE HPI SYSTEM

you can **RELY** on

CEMENTAID

The Way to Better Concrete

Protection against corrosion in West Musgrave Processing Plant. Photo: BHP



Photo: BHP



Photo: BCI Minerals

Consultants and manufacturers of concrete control compounds; specified and used by industry leaders worldwide to maximise durability, profitability and sustainability of concrete infrastructure. Everdure CALTITE (HPI) is time-proven over 61 years delivering extended design-life and maintenance-free performance under severe salt, sulphate, acid and other corrosive environments.

Key Specification Areas For HPI Use:

- Processing • Crushing • Marine Infrastructure, Jetties, Wharfs and ship lifts
- Sag Mills • Launch Facilities • Chemical Storage • Refineries • Treatment
- Separation Facilities • Primary Leaching • Tailings and Storage Dams
- Berths and Weir Infrastructure • Water Tanks • Concrete Subject to Tidal Zones
- Concrete Subject to wetting and drying cycles • Footings • Foundations
- Concrete Storage Bunds • Wash Down Bays • Tunnel Walls • Maintenance Bays
- Culverts • Revetment Walls • Desalination Plants • Hardstands • Shotcrete

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Dynamic test

Test bench configuration :

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- 4 rolls Ø350 :
- Constant hydraulic tension with compensation of the belt elongation
- Speed 5.23 m/s
- 24-hour operation

Splices :

SUPER-SCREW® Evolution

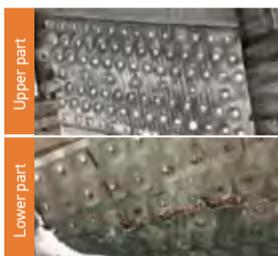
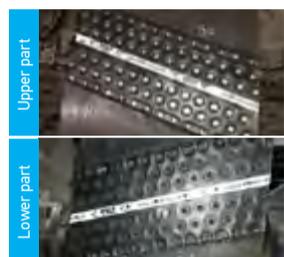
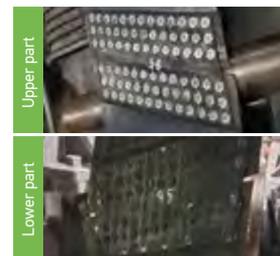
Model : 80
Installation 1/3
Conveyor belt : BW 300 mm 800/3 6+2 LG

SUPER-SCREW® Original

Model : 80
Installation 1/3
Conveyor belt : BW 300 mm 800/3 6+2 LG

Counterfeit copy

Model : 80
Installation 1/3
Conveyor belt : 800/3 6+2 LG



Lower part of the splice ripped in the central axis



MLT BRINGING MORE THAN 70 YEARS OF INNOVATION TO YOUR OPERATION



Conveyor belt splicing specialist MLT is constantly looking to build on its business offering which includes the manufacture of technical belts and equipment for conveyors and the support of its industry leading Super-Screw® offering.

As a leader in its field, MLT has constantly pushed the boundaries of innovation and excellence.

Through a number of success stories, the company has highlighted its commitment to quality and the value it brings to its customers.

These success stories have included its work in the Australian mining sector, with the company supporting a range of operations in different locations.

Part of its local history since 2008 includes MLT Belt Fasteners in Australia which came under the full control of MLT Group and became MLT Asia Pacific in 2015.

Technology and reliability with original Super-Screw® products at the forefront

Technology and the reliability of its service has always been at the forefront of MLT's successful operations.

A recent point of emphasis has been highlighting the importance of using original Super-Screw® Products compared to the risk of using copies.

The Super-Screw splice has proven its worth around the world since it was created by MLT nearly 30 years ago. Many users have highlighted their satisfaction with the product, their loyalty and the gain in productivity they have achieved as a result of utilising it.

Sadly, for a period of time now, some players in the industry have been commercialising copies of MLT's Super-Screw® 1st generation splice, even though this is still under patent protection.

Significantly, it is only MLT's expertise and nearly 30 years of experience that mean that it is able to fully master its technical skills and provide clients with a quality, high-performance, safe and reliable product.

As a confirmation of the product's superiority, MLT has recently published the results of dynamic endurance tests with the results speaking for themselves.

MLT has also introduced numbered "certificate of authenticity" in all Super-Screw® splice packages. The purpose of this document is to assure that you have acquired the genuine product made 100% in France, but above all the experience and expertise of the MLT Group. Importantly, this will protect users from the risk of using copies instead of the original and protecting their investment, installations and their people. **AMR**

SUPER-SCREW® PREMIUM

The only flexible screw splice in
POLYURETHANE

In order to meet the most extreme environments and the most demanding requirements, **MLT** created the **SUPER-SCREW® PREMIUM** : the first flexible splice to screw in **POLYURETHANE**, designed for extremely abrasive applications*.

The polyurethane that composes the upper part of this new **SUPER-SCREW®** splice provides a considerable gain in abrasion resistance (15 mm³), while maintaining the flexibility, perfect integration and strength of **SUPER-SCREW®**.

Applications



Cement plants



Quarries and surface mines



Heavy industries

VERY HIGH ABRASION RESISTANCE (15 mm³)

THE ADVANTAGES

- Very high abrasion resistance (15 mm³)
- Polyurethane: reduced friction
- Permanent solution
- Reduces downtime of your conveyor
- Optimizes your productivity
- Easy and quick to install (1 to 2 persons)
- Self installation, low cost investment
- Leak proof and flexible
- Compatible with small pulley diameter
- Compatible with conveyor scrapers

**EVEN FASTER
EASY SCREW SOLUTION**



NEW

In order to optimize screwing time of the **SUPER-SCREW® PREMIUM** splice, **MLT** created **Easy Screw Solution**. This system of screws pre-positioning will allow you to save even more time in your belt splicing.

Types of steel for screws and inserts available

Steel screws and inserts

High resistance, it's the perfect choice for most applications :
Quarries, Cement Plants, Mines, etc.



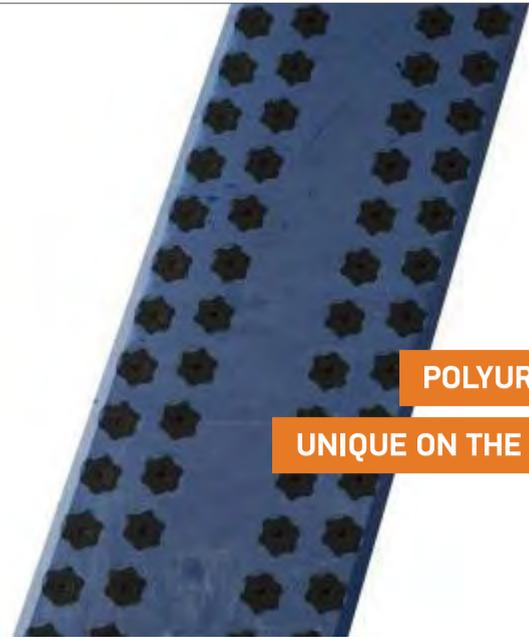
*Only compatible with applications with anti-abrasive and oil-resistance requirements



MLT Asia Pacific

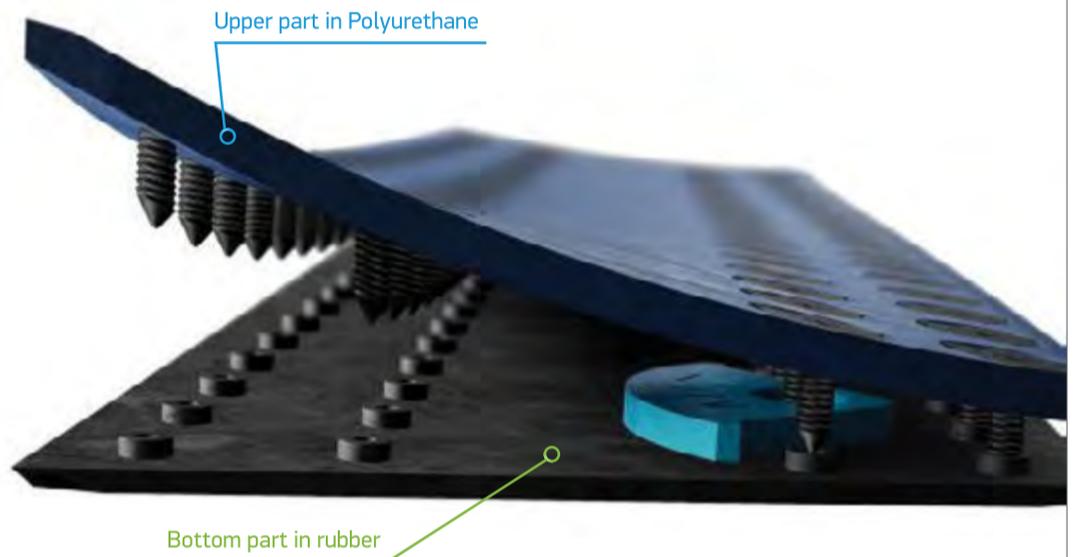
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POLYURETHANE

UNIQUE ON THE MARKET



Upper part in Polyurethane

Bottom part in rubber

Technical data

Belt thickness before skiving		mm	6+2	6+3	8+3	10+3				
		inch	1/4" + 1/16"	1/4" + 1/8"	5/16" + 1/8"	3/8" + 1/8"				
Skiving blades (mm)			6.5	2.5	6.5	3.5	8.5	3.5	10.5	3.5
Type*	Type of belt	Belt tension N/mm	Operating tension PIW	Min pulley Ø, mm	Screw dimensions					
65 - 6mm	630/2 630/3	630	360	200	5x14 - 5x16					
	630/4				5x16 - 5x18					
65 - 8mm	630/2 630/3	800	450	250	5x16 - 5x18					
	630/4				5x18 - 5x20					
85 - 8mm	800/2 800/3	1000	570	300	5x18 - 5x20					
	800/4				5x20 - 5x22					
85 - 10mm	800/2 800/3	1000	570	300	5x18 - 5x20					
	630/4				5x20 - 5x22					
105 - 8mm	1000/3 1000/4	1000	570	300	5x18 - 5x20					
	1000/5 1000/6				5x20 - 5x22					
105 - 10mm	1000/3 1000/4	1000	570	350	5x20 - 5x22					
	1000/5 1000/6				5x20 - 5x22					

Spacers: One size spacer

*Our splicing solutions have been engineered for normal applications. For tough and abrasive environments, we encourage you to select an upper Super-Screw® size (please check specifications before)

	65 - 6mm	65 - 8mm	85 - 8mm	85 - 10mm	105 - 8mm	105 - 10mm
Hardness, shA	75	85	75	85	75	85
Top Cover Thickness, mm (± 1 mm)	6	8	8	10	8	10
Bottom Cover Thickness, mm (± 1 mm)	3					
Top Cover Thickness, (inch)	1/4	5/16	5/16	3/8	5/16	3/8
Bottom Cover Thickness, (inch)	1/8					
Width of SUPER-SCREW®, mm (inch)	116 (4 9/16)			160 (6 5/16)		
Width to be skived on trailing edge, mm (inch)	58 (2 5/16)			80 (3 1/8)		
Width to be skived on leading edge, mm (inch)	58 (2 5/16)			80 (3 1/8)		
Screw Diameter, mm	5					
Number of screws required for 1 m	184			276		
Number of spacers required for 1 m	4					
Number of PZ2 Bits required for 1m	1					

Packaging

ROLL packaging	65 - 105					
Length of SUPER-SCREW®	3 m roll					
Installation tools / Spacers / PZ bits / Screws / Easy Screw Solution	Included					
KIT packaging	65 - 105					
Belt width, mm (inch)	650 (25 1/2)	800 (31 1/2)	1000 (39 1/4)	1200 (48)	1400 (55)	1600 (63)
Length of SUPER-SCREW®, mm (inch)	675 (26 1/2)	832 (31 3/4)	1057 (41 1/2)	1260 (49 1/2)	1462 (57 1/2)	1665 (65 1/2)
Screws / Installation tools / Spacers / PZ bit	Included					



MANUFACTURING WITH PRECISION

IT'S HAPPENING! AMW2024 IS ON AT SYDNEY'S ICC DARLING HARBOUR 17-19 APRIL, 2024!

Australia's premier manufacturing technology trade show, AMW2024 in Sydney, is promising to be a dynamic and innovative event that brings together professionals, companies and experts from many industries related to manufacturing, engineering and technology. It is AMTIL's aim for Australian Manufacturing Week to be more than just an exhibition. This is the centrepiece of a week-long celebration of manufacturing in Australia today.

"On the back of the overwhelming success of AMW2022 in Sydney, we have returned to the ICC at Darling Harbour for April 2024 and are excited to be delivering another strong show," said Shane Infanti CEO of AMTIL, organisers of Australian Manufacturing Week. "We are very pleased to have the support of the NSW Government as the Major Sponsor for AMW. Government support is important in delivering the message to our industry that manufacturing is important and that the support mechanisms are there to assist."

Australian Manufacturing Week will take place at the International Convention Centre, Darling Harbour, Sydney.

The stats from our Melbourne show at the MCEC showed conclusively the appetite for large-scale manufacturing exhibitions is healthy for all levels of the economy. The numbers from the Melbourne AMW2023 show are something we are particularly proud of, with 15,914 attendees coming to see 348 exhibitors in the biggest exhibition space in Australia. And AMW2024 Sydney would strive to deliver the same if not better. As we saw in 2022, the ICC Darling Harbour in Sydney is also up to the task.

"We will again be running the Future Solutions Speaker Program on the floor of the show. Themed towards Opportunities and Managing Change, the Speaker Program is once again free to visitors to attend,"

added Kim Banks, AMTIL's Head of Events. "Our plans for AMW include expansion of our Welding & Air Technology Zone and Robotics & Automation Zone. This will round out the event in representing the manufacturing technology sectors in Australia."

There will be Seven distinct Zones at AMW2024, each showcasing the highlights of the different active sectors in Australian manufacturing industry.

The **AUSTECH Machine Tool Zone**, specifically targeted at the metalworking, machine tool and ancillary market. AUSTECH covers advanced manufacturing products and processes including CNC Machinery, Lathes, Mills; Contract Manufacturing/Precision Machining; Cutting Tools, Tooling and Tool Holding; Forming and Fabricating Machines; Plasma, Laser, Waterjet and Ultrasonic Machines; Ancillary equipment suppliers.

The **Additive Manufacturing Zone** will showcase the most advanced technologies within this sector. The various techniques within Additive Manufacturing include Stereolithography, Selective Laser Sintering, Material Extrusion, Sheet lamination, Binder jetting, Cold Spray processing, Material jetting, directed-energy-deposition, powder-bed fusion, VAT photo-polymerisation and wire arc manufacturing (WAAM).

The **Australian Manufacturers Pavilion** showcases the capabilities of Australia's precision engineering and advanced manufacturing industry. The Australian Manufacturers Pavilion is where AMW celebrates the very best in Australian manufacturing, providing a showcase for some of this country's most accomplished component manufacturers, precision engineering firms, toolmakers, advanced manufacturers, and general engineering companies.

The **Manufacturing Solutions Zone** at AMW2024 offers optimised solutions to the most common challenges experienced by manufacturers. From materials handling and warehousing to integrated manufacturing and safety solutions. The Manufacturing Solutions Zone is where you can find answers, incorporating everything from equipment for materials handling and logistics, and safety products, through to the latest software for streamlining manufacturing operations, and specialist service providers in areas such as law, finance, skills, training, and recruitment.

The **Robotics and Automation Zone** at AMW2024 will feature the latest state-of-the-art equipment and processes for the optimisation of manufacturing operations. Robots are practical technologies, with artificially intelligent software brains, created and designed by engineers to refine, manufacture, and move Australian manufacturing ahead. The robot realities of today are liberating human workers from an ever-growing array of repetitive

and dangerous tasks. There will be Industrial robotics, Robots, Automated Solutions, Instrumentation Control Systems, Measurement, Pneumatics, IOT Solutions, Industry 4.0 and Digitalisation.

The **Weld & Air Solutions Zone** will highlight advanced welding processes and provide high-quality interactive experiences that demonstrate developments and applications in the welding sector. Welding is critical in metal fabrication and manufacturing today. In fact, it is used in creating more than half of all the products manufactured in Australia.

The **Plastics Technology Zone** is your hands-on opportunity to see and feel the latest in plastics machinery, mould-making technologies, recycling materials, and the many plastics manufacturing processes. Plastic technology is a specialised branch of study which includes the study of diverse types of chemicals that exhibits plasticity. It also involves the study of several methods in which plastics can be utilised for use in human life. **AMR**



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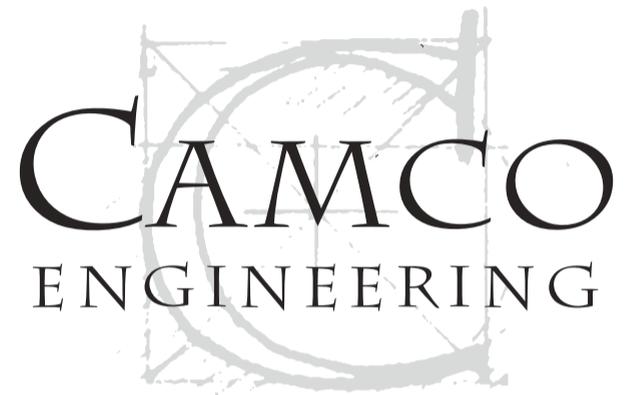
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CAMCO PILBARA FACILITY LOOMS LARGE



Camco Engineering (Camco) has added significant mechanical engineering capacity to the Pilbara region. The new heavy industrial workshop, based in Karratha is now operational.

The new workshop comprises of 2,500 sqm workshop space with additional significant external hard stand. 90 Tonnes tandem lift capacity craneage with 10m clearance under the hook allows for handling large scopes of work. Core engineering capabilities includes precision CNC machining, fabrication and specialised welding, mechanical fitting and blast and paint facilities.

Camco operations across Western Australia employ a workforce of over 450 persons engaged in Mining, Energy and Defence industries. The Karratha facility is fully supported by our group operations and brings with it the service standards our clients expect and demand.

The facility is targeting a permanent, full-time workforce of residential employees. Camco continues to demonstrate its commitment to the community through local supplier engagement and employing and developing local tradespeople. Camco also offer exceptional training, upskilling and learning opportunities for apprentices.

The inclusion of a sophisticated apprentice program in our Karratha facility will contribute to the company's investment

in the Pilbara. Camco has a track record of producing award winning apprentices, who are dedicated, motivated and skilled. In almost all instances Camco apprentices qualify to tradespersons with a best-in-class skillset.

Camco remains dedicated to its Indigenous Engagement programme and is currently positioned at the Innovate RAP stage. Indigenous employees represent three percent of Camco's workforce with high rates of retention. Camco also provides engagement opportunities for indigenous suppliers of goods and services.

The Camco Pilbara workshop provides capable, high quality, timely solutions in the region

our customers operate, which also provides the opportunity to reduce the carbon footprint associated with transporting equipment to Perth.

Corrosion Resistant Alloy Welding

Camco is well known for its specialised fabrication and welding capability. In addition to its ability to provide fatigue purpose welding solutions, Camco also operates a fully segregated specialised welding facility at its Belmont premises in Perth. The facility allows for the manufacture of high quality welded products in a range of corrosion resistant alloys, including Martensitic and Austenitic stainless steel, Inconel, Super Duplex and CuNi.

Camco Engineering, the supplier of choice for innovative time critical engineering solutions.





#camcocareer
#thewaywework
#camcokarratha

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 manufac-

tures 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**



Prefabricated and manufactured entirely on-site, Northern Transportables products are delivered Australia-wide with its own freight fleet.



Mine site accommodation and offices, delivered and installed are a speciality.



☎ (08) 8995 6500

🌐 www.northerntransportables.com.au

✉ enquiries@northerntransportables.com



GET THE RIGHT TRANSPORTABLE THE FIRST TIME



Northern Transportables specialise in the design, manufacture, delivery and installation of turn-key transportable modular building solutions.

Transportable buildings are a fast & cost-effective solution available for both sales and hire, our buildings are completely customisable, cyclone rated and built to code.

We operate under a certified Integrated Management System, ensuring you **GET THE RIGHT TRANSPORTABLE THE FIRST TIME.**

Whether your business is in mining and civil, oil & gas, government or private enterprise, our professional team will make it happen.

Our team of professionals provide:

- Commercial accommodation, bunkhouses and site huts
- Mining camps
- Education and recreation facilities
- Offices, control rooms and site facilities
- Commercial kitchen facilities, lunch rooms and cribs
- Toilets, ablutions and laundries
- Health care and first aid facilities
- Domestic housing and granny flats
- Emergency housing solutions



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**



EX-MINER DOMINATES HOTSHOT INDUSTRY FOR WA MINING, OIL & GAS

Harmon Transportation was founded with a simple yet ambitious goal: to provide reliable and efficient transportation services to the Australian mining industry. As a former miner himself, founder Paul Harmon understood the importance of timely and dependable deliveries in keeping mining operations running smoothly. With this vision in mind, Paul set out to establish a company that would deliver on its promises, and, through sheer determination and a commitment to excellence, he has built a thriving business that has become the go-to provider for hotshot transportation services in WA's mining industry.

Available any time of the day or night, 365 days a year, Harmon Transportation keeps your mine operating.

With its expanding fleet ranging from 1 tonne to 24 tonne loads – operations won't be hampered while you're waiting for a part. For interstate and urgent deliveries, Harmon Transportation can also provide air freight hotshots. At the heart of Harmon Transportation's success is a simple strategy: do what you say you will do. This means understanding the needs of the mining industry and being aware of the urgency and cost of downtime. To ensure timely deliveries, the company uses only its own fleet of vehicles, which are wrapped in bright yellow with the company logo. Harmon Transportation Chief executive Paul Harmon describes the company's vehicles as "beacons of light."

"When our clients see our bright yellow

vehicles, they know they can count on us to deliver on our promises," he said. "We take pride in our vehicles being reliable and recognisable, and they serve as a symbol of our commitment to providing exceptional service to our clients." In addition to providing leading transportation services, Harmon Transportation is committed to giving back to the community which has supported them.

Led by Paul and his team, the company donates a percentage to The Pantry, a not-for-profit organisation that provides food and other essentials to those in need. Harmon Transportation also supports local Aboriginal communities and schools by providing essential items.

This dedication to community support

is an outworking of the company's values of reliability, urgency and social responsibility. Harmon Transportation's remarkable success story is a testament to the hard work and determination of this family business. With a deep understanding of the mining industry and its needs, Paul Harmon has built a company that not only provides reliable and efficient transportation services but also gives back to the community. Within a short period of time, the company has grown its fleet substantially and now services a large number of clients throughout WA and Australia. As the mining industry continues to grow, companies like Harmon Transportation will be essential in ensuring smooth operations and reducing costly downtime.

AMR



birdon
make it happen

Since its establishment in 1977 in Port Macquarie NSW, Birdon has been a pioneering force, delivering engineered dredging solutions for decades.

Renowned for setting unparalleled standards in quality, reliability and compliance, Birdon has made a significant impact across diverse sectors, serving multinational defence, government bodies, maritime enterprises, and the energy and resources industries.

As a privately owned business run across two generations with 40 years of experience, Birdon was originally founded as a dredging contractor and for nearly five decades has developed the knowledge, capability and experience to design, modify,

operate and maintain its extensive fleet of dredging equipment.

With a global reach spanning across Australia, the USA, the UK, Europe and Asia, Birdon stands at the forefront of complex dredging operations, and thanks to its extensive experience, has secured high profile contracts over the years to deliver projects on a global scale.

Birdon's success lies with its in-house engineering and passion for innovation, ensuring all works are delivered effectively to requirement and with safety in mind.

In the dynamic energy and resources sector, Birdon has emerged as a leader in dredging innovation, seamlessly

executing substantial projects for various oil, gas, mining, and exploration companies. As a self-reliant and forward-thinking subcontractor, Birdon excels in anticipating needs, working within timelines, meeting precise specifications and making it safe.

Birdon has also established a network of ten vessel maintenance locations in Australia and four bases in the US. These strategic expansions have further solidified Birdon's global presence, enhancing its capacity to deliver exceptional services across continents.

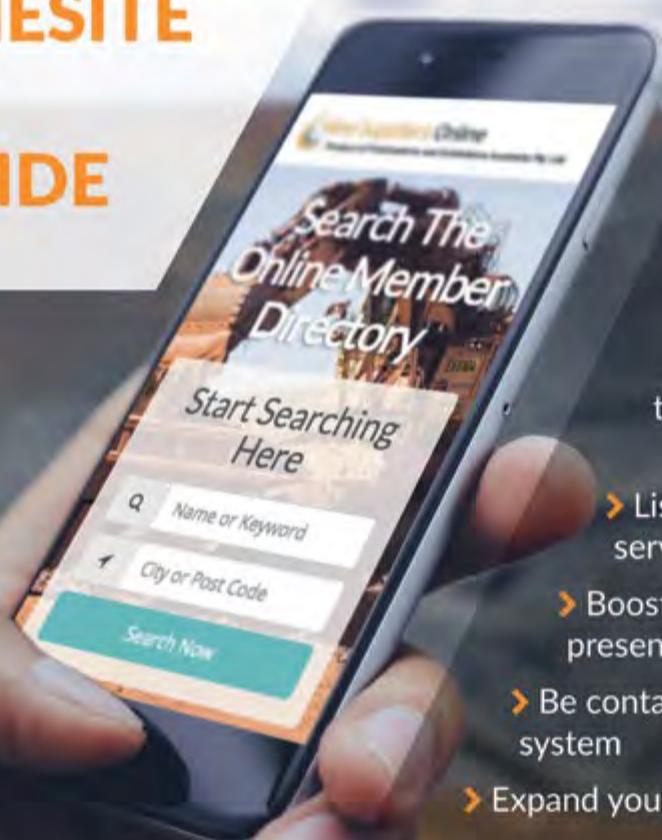
Birdon maintains an enviable reputation as an efficient, agile and highly responsive contractor, achieved through strict

adherence to quality, safety, environmental standards and a commitment to working closely with clients on expectations, schedule and cost. Birdon specialists understand the risks associated with complex energy and resources projects, and operates in accordance with its Integrated Management System, ensuring consistent provision of key benefits for its clients.

Committed to quality and dedicated to building long term partnerships, Birdon's clients can be confident that it will deliver a safe, engineered and well planned quality solution. **AMR**

More info:
www.birdon.com.au

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ARCTIC HEAT PRODUCTS

Ice Vests WA is an Australian owned and operated local business with focus on delivering an innovated line of Arctic Heat products. Our products are versatile, which means they can be used cooled and heated.

Arctic Heat products are lightweight, not bulky and easy to use. They are manufactured from scientifically tested materials, wicking polyester fabrics and pockets of gel, which have been specially designed to retain temperature for extended periods of time.

Medical organisations are sourcing our products to reduce the effect of heat related illnesses common with conditions such as Multiple Sclerosis, Epilepsy and those impacted by Spinal Injuries. We also supply many individuals with our Chemo Cap Kits for hair retention during Chemotherapy treatment.

Industrial organisations use our products as an effective and convenient method of protecting employees health by preventing heat stress as well as improving productivity in the workplace.

Leading sporting organisations use Arctic Heat products to gain a competitive advantage by controlling body temperature, resulting in sustained levels of high performance and faster recovery.

The Arctic Heat range of products are suitable for everybody in any general daily activities and events. These products are so versatile that there is no limit to their use. Whenever overheating is a problem whether that be in the garden, playing a round of social golf or tennis, treating an injury or just trying to keep your sick child or pet cool. There is an Arctic Heat product that will assist.

The Cooling Vest

Designed especially for body cooling. The vest works by mimicking the body's natural cooling process of keeping the skin cool and dry.

- Testing conducted by the CSRIO has proven the effectiveness of the vest in all applications, reducing skin temperature by up to 17 degrees Celsius.
- Maintains a stable core temperature.
- Delays the onset of dehydration by conserving fluid that would normally be lost through sweating.
- Lower cardiac output towards the skin which allows more blood to be sent back to the muscles, resulting in a prolonged high level of performance and more efficient recovery.

Other Cooling & Heating Products

After years of research Arctic Heat have developed ancillary products that are best used in conjunction with the cooling vest. Such as our ties, neck wraps and cooling caps.

We also have an extensive range of hot/cold wraps designed specifically for injury and rehabilitation.

- Neck ties
- Neck wraps
- Cooling Caps
- Cooling Blankets (Half & Full size)



- Hot/Cold Wraps (back, shoulder, wrist, knee)

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THE COMPETITIVE ADVANTAGE

Our Arctic Heat products can be not only used to keep cool but to also keep warm.

Our products are used by Australian and international sporting teams, industrial organisations and the medical industry.

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- Neck ties and neck wraps
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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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- ✓ Extensive experience in civil works and construction projects

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RELY ON EXCELLENCE WITH EAGLEBURGMANN

EagleBurgmann are one of the leading providers of industrial sealing technology on the international stage.

Their products and comprehensive services are used wherever key requirements are reliability and safety.

EagleBurgmann's portfolio includes:

- Mechanical seals and seal supply systems
- Expansion joints

- Magnetic couplings, carbon floating ring seals and gaskets

Sealing technology from EagleBurgmann demonstrates every day exactly what reliability, safety and maximum cost-effectiveness really mean.

The company's success derives from its employees who contribute their commitment, ideas and expertise in every organisation as well as in every country.

It is widely known that equipment used within the mining industry or to process ore and other mineral resources has to withstand extreme conditions.

The sealing systems used on this equipment are exposed to abrasive and chemically aggressive media. In some applications, high temperature and pressure make conditions even more challenging, and despite the harsh operating environment, users expect high reliability to avoid costly downtime.

Extremely rugged EagleBurgmann slurry seals have a proven track record worldwide going back many years. The range of applications includes the production of aluminium oxide in Australia, extraction of oil sand in Canada and nickel mining in New Caledonia.

You too can save water and money! Using EagleBurgmann's expertise, you can very easily determine your water consumption

and costs, along with all likely savings. You will be amazed at the positive effect simply using EagleBurgmann will have on the cost-effectiveness of your facility.

Comprehensive seal service for industrial facilities

Production systems need to work safely, reliably and with maximum cost-effectiveness, so it is good to have access to an expert and efficient partner.

With TotalSealCare, EagleBurgmann offers customised service programs, and flexible service for seals and gaskets. The service portfolio extends from consulting and engineering, via a range of maintenance services through to individually-tailored service contracts – for both EagleBurgmann products and products from other manufacturers.

For more info visit:
www.eagleburgmann.com

AMR



RELY ON EXCELLENCE

More than 25,000 applications running with EagleBurgmann Diamond Face

DiamondFace is an innovative MicroCrystalline Diamond coating for mechanical seals.

It is characterized by extreme hardness, excellent wear resistance, maximum chemical resistance, excellent heat conductivity, superb resistance to electrochemical corrosion and minimum friction.

Diamond technology improves seal performance significantly

Maximum operating performance due to minimum wear extends the maintenance intervals.

Many applications demand maximum hardness.

DiamondFace mechanical seals are especially for:

- Poor lubrication
- Temporary dry running
- Multiphase media
- Abrasive media (suspensions)
- Electrochemical corrosion
- Contact mode



Innovation in Technology



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CRUSADER HOSE WOWS AT IMARC

Crusader Hose showcased their innovative layflat hose system to many participants at IMARC '23. The Crusader Layflat Hose System not only reduces the time and labour considerations of installing a pipeline up a high pit wall but reduces the safety risks as well. The reusable nature of the product aligned perfectly with IMARC's focus on innovation towards a sustainable future.



Crusader Hose at IMARC 2023.



High-pressure pumping up the high pit wall with Waterlord layflat hose.

The International Mining and Resources Conference & Expo (IMARC), Australia's largest and most influential mining event, was held in Sydney in November. Crusader Hose, the Australian leader in layflat hose and reel system production, saw IMARC as a great opportunity to showcase their innovative layflat hose system.

Imagine establishing a pipeline up a 150 m high pit wall without the need for anchoring, building supports or recruiting welding experts. Imagine replacing poly pipe with something flexible, less bulky, and easy to use.

Crusader Hose is an Australian manufacturer of layflat hose for over 38 years. Their state-of-the-art factory with weaving looms and extruders 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

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-pipe," 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 20mm thick pipe can only handle a burst pressure of 10 bar.

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

Secure couplings

Crusader Hose has worked closely with the mining industry to design the Boa coupling clamp that stays on at 100 bar pressure.

Flanged ends are securely attached using the three-section clamp. These are tightened using cap screws, making this method easy to refit 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 continuous lengths up to 500 m and diameters up to 300 mm. 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.

The 300 mm Waterlord layflat hose weighs 4 kg/metre. 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 small patrol.

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.

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



4km of layflat hose easily transported on a truck.

MAXIMISING EFFICIENCY AND LONGEVITY:

THE CASE FOR SPECIALIST AFTERMARKET EARTHMOVING PARTS SUPPLIERS



In the realm of earthmoving operations, the pursuit of efficiency and longevity is paramount. While Original Equipment Manufacturer (OEM) products have traditionally been the go-to option, a shift towards specialist aftermarket earthmoving parts suppliers is proving to be a shrewd move for operations of all sizes.

Quality That Stands the Test of Time

One of the prevailing misconceptions is that OEM products are inherently superior in terms of quality and longevity.

Specialised aftermarket earthmoving parts suppliers employ cutting-edge techniques and high-quality materials.

Research has shown that aftermarket earthmoving parts can offer wear life comparable to OEM products, if not better in certain cases.

This is largely due to the focus on refining and improving specific wear parts, with the goal of meeting the unique demands

of different earthmoving operations. Contrary to popular belief, some OEM products may lack the wear resistance required for the rigorous conditions of mining and heavy earthmoving tasks due to inadequate product selection from the outset.

The Specialist Advantage

What sets specialist aftermarket earthmoving parts suppliers apart is their unwavering dedication to a single purpose: supplying the most efficient and durable wear parts and machinery for specific operations. One of the critical factors often overlooked is the impact of Ground Engaging Tools (GET) attachments on wear life and operational efficiency. Specialist suppliers recognise the nuanced effect that correct GET attachments can have on equipment performance.

Their ability to provide tailor-made solutions for specific operations optimises wear life and also enhances the overall efficiency of earthmoving tasks.

Cost-Effectiveness without Compromise

By opting for aftermarket solutions, operations can substantially reduce procurement costs without sacrificing quality or performance.

The cost-effectiveness of aftermarket parts becomes particularly evident when considering the longevity they offer. Reduced downtime, increased operational efficiency, and lower maintenance costs combine to deliver a compelling financial case.

Price does not determine quality and a lower cost alternative should not always be viewed with such scepticism. Pricing can be more competitive when the product is not sold through a variety of dealership models.

Purchasing direct from foundry and sold to market can have a huge impact on the final price and inevitably lead to a huge price saving when compared to a more

traditional sale dealership model.

The Path Forward

The move towards specialist aftermarket earthmoving parts suppliers represents a strategic shift that not only aligns with the financial goals of operations but also elevates their efficiency and longevity.

The myth that OEM products are the sole guarantors of quality and durability is fading, replaced by the reality that specialised aftermarket suppliers are consistently pushing the boundaries of innovation.

As earthmoving operations continue to grow in scale and complexity, the choice of wear parts and equipment becomes an increasingly crucial determinant of success. The intelligent choice is clear: by partnering with specialist aftermarket suppliers, operations of all sizes can secure the highest quality, performance, and value for their investments, propelling them towards a future of unparalleled efficiency and profitability. **AMR**

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UNVEILING THE VIBRANT ROLE OF VIBRATORS IN CONCRETE BATCHING PLANTS

Concrete, often referred to as the backbone of modern construction, has the power to shape our world. The very structures we live and work in, the bridges we cross, and the roads we travel, all begin as batches of carefully mixed concrete. To ensure that this foundational material is of the highest quality and durability, concrete batching plants play a crucial role. Within these plants, vibrators, both electric and pneumatic, and flow aids are the unsung heroes that ensure the concrete's reliability. In the heart of Australia and New Zealand, Oli Australia shines as the prominent supplier of these vital components, and its contributions are felt far beyond the concrete industry.

Concrete production is a precise science, demanding uniform consistency and the absence of air bubbles. This precision is achieved through the meticulous use of vibrators. These quiet powerhouses effectively compact the concrete mixture, preventing segregation and ensuring that the final product is strong and dependable.

Oli Australia's range of vibrators, including electric and pneumatic options, along with flow aids, have become the cornerstone of

the pre-mix concrete industry. By providing products that guarantee smooth and consistent concrete flow, Oli ensures that every batch meets rigorous quality standards. Their role is fundamental in the production of concrete that's free from defects and voids.

What truly sets Oli Australia apart is its team of fully trained and experienced experts. In an industry where precision is non-negotiable, their guidance and expertise are invaluable. Oli's experts not only supply these essential tools but also offer crucial insights on optimising their use, enhancing the efficiency of concrete batching plants.

The construction industry operates in a world of fast-paced demands, and Oli Australia is acutely aware of this reality. Instant availability of their products ensures that construction projects are not delayed. As a trusted partner, Oli Australia prides itself on its ability to provide the necessary components promptly.

Outstanding quality is Oli Australia's hallmark. Their vibrators and flow aids are engineered to last, standing up to the harsh-



est conditions and providing unwavering reliability. In an industry where structural integrity is paramount, this commitment to quality ensures that the concrete produced is not just dependable but also safe and durable.

While Oli's vibrators are extensively used in the concrete industry, their applications extend far beyond. These vibrators find their place in the mining and extractive industries, facilitating efficient material handling. Furthermore, they play a crucial role in the offshore drilling sector, where reliability is of utmost importance.

In conclusion, Oli Australia has earned its reputation as a reliable partner for the concrete industry across Australia and

New Zealand. They don't merely supply vibrators and flow aids; they offer a team of experts, instant availability, and unwavering quality. In the world of construction, where the foundation of our built environment is laid, Oli Australia stands at the forefront, ensuring that every project meets the highest standards of reliability and durability.

Vibrators in concrete batching plants may not be the most visible components, but they are undoubtedly the heart of quality construction. When it comes to these vital components, Oli Australia is not just a supplier; they are a dependable ally, always just a phone call away, ready to aid in constructing a more stable and sustainable future. **AMR**



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A Cut Above the Rest

HD Plasma and Laser Cutting Services provides an innovative and dynamic profile cutting service to all steel manufacturing industries within Australia.

The purpose-built, multi-function, steel processing business located in Bibra Lake, WA, is seen among the leaders in the steel cutting industry.

Laser Cutting

The technology of the HD Plasma and Laser Cutting Services machines delivers superior performance, giving the ability to provide clients with exceptional quality, together with 24-hour operations, shorter lead times compared with other conventional laser cutting machines.

- Cutting table size 4000 x 2000mm
- Capable of processing up to 20mm thickness mild steel
- Capable of processing up to 20mm thickness QT Material
- Capable of processing up to 32mm thickness aluminium
- Capable of processing up to 25mm thickness stainless steel

Plasma Cutting

HD Plasma and Laser Cutting Services operates three plasma machines - one Kinetic K4000 and two Kinetic K5000. These state-of-the-art, heavy duty combination plasma/oxy/machine centres can process a wide variety of materials at an extremely fast rate.

The 62m plasma cutting bed, together with 24-hour operations, allows high volumes of cutting to be achieved with short lead times.

- Counter sink/counter bore
- Drilling - 3mm up to 60mm
- Plasma cutting - 3mm up to 50mm
- Oxy-cutting - 60mm up to 300mm
- Beveling - up to 50mm with maximum of 45°

Steel Plates

HD Plasma and Laser Cutting Services holds steel plate in stock.

Plate is sourced from quality local and imported steel mills, to cut a wider range of materials at a greater thickness range than most of its competitors. **AMR**



THE STATE-OF-THE-ART, HEAVY DUTY COMBINATION PLASMA/OXY/MACHINE CENTRES CAN PROCESS A WIDE VARIETY OF MATERIALS AT AN EXTREMELY FAST RATE.



GRADE	THICKNESS (mm)
AS 3678-250	UP TO AND INCLUDING 300mm
AS 3678-350	UP TO AND INCLUDING 300mm
FLOOR PLATE M/S	UP TO 10mm
BOILER PLATE - ALL GRADES	UP TO 80mm
QUENCHED AND TEMPERED	UP TO 80mm
CARBIDE OVERLAY	UP TO 40mm
ALUMINIUM PLATE	UP TO 32mm
PGI, ZINCANEAL, GALVANISED & COLORBOND	UP TO 6mm
STAINLESS STEEL - ALL GRADES	UP TO 40mm

A cut above the rest



HD Plasma & Laser Cutting Services Pty Ltd is a purpose built, multi-function, steel processing business located in Bibra Lake, Western Australia.

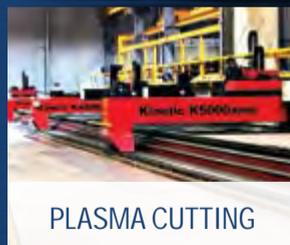
We can deliver an innovative and dynamic profile cutting service to all steel manufacturing industries within Australia.

HD Plasma & Laser Cutting Services philosophy of progressive service to our customers is what is bringing us to the forefront of the steel cutting industry.

A continual process of system and service development and refinement is where our key advantage lies. We constantly find new ways to add value to the service we deliver to you.

Progressive service and quality is about staying one step ahead.

Services



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BHF COURIERS



Operating all over Australia and well as internationally, BHF Couriers prides itself on its quick and same day delivery to its customers.

With both express and standard delivery services available via road or plane, be assured BHF Couriers will take care of your delivery.

Super Express Freight

For those wanting their delivery as soon as possible, BHF's super express freight service will have goods delivered by express road or air in approximately one to two business days. For bulky goods and goods over 30kg, you will need to

have assistance or equipment to load and unload the freight.

Standard Road Service

Suitable for most items, goods under BHF's standard road service will travel by road freight. Generally, pick ups and deliveries are done by one person so if freight is heavier than 30kg and bulky, assistance or equipment will be needed to load and unload.

Same Day Freight Service

This service is BHF's quickest and most efficient service the company offers. BHF works with the customer to ensure the shipment arrives in Australia-wide in

the fastest way possible. Depending on the location, this service includes direct drives and next flight options which have a general turnaround time of 6-12 hours. Services run 24/7 so when you need it, BHF Couriers will find a way to deliver.

International Freight Service

From anywhere in Australia, BHF Couriers has options to deliver freight to most international locations.

Budget Road Service

For those looking for a cost-friendly service, BHF's budget road service is the service for you. This service is ideal for those who aren't in a hurry to receive the

freight and don't mind it taking the time to arrive. The goods still travel by road but are listed as non-urgent.

Tail Lift Road Service

The tail lift road service is for items over 40kg, bulky or in an awkward shape that is difficult to carry. BHF brings out a truck with a tail lift which helps the driver lift heavy items with ease. Most items will need a pallet jack or trolley to help lift these items.

For more information or to get a quick quote, visit www.bhfcouriers.com.au or call 1300 312 658.

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ENHANCING EFFICIENCY AND COST REDUCTION through LiDAR payload monitoring from Mine Payload Technologies

Ensuring profitability, efficiency, and safety in mining operations relies heavily on accurate payload monitoring.

Conventional load monitoring methods, however, are susceptible to errors, leading to financial losses, equipment damage, and safety compromises.

Mine Payload Technologies, the specialised mining division of leading volume scanning technology company Loadscan, addresses these challenges with its Mine Payload Scanner (MPS). This payload monitoring solution utilises advanced LiDAR technology to optimise truck loading, reduce the cost per tonne of hauled material, increase profits, and enhance productivity.

The MPS employs state-of-the-art LiDAR lasers, coupled with proprietary software, to precisely measure the volume of

material loaded into a truck with an operating accuracy of +/- 1%. The process involves scanning the empty truck to create a reference scan in the database and then re-scanning the loaded truck to measure the exact volume of the hauled product.

The Loadscan mining software provides real-time reports on volumetric measurements and creates 3D load profiles, allowing identification of underloading, overloading, off-centre loading, or carryback of material. This information enables prompt corrective actions to be taken to optimise loading cycles and improve operator efficiency.

Loadscan Managing Director Carey West emphasises the significant impact of inefficient loading cycles on profitability.

"The MPS provides real-time data of every load with an accuracy of +/- 1%

and, by identifying underloading, the equipment can be better utilised, and operators can be trained in more efficient loading practices," he says.

"Volumetric load scanning is an extremely valuable tool that can be utilised effectively to reduce mining operating costs and increase productive and efficient use of equipment."

Benefits of LiDAR-based payload monitoring

When it comes to LiDAR-based payload monitoring, there are some immediate benefits that the Mine Payload Technologies MPS brings. The

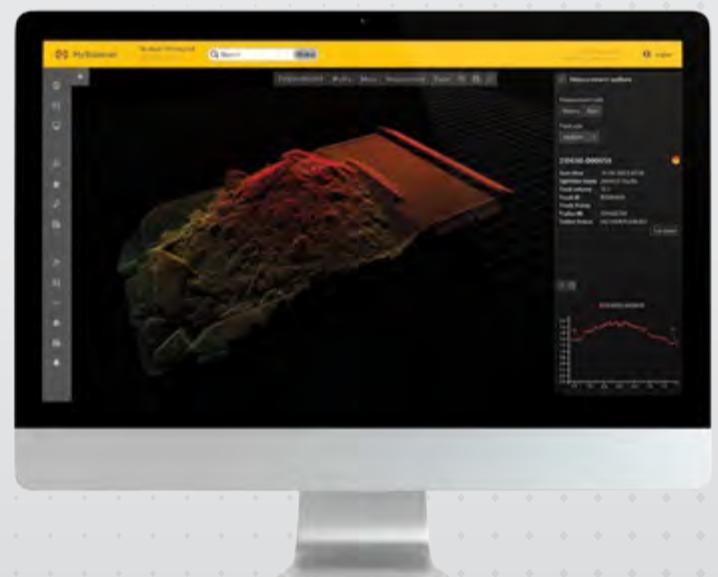
LiDAR-based scanner uses eye-safe technology, it doesn't require human contact to operate, there are no ongoing calibration costs needed, and it provides load data to an accuracy of +/- 1%. Along with this, there are a wide range of long-term benefits that a mine payload scanner brings with it. These include:

- **Real-time monitoring and reporting** — Using Loadscan's secure cloud-based MyScanner data management system, a 3D scan is created for every truck coming in or out of the site. These scans can be used to educate loader operators to prevent overloading or off-centre loading, ultimately enhancing trucking cycles.



MPS unit with Outtrigger installed at underground mine portal.

Optimise mine performance with accurate payload information



Lower cost-per-tonne of material hauled, optimised truck loading, improved productivity and increased profits.

Loadscan's Advanced Mining Solutions are satisfying growing global demand for reliable and accurate load measurement across a range of increasingly challenging surface and underground mining operations.

Loadscan's LiDAR-based Mine Payload Scanner (MPS) revolutionises mine performance and profitability. The MPS provides real-time data integrated into your mine management software. Contact our Team to see it in action today.

- Reducing underloading** — Data from the MPS can accurately measure all loads and identify when underloading has occurred. It alerts drivers through LED message board displays and allows them to take corrective action in real time. By reducing underloading and optimising loads, trucking factors are also increased, reducing fuel usage, reducing CO₂ emissions, and improving productivity.
- Avoid truck bunching by minimising overloading** — Truck bunching occurs when heavily loaded trucks become slower up ramps, holding up other trucks and creating bottlenecks in production. By ensuring trucks aren't overloaded, you are also ensuring your mine is running efficiently.
- Avoid carryback to improve operations** — Mine operations are often hindered by carryback as it has a serious impact on productivity, shift tallies, and the number of manual data entries required. By scanning all of your loads with the Mine Payload Scanner, carryback out of the mine is accounted for and can be deducted from shift tallies, improving the accuracy of actual loads shifted.
- Improve health and safety by reducing off-centre loading** — This is a difficult issue to identify



Custom MPS unit mounted on overhead gantry.

and quantify on a mine site as both overloading and carryback, along with uneven loading, feed into this problem. However, this doesn't negate the fact that uneven load distribution adds stress to trucks' components, reducing their working life and adding substantial costs to your operation. Using Loadscan's 3D scanning technology, off-centre loading is calculated and reported within the four quadrants of the truck bin. Truck drivers are then notified by an LED

message board and able to take corrective action. By reducing both overloading and underloading, the MPS minimises wear and tear, improves production efficiencies, and identifies carryback issues, enhancing the accuracy of actual loads shifted.

Case studies of the Mine Payload Scanner

In a real-world application, Aeris Resources' Tritton copper mine in NSW experienced a 9.7% increase in trucking factor after installing a Load Volume Scanner (LVS) system in 2022. The decision was driven by consistent inaccuracies in previous payload measurement systems and limited forward compatibility with truck fleet upgrades.

A recently-released report on the economic benefits of load volume scanning in underground mining further underscores the value of Loadscan's technology. The study — UNDERGROUND MINING; Economic benefits of load volume scanning of underground mining trucks — was conducted over seven months at a Central Queensland underground gold mine and revealed issues such as carryback, excessive fuel consumption, and under-utilisation of equipment contributing to unnecessary operating costs and lost revenue.

The study showed that the average load on all trucks could be considerably improved by addressing underloading. This would not only improve loading cycles but also reduce fuel costs, both of which considerably impact profitability.

An increase of just 10% in the average load would be valued at just under \$1 million per annum.

"Mine Payload Technologies is committed to reducing cost and enhancing payload efficiencies in mining applications through use of our world-leading volume scanning technology," West says.

About Loadscan

Loadscan is the global leader in the delivery of volumetric scanning technology for the civil construction, mining, and bark and mulch sectors. We provide our customers with technology to ensure accurate measurement and reporting, ensuring efficient, effective and cost-effective use of their equipment. Having invented and patented the original load volume scanner, Loadscan — and its specialist mining division, Mine Payload Technologies — brings more than 20 years' experience to the sector and strives to continue developing and evolving its innovative products. **AMR**



Loadscan Managing Director, Carey West.



For more information, visit www.minepayloadtechnologies.com

Eye-safe Lidar scanning and monitoring technology

- ▶ Monitoring & reporting in real-time
- ▶ Accuracy to +/- 1%
- ▶ Improving health & safety
- ▶ Identifies overloading
- ▶ Addresses underloading
- ▶ Minimises off-centre loading.
- ▶ Reduces carryback



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MinePayloadTechnologies.com

DREDGING SPECIALISTS SINCE 1995



Dredging Systems completes both hydraulic work and mechanical dredging. Its fleet of equipment includes amphibious dredges; remote-controlled dredges for polluted water; weed harvesters; barges; floating and submersible discharge pipes; and booster pumps.

It specialises in cleaning and maintenance of mine tailings dams; industrial ponds; lakes; ponds; agricultural irrigation dams; creeks and rivers; council wastewater treatment plants and lakes; marinas; beach renourishment projects; and private dams.

De-watering

Pumping and digging is only half the dredging job. Dredging Systems specialises in dealing with dredged material, with equipment and skills to dewater, dry, treat and dispose of mud, tailings, sand, weed, rubbish and other underwater material.

Dredging Systems operates a modern fleet of cutter suction, mechanical and remote-controlled dredges. In addition, it uses discharge pipelines, barges and associated booster pumping equipment

to enable material transportation over more than 4 kilometres.

Specifics

Mining and Tailings Dams

Dredging Systems has mine specified, road-transportable cutter-suction equipment to dredge and maintain mine tailings dams:

- 25 tonne dredges for operating in clay-lined dams
- 8 tonne remote controlled dredges for plastic lined dams or tight access dams.
- Discharge pipes, booster pumps, barges and dewatering solutions, if required.

Ponds and Dams

Dredging Systems has dredges that can either unload and “walk” themselves into ponds and dams, or be lifted into the water, if required.

Marinas

Dredging Systems can remove any underwater sand, mud or sludge, increasing depth of boat berths and channels to their original design depth, and making safe boating operations possible.

Rivers and Waterways

Dredging Systems’ amphibious dredges remove years of built up material including sludge, weed, reeds and rubbish from environmentally sensitive rivers and creeks.

Wastewater Treatment

Dredging Systems’ remote-controlled dredges safely and efficiently remove sludge from council wastewater treatment facilities.

Weed Harvesting

Dredging Systems has portable equipment that can both dig out heavy weed and roots or cut and harvest marine weeds and floating vegetation.

Dewatering Geobags

Dredging Systems has been using dewatering geobags for more than 15 years. Different sized bags – from 400m³ to 2000m³ capacity – can be supplied.

Dewatering bags are efficient in capturing fine material under 100 microns (symbol) in size.

Portable Mechanical Dewatering Equipment

Dredging Systems’ fleet of transportable

mechanical dewatering equipment can dewater material which is then pumped straight from dredges and loaded into piles or trucks.

The equipment is suitable for materials such as sand or materials with a particle size greater than 100 microns (symbol)

Portable de-watering pools

Dewatering dredge spoil in dewatering pools is a good system for treating larger volumes of material. Unlike geobags, which can only be used once, dewatering pools can be used multiple times.

Bridges and Wharfs, Pipelines, Pump inlets and Outlets

Dredging Systems has the equipment — barges and marine-lifting gear — to work in tight access areas around bridges, pump inlets and outlets, wharves and seawalls.

Beach Renourishment Projects

Dredging Systems can pump sand from around boat ramps and lagoons to replenish local beaches.

Dredging Systems can also dredge and maintain channels in shallow waters, allowing safe passage for boating activities.

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dredgingsystems.com.au

Leading dredging mining & marine experts

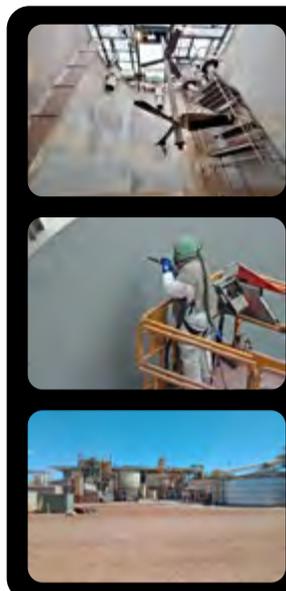
Dredging Systems is a leading dredging mining and marine specialist, working in underwater dredging and underwater construction since 1995. It has unique equipment and skills to tackle all dredging, underwater civil, marine weed and underwater clean-up projects.

Operating across Australia, PNG and Singapore, Dredging Systems has successfully completed projects for mining companies, oil refineries, government agencies, marinas and private properties. All equipment is built to mine specifications and all teams are trained to work safely and efficiently in large mines and sensitive environmental and historical sites.

It specialises in quality, cost-effective dredging for the mining, marine, industrial and government industries. Its highly manoeuvrable and transportable dredges operate in mine tailings dams, wetlands, rivers, ponds, lagoons, canals and industrial ponds where they ‘walk’ or are craned into tight-access areas. The multi-purpose dredges – one machine excavates, pumps and removes weeds – are transportable by truck anywhere in Australia.

The fleet also includes remote-controlled dredges that can work safely in lined dams and polluted or toxic liquids. They can also measure water volumes, water depths and sludge volumes with transportable bathymetric equipment.

P: 1300 373 343 **E:** info@dredgingsystems.com.au



NXT GROUP:

PROVIDING STRUCTURAL REMEDICATION AND ASSET MAINTENANCE



With a primary business focus on asset integrity management solutions, NXT Group is a multi-disciplined contractor providing innovative solutions for complete structural remediation and asset maintenance.

These solutions involve the application of protective coatings systems, fire proofing systems, specialised coatings, non-structural and mechanical repairs, shutdown works and maintenance contracts.

Part of NXT Group, Nukote focuses on asset integrity management solutions such as the application of high-performance spray-on polyurea, protective coatings systems and acid proofing.

Since 2005, Nukote has earned its reputation as a professional organisation, particularly in the mining sector, delivering projects safely and effectively.

NXT Group's other company, NXT Industrial Solutions, focuses on the application of industrial coatings, fireproofing systems, asset integrity maintenance contracts, non-structural mechanical and steel repairs, and access solutions.

NXT Coatings (Previously known as **Nukote**) is part of NXT Group with the primary business focus on asset integrity management solutions such as application of high-performance spray-on polyurea, protective coatings systems, acid proofing and other specialised coatings.

Since 2005, Nukote Australia has forged a reputation, most notably in the mining sector, as a professional organisation consistently delivering projects with high standards of service, in a safe and timely manner. Our multiskilled specialist operators can respond to any immediate client requirements including shutdowns for effective serviceability. We also provide

a comprehensive mobile and workshop based abrasive blasting and industrial painting service.

Nukote Australia has extensive experience in applying polyurea linings, 3 million litres so far and counting.

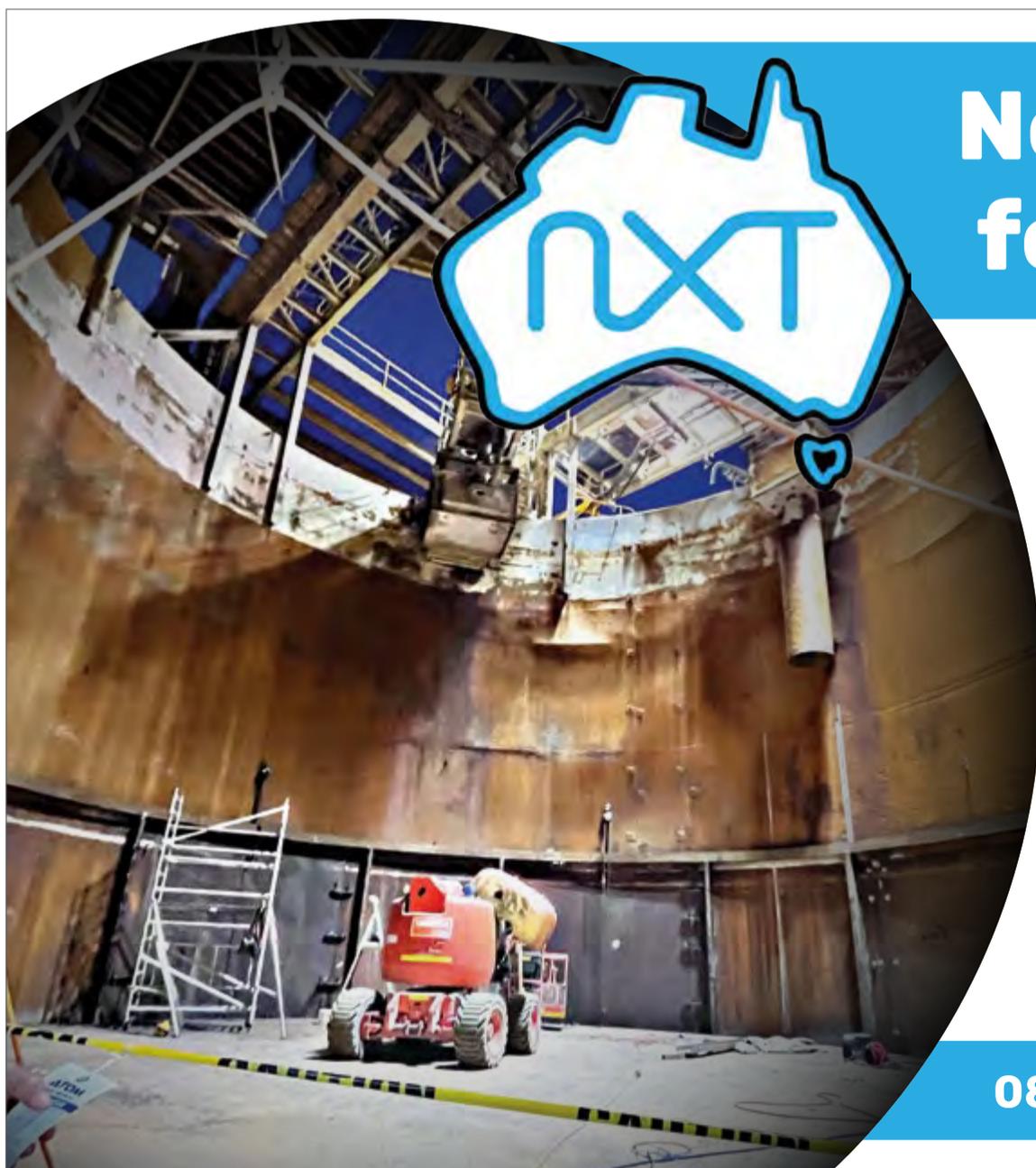
NXT Industrial Solutions is a part of NXT Group with the primary business focus on complete asset integrity management solutions with a multidisciplinary workforce providing innovative solutions for complete structural remediation and asset maintenance including structural integrity management, mechanical and steel repairs, access solutions, industrial coatings, fireproofing systems, shutdown maintenance etc. Services include:

- UHP Water-jetting;
- Internal tank repairs including carbon steel mounts, draft tubes, tank floor and shell;
- Repair/replace agitator blades and

- shaft;
- Robotic surface preparation;
- Surface treatment of tanks;
- Repair/replace tank top steelworks;
- Grid mesh repairs/modifications;
- Non Destructive Testing on repair works;
- Structural integrity remediation works.

NXT Engineering is a part of NXT Group specialising in providing engineering support to advance project delivery and maximise the performance and value of your assets to achieve the full-service capability. Our engineering team is involved in developing custom solutions for our clients involving state of the art structural polyurea solutions, spin cast structural pipe linings and more. **AMR**

For more information, visit www.nxtgroup.au or phone 08 9419 0600



Now Excelling for Tomorrow

Providing asset integrity management solutions for protective coatings systems, fireproofing systems, mechanical repairs, maintenance contracts and shutdown works.

Our group companies:



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PROTECTION AGAINST **EXTREME** STRESSES



Steuler is your experienced partner for linings. Whether pickling or regeneration plant, vessel, flue gas line or reactor, whether Venturi scrubber, autoclave or absorption tower – we have the expertise in a wide range of applications. In theory and practice.

We draw on this when selecting the acid resistant lining system for the process in question and in the specific advice we provide for you.

As a specialist, we naturally also offer very special solutions. To this end, we have exceptional, original technical know-how, for example: for high temperatures, autoclaves or pressure vessels.

Steuler consistently develops and im-

proves its product portfolio. This enables us to serve even the most complex and modern plant technology of our customers.

We combine sealing layers, mortars and ceramic materials to create solutions that are just right for your project.

In addition to having access to our extensive range of materials, we can also work out new solutions with our development departments at any time.

- Sealing layers based on polyurethane, epoxy resin, polyester resin (unsaturated), vinyl ester resin, furan resin; special formulations; rubber linings; thermoplastics
- Synthetic resin mortars based on

furan resin, phenolic resin, polyester resin (unsaturated), vinyl ester resin, various water glass mortars; special formulations

- Standard bricks, shaped bricks and special formats in various stone qualities (acid resistant ceramics, graphite and carbon stones, refractory materials)

The professional installation of our brickwork is always part of the service. Perfect performance from a single source.

Linings are subject to the highest stresses from individual media or combinations of different media:

Chemical stress

- Chemical attack by media in liquid,

gaseous or solid state

Thermal stress

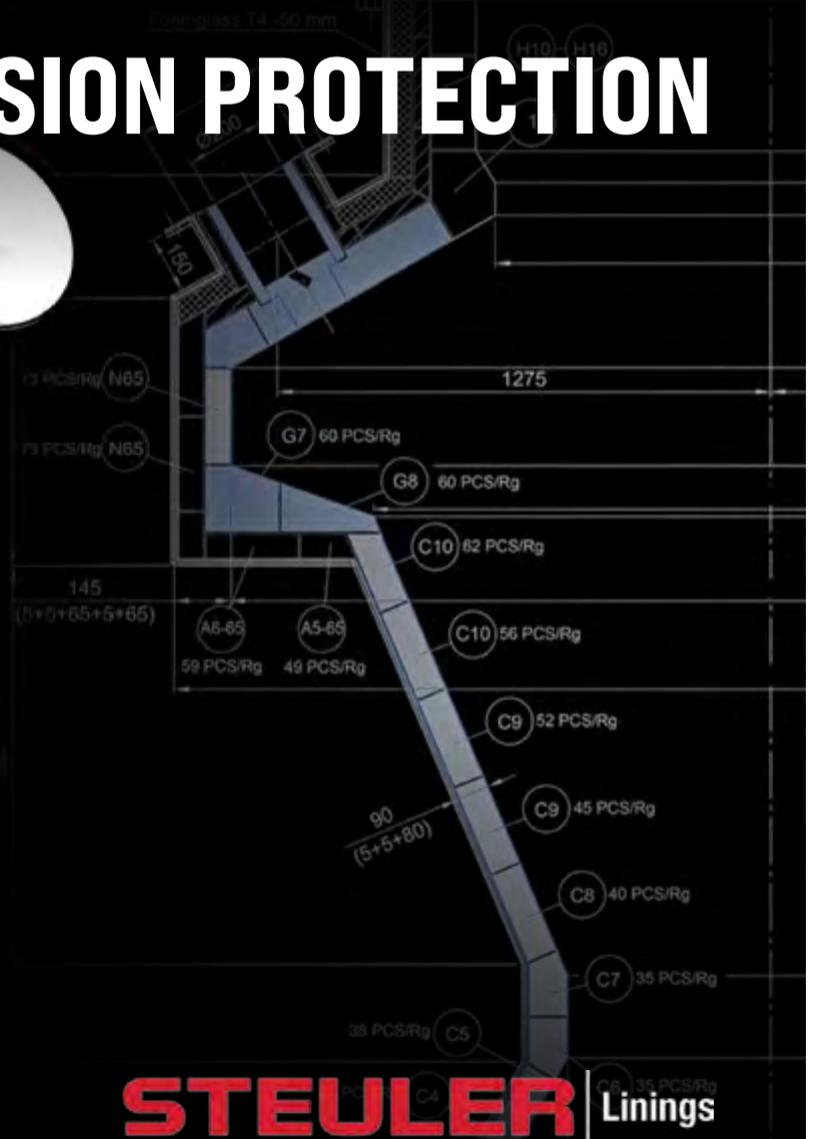
- Height of the temperature and different temperature distribution
- Temperature differences in the individual layers of the lining and to the surroundings
- Thermal cycling
- Different coefficients of thermal expansion for lining materials and construction

Mechanical stress

- Pressure ratios
- Vibration
- Abrasion
- Impact stress
- Passable by vehicles

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STEULER Linings

ELS MECHANICAL

THE “CAN DO” PEOPLE TO CRUSH DOWNTIME



A labour hire company providing manpower and womanpower, ELS Mechanical makes sure production keeps rolling while mechanical services are underway.

Predominantly providing its services to open cut and underground mining companies and its subcontractors, ELS also supplies highly skilled heavy-duty diesel and light vehicle mechanics, auto electricians and mobile plant operators for long or short-term requirements.

With the ability to rapidly expand in meeting requirements, plus an array of tradespeople and skilled labourers, ELS Mechanical can deliver a contract package to suit the specific needs of the site, workspace or project.

Labour hire is an extremely volatile

business, but ELS continues to strive in growing its business year after year and developing new business opportunities. Gross revenue doubled from \$6.7 million in FY19/20 to \$13 million in FY20/21.

In addition to its labour hire operations, ELS Mechanical is also operating full mechanical workshops in Northam, Cue and Meekatharra where they perform scheduled maintenance and repairs on government, mining and general light vehicles and ancillary equipment.

With experience in the mining industry, ELS is known for its “can do” attitude, with the company priding itself on keeping downtime to a minimum.

In 2019, West Gold Resources sought the services of ELS to deliver reliable maintenance services across their operations due

to their previous track record of good performance and efficiency.

This work saw ELS manage West Gold Resources’ large fleet of mobile plant, road transport and light vehicles, plus ELS provided the entire maintenance team from supervisors, mechanics, service truck operators, light vehicle mechanics and tyre fitters.

ELS has also provided its labour hire services to other open cut and mining companies such as Rio Tinto, BHP and FMG. Word of mouth is extremely important to ELS with many of its contracts coming from customer referrals and positive experiences with previous clients.

Notably, ELS Mechanics joined the Avon Valley Business Award in 2022 after it won Big Business of the Year. **AMR**

WE ARE HIRING!

ELS Mechanical are on the lookout for enthusiastic tradesmen and tradeswomen to join our growing team.

We have multiple positions available, focusing mainly on mine-site based FI/FO rosters.
 HD Fitters, Servicemen, Boilermakers, LV Mechanics

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ECONOMY-PRICED PPE COSTS MORE THAN YOU THINK



It's not what you spend—it's what you get. Everybody loves a bargain, yet no discount is worth putting workers at risk. With PPE, there's a monumental difference between buying cheaper hard hats and face protection and investing in high-quality helmets like the MSA V-Gard® Hard Hat and complete above-the-neck safety solutions. Purchasing head, eye, face, and hearing protection (HEFH) from a value-added safety partner lets you maximise your PPE budget. That means you get a better, more consistent return on the dollars you spend. MSA has developed thousands of products, owns hundreds of patents, and has a global reach in the millions — all to keep in motion the mission of worker safety that started more than 100 years ago. In our experience, we know that companies like yours can realise savings of between 20 and 80 percent.

So, what does this mean for you? Look at the total value of your purchase instead of only the per-item cost. You'll realise the money you invest in with MSA, including V-Gard Hard Hats and accessories, can pay you back in ways that spending on discount hard hats never could.

Purpose-built for the type of work. Did you know that MSA Australia spent time engineering our metal lamp brackets on our miners' caps to ensure that a fixed lamp will tilt to shine in the correct trajectory. Both our metal and plastic lamp bracket options are mounted during production, both meeting the correct lamp positioning trajectory, minimising any 'eye blinding incidents'.

Tested to perform in some of the toughest environments imaginable. PPE needs to work, and it needs to last, even in tough environments. UV inhibitors in our colorant are designed for and tested against some of the harshest environments, for five years of outstanding performance.

Engineered for increased service life. There's a reason MSA is known worldwide as "The Safety Company." It's because we harness precision engineering to craft high-quality safety products to help people across the world work safely in their environments. Quality materials and construction mean better durability and a longer wear life. The MSA V-Gard Hard Hat is the #1 Hard Hat for a reason.

Designed to meet MSA's strict safety, function, durability, and usability criteria. MSA V-Gard Hard Hat is AS/NZS 1801 | SEI third-party tested | ANSI and CSA Certified to every optional criteria available | 100% lot tested. As evidence of our commitment to quality, MSA also maintains ISO 9001 quality management system registrations at major production and service locations.

Designed to thoughtfully consider an ecosystem of quality safety accessories to complement. EXTRAS, EXTRAS!! Alone, a hard hat is good, including accessories for the job at hand, even better. MSA offers more than 100 accessories designed and tested specifically to attach to our V-Gard Hard Hat to ensure optimal performance.

- Unique 3-point visor loading to fit and remove visors quickly
- Sloped design allows material to easily slide off the frame
- Works with or without earmuffs
- 20 visor versions to suit all applications
- Reliably protect against impact, chemical splash, high temperatures, short-circuit electric arc, Ultraviolet and InfraRed
- Optional: debris control to create a tight seal and chin guards
- Browguard V-Gard Headgear uses same visor range

LEARN MORE Industrial Worker Safety
| MSA Safety | Australia

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AGent INDUSTRIAL:

A TRUSTED PROVIDER OF CHEMICAL SOLUTIONS FOR MINING AND OIL & GAS



For over 30 years, AGent Industrial has been manufacturing and distributing chemicals tailored to the unique needs of their mining and oil & gas industry partners across Western Australia.

Managing Director, Armando Gentiluomo, says this of AGent's capabilities, "Our years of experience in the industry mean that we can be versatile and maintain a high quality of product."

With key involvements in gold, copper, lithium, nickel, and iron exploration and processing supply chains in both upstream and downstream contexts, AGent has become a trusted source of high-quality chemical solutions for clients throughout Australia.

Global sourcing, local expertise.

AGent Industrial goes beyond borders, assisting clients in sourcing chemical products and raw materials globally. From ac-

quisition of raw materials through to the delivery of finished products, AGent offers bulk blending, filling, delivery and distribution programs for almost any chemical product or formulation.

A comprehensive chemical portfolio.

For products used in process applications, metal treatment, tailings dam treatment and more, AGent Industrial is a complete chemical solutions provider. They specialise in water treatment chemicals, including flocculants, coagulants, and pH reducers.

With a significant strength in the supply of acid and alkali process chemicals, AGent Industrial can help with creative logistic options, technical advice on handling and delivery of hydrochloric acid, sulphuric acid, sodium hydroxide, sodium hypochlorite, and many other ancillary products.

Customised chemical product supply.

AGent's range of products is extensive

and tailored, offering bulk and packaged chemicals including chlorine compounds, acids, acid inhibitors, alkalis, and flocculants. From drums to IBCs and mini loads, AGent Industrial provides solid and soluble materials at customised volumes ranging from 5L to 10,000L.

Reliable logistics and safety standards

In addition to quality chemical products, AGent Industrial delivers their clients' complete peace of mind. Equipped with a dedicated fleet of vehicles, AGent ensures secure and prompt delivery to even the remotest of sites.

AGent Industrial is focused on Hazard Identification and Safety Protocols, complying with ISO9001 standards. All drivers are experienced in the handling and transportation of products, with transportation of chemicals fully compliant with Federal and State Government regulations.

AGent Industrial's commitment to providing the highest level of dangerous goods safety and process safety is a key aspect of their service value to their clients.

A client-centric approach.

Working with AGent Industrial means gaining expert technical advice on safe handling, transport and usage. AGent Industrial's General Manager, Kevin O'Malley stated "We're really proud of the work we've done and that we've been able to add value to mining operations from Broome to Albany, Kalgoorlie and beyond."

With three decades of experience in providing chemicals and water treatment solutions to the mining and oil & gas industries, AGent Industrial guarantees quality, reliability, and safety in every aspect of their service. **AMR**



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- | Sodium Hydroxide
- | Sodium Hypochlorite
- | Flocculants



GAIN MAXIMUM SITUATIONAL AWARENESS WITH AERIAL SURVEY

PERTH BASED Geospatial technology expert Outline Global continues to support the digital transformation in the mining sector. A growing portfolio of services which include multispectral imagery, LiDAR, and geospatial data intelligence have opened new possibilities for the industry.

Established in 2009 to cater to the mining sector's need for high-quality aerial imagery and data services, Outline Global is an Australian owned and operated company that has developed and commercialised a hybrid technology to bring unique capabilities to solving complex challenges.

Mining and Aerial Mapping is a perfect match

Mining is a vital sector of the global economy, providing essential raw materials and energy. The global energy transition mandate has further highlighted the importance of the mining sector amid existing and emerging challenges, such as environmental degradation, safety risks, and continuous productivity improvement. To overcome these challenges, mining companies need to embrace modernisation and innovation, leveraging new technologies and best practices to improve their operations and performance.

Aerial surveys are a valuable tool for mine exploration, monitoring and closure. They can provide high-resolution imagery, geophysical data, topographic maps and environmental assessments of large areas in a cost-effective and timely manner. Aerial surveys can help identify mineral deposits, assess the feasibility of mining projects, monitor the progress and impacts of mining operations, and plan for the rehabilitation and restoration of mine sites after closure.

There are different types of aerial surveys, such as photogrammetry, lidar, hyperspectral imaging, magnetic and gravity surveys, and airborne gamma-ray spectrometry. Each type has its own advantages and limitations, depending on the objectives, terrain, vegetation and weather conditions of the survey area. Aerial surveys can be conducted using fixed-wing aircraft, helicopters, drones or balloons. The choice of platform depends on the size, accessibility and budget of the project.

Photogrammetry is a type of aerial survey that uses photographs taken from different angles to create three-dimensional models of the terrain and objects on the ground. Photogrammetry can measure distances, heights, areas and volumes with high accuracy and precision. Photo-

grammetry can also produce orthophotos, which are images that have been corrected for distortions and aligned with a map projection. Photogrammetry can be used for mapping, surveying, engineering and archaeology applications.

Aerial surveys can provide valuable information for mine exploration, such as:

- The location, extent and shape of mineral deposits
- The geological structures and faults that control mineralisation
- The surface and subsurface features that indicate potential ore zones
- The alteration patterns and geochemical anomalies that reflect mineralisation
- The environmental and social impacts of exploration activities

Aerial surveys can also support mine monitoring and closure, such as:

- The changes in land use, vegetation cover and water quality due to mining activities
- The compliance with environmental regulations and standards
- The detection of hazards and risks, such as landslides, erosion, subsidence and acid mine drainage
- The evaluation of the effectiveness of mitigation measures and remediation techniques
- The identification of opportunities for biodiversity conservation and ecosystem restoration

Digital Terrain for mining erosion assessment

Mining erosion is the process of soil and rock removal by water, wind, ice, or gravity in areas where mining activities have disturbed the natural landscape. Mining erosion can have negative impacts on the environment, such as sedimentation, water pollution, habitat loss, and land degradation. To monitor and mitigate mining erosion, digital terrain models (DTMs) are useful tools that can provide high-resolution spatial information on the topography and surface features of a mining site. DTMs are digital representations of the elevation and shape of the terrain, derived from remote sensing data such as aerial photographs, satellite images, or LiDAR scans.

A DTM can be used to assess the extent and severity of mining erosion by comparing different time periods and identifying changes in the terrain. For example, a DTM can show the amount of soil loss, the formation of gullies or landslides, the alteration of drainage patterns, or the exposure of bedrock. A DTM can also be



used to evaluate the effectiveness of erosion control measures, such as revegetation, mulching, terracing, or contouring. By measuring the changes in the terrain before and after the implementation of these measures, a DTM can indicate whether they have reduced or prevented further erosion.

Additionally, a DTM can be used to simulate and predict future scenarios of mining erosion under different conditions and management practices. For instance, a DTM can be combined with hydrological models to estimate the runoff and sediment yield from a mining site under various rainfall events and climate change projections. A DTM can also be integrated with geomorphological models to forecast the evolution of the terrain and the potential hazards associated with mining erosion, such as slope instability, flooding, or sediment transport. By using a DTM to simulate and predict mining erosion, decision-makers can plan and implement appropriate strategies to minimise its environmental and social impacts.

LiDAR vegetation analysis for mine rehabilitation

LiDAR (Light Detection and Ranging) is a remote sensing technology that uses laser pulses to measure the distance and characteristics of objects on the Earth's surface. LiDAR can provide high-resolution and accurate data on the structure and composition of vegetation, which is essential for monitoring and evaluating the progress of mine rehabilitation.

One of the challenges of mine rehabilitation is to establish and maintain a healthy and diverse vegetation cover that can sup-

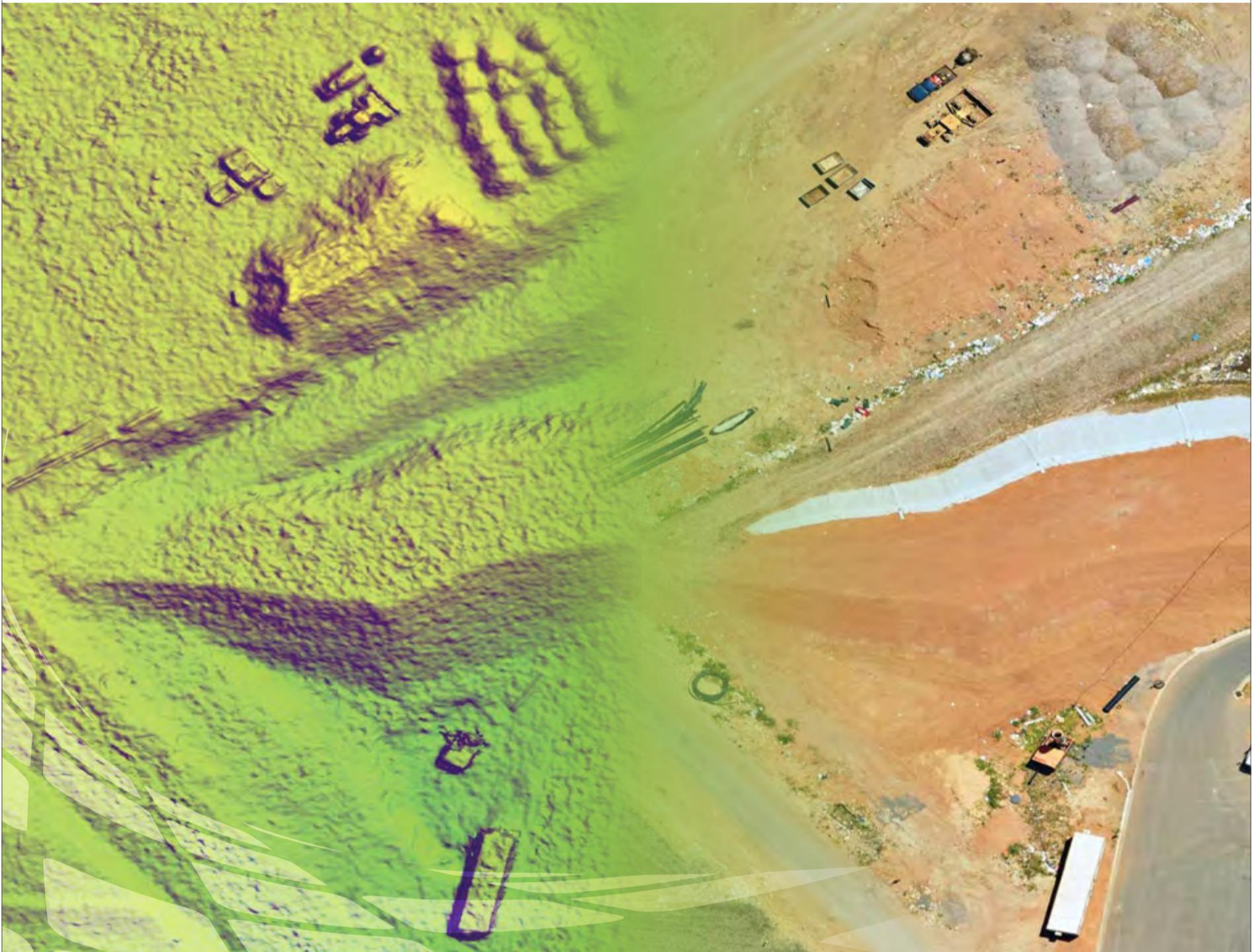
port the ecosystem functions and services of the reclaimed land. Vegetation cover can improve soil quality, reduce erosion, increase water infiltration, sequester carbon, provide habitat and food for wildlife, and enhance the aesthetic and recreational value of the land.

LiDAR vegetation analysis can help mine operators and regulators to assess the effectiveness and efficiency of mine rehabilitation efforts. LiDAR can provide detailed information on the height, density, biomass, canopy cover, species composition and diversity of vegetation across large areas and over time. LiDAR can also detect changes in vegetation condition and health, such as growth rate, stress level, mortality and regeneration.

LiDAR vegetation analysis can support various aspects of mine rehabilitation planning, implementation and evaluation. For example, LiDAR can help to:

- Identify suitable sites for revegetation based on topography, soil type, hydrology and existing vegetation.
- Select appropriate native plant species that match the environmental conditions and restoration objectives of the site.
- Design optimal planting patterns and densities that maximise vegetation survival and growth.
- Monitor vegetation establishment, performance and survival over time and identify areas that need further intervention or maintenance.
- Evaluate vegetation outcomes against predefined criteria and standards and report on the progress and achievements of mine rehabilitation.

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Bringing unique capabilities to solve complex challenges

Outline Global was established to develop aerial imagery services to the mining sector through the design and integration of innovative technology.

With a growing portfolio of services including multispectral imagery, LiDAR and geospatial data intelligence, new possibilities have opened in the industry.

Aerial surveys provide valuable information including:

- ✔ The location of mineral deposits
- ✔ Geological structures that control mineralisation
- ✔ Surface and subsurface features
- ✔ Alteration patterns and geochemical anomalies
- ✔ Environmental and social impacts



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A FRESH STANDARD

All Freshfilter systems utilise advanced cabin air filtration technologies that are designed to combat any health issues due to poor air quality now, or into the future.

Each Freshfilter Cabin Air Filtration System has been designed to comply with:

- International Standards ISO 10263 & ISO 23875
- Recognised Standard 20 (RS20) Queensland Mining Safety • HEPA Filter International Standards EN1822 / 29463
- Active Carbon Filters International Standards EN14387
- Australian Construction and Mining Industry Standards

CUSTOMISATION AND REPORTING

The SmartTech Australia team has extensive experience pulling data from a variety of new and existing hardware/software options in the market.

The company's development team can help scope and deliver:

- User Interface customisation
- API Integration
- Management reporting
- Critical site dashboard tools

SAFETY, SITE AND PROJECT CONSULTING

SmartTech Australia has project teams that have worked across almost all categories of the industry in Australia during the past. These dedicated teams provide clients with consulting services that focus on the safe application, design, installation and maintenance of various technologies.

A HEALTHY WORK ENVIRONMENT STARTS WITH FRESHFILTER

SmartTech Australia is raising the bar when it comes to workplace health and safety standards with their new Freshfilter systems, an innovation in cabin air filtration for the mineral resources sector.

The cutting edge products combine stainless steel durability with high grade HEPA filters and digital controllers, enabling operators to monitor cabin pressure, carbon dioxide levels and hydrocarbons.

Clients can choose from a variety of purpose-built systems, including the F20, F33-R and FF Multibox XS.

With a diameter of only 350mm, the F20 is a particularly compact solution for tight-fit arrangements, while the F33-R is also limited in height and considered perfect as a roof unit.

SmartTech Australia Sales Manager Brendan Villiers said the FF Multibox XS was designed specifically to protect operators against severe dusts and gasses, making it the ultimate safety solution for domestic mining projects.

He said the 3000 Series Controller unit was also a highly-sought after solution, and popular for its stainless steel components and optional hydrocarbon sensor.

"The Freshfilter 3000 series control system is the standard choice," Mr Villiers said.

"It's a robust, stainless steel design with capacity to regulate air flow to maintain cabin air pressure.

"It has audible and visual monitoring and can be upgraded with a hydrocarbon sensor.

"Meanwhile, the 6000 Series Control System is the advanced option in controllers.

"It's similar to the 3000 Series but can be upgraded with both a CO² Monitoring and hydrocarbon sensor."

With offices nationwide and a highly experienced team, SmartTech Australia was trusted to be the exclusive distributor

of Freshfilter systems, underpinned by the ability to provide both installation and support for clients.

The company's extensive offering to the civil and mining sectors is backed by a highly experienced team with their finger on the pulse of the latest market and technological trends.

Launched in 2017, Australian specialist has its roots in SITECH WA, where it first expanded from with just four employees.

Within a year, the exciting new company had acquired LOADRITE dealerships across the Northern Territory, Queensland, Victoria, Tasmania and New South Wales.

Combined with SITECH WA, SmartTech Australia is now the world's biggest Trimble LOADRITE dealership and has grown to more than 20 experienced technicians.

Mr Villiers said his consulting teams offered clients a first rate experience that hit the mark every time on safety and budget, giving operators a strong competitive advantage.

"SmartTech Australia has you covered, no matter the tech you want to engage, data

you need to collect, reporting you need to provide and the industry you are in," Mr Villiers said.

"Through us, you can learn how easy it is to utilise technology that makes significant improvements in project workflow and solves your biggest challenges

"With the addition of On-Board Weighing, Safety and Software solutions to your civil construction projects, you're in a stronger, more competitive position.

"You'll experience new levels of productivity that will enable you to earn the bid and be profitable, project after project.

"Only one partner offers the broadest, deepest and most advanced set of tools, advice and support to revolutionize your construction workflow – SmartTech Australia." **AMR**





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STATE-OF-THE-ART FLANGE FACING & ON-SITE MACHINING



Flange facing can be used on a multitude of applications. Traditionally, it is used to re-machine flanges or heat exchanger faces in situ when they have become warped, worn or damaged. Machining these surfaces can take anywhere from 12 hours to 12 days to complete, which can then translate to thousands of dollars in lost productivity.

Morgan Engineering has been delivering specialised engineering services to the coal mining and construction industries for over 40 years. Since its establishment in 1975, the company has grown from a small engineering shop to one of the most extensive in the Hunter Valley.

Although we have been offering machining services for almost four decades, that doesn't mean we're happy to just keep doing things the way they've always been done. Our team is inspired by a culture of innovation, integrity and quality, working closely with clients to ensure the smooth and efficient delivery of all services.

With many clients in mining, power, water treatment and heavy fabrication, we became aware of the need for a more accurate and cost-effective solution to flange facing machining, with reduced lead time. This is where our team really shines.

We have earned a strong reputation for our innovative approach to delivering bespoke engineering solutions, and this extends to our machining capabilities. We invested in cutting-edge technology and adapted our machining processes, introducing an innovative digital approach. This allows us to provide a far greater scope than businesses that use more analogue methods.

When an unusual application or restrictions make it impossible to fit a standard machine in the space provided, our highly experienced team is fully equipped to go on-site and inspect the item. We take detailed measurements of the equipment and scope using our Leica Absolute Track

AT403 (laser tracker) and leverage our extensive knowledge and skill to build a special machine to complete the job.

Using our 3D laser tracker, we're able to deliver a level of precision that is second to none – on both standard and highly unique applications. The Leica Absolute Track (from Hexagon Manufacturing Intelligence) is an all-in-one metrology solution, which is more portable than any other on the market. The integration of this tool means that we can provide unmatched measurement process speed, improved accuracy and reduced downtime cost – all while maintaining operational simplicity.

This laser tracker is used to determine where the bores are and the XYZ axis and depth, eliminating the risk of human error through digital precision. This extra level of quality assurance gives customers confidence their assets are repaired to within specification, with an exceptionally high standard of workmanship. Our award-winning in-house training pro-

grams for machinists are delivered with care and precision by qualified experts, which radiates through the successful projects we've delivered for clients all around Australia.

Our partnership with Field Machines Australia (FMT) gives us access to an incredible array of tools, which means we've always using the right tool for the job.

FMT also trust us as their partner for on-site machining, and regularly refer clients to us for support on their projects.

Our modern and innovative approach to equipment, technology, processes and training has all culminated in feedback from our clients that they have seen increased accuracy and reduced turn-around time, while also enjoying a cost reduction.

If you're looking for flange facing work to be completed, or any on-site machining, then we are your go to team.

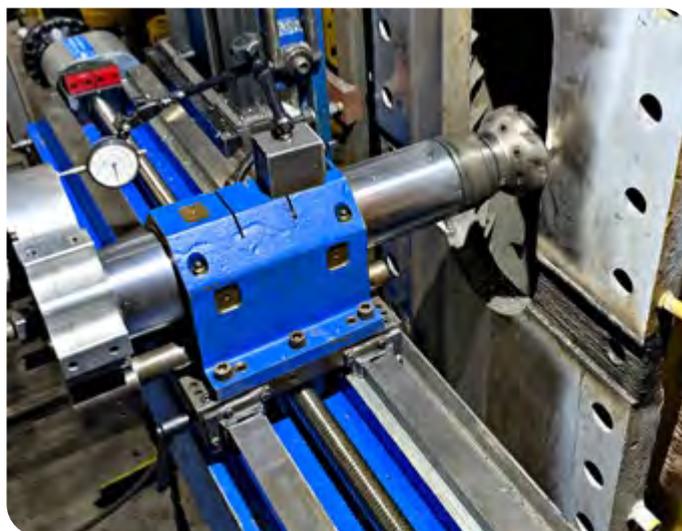
Our on-site machining, field service, and line boring division is complemented by our ultra-modern, high-capacity workshop facility.

Specialising in engineering design and drafting, large capacity CNC Machining and heavy fabrication, our team is equipped to handle end-to-end customer needs.

We work with our clients to provide innovative and tailored solutions. We make it happen.

Contact us today on (02) 6572 2032 or morganengineering.com.au/contact/ to find out more.

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MORGAN ENGINEERING

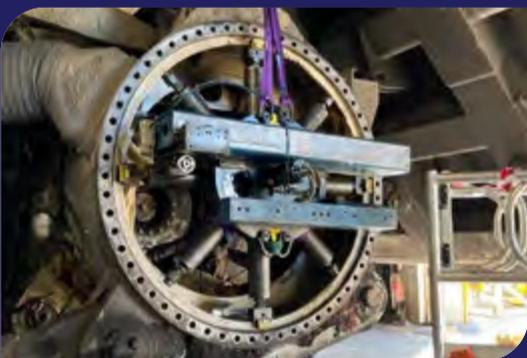
EXPERIENCE. QUALITY. RELIABILITY.

Since 1975, Morgan Engineering has been focused on delivering state-of-the-art capabilities with advanced equipment, providing clients with tailored solutions.

We have proactively shifted away from the traditional analogue approach to the flange facing/flat face circular milling, utilising the latest in digital technology, the Leica Absolute Tracker AT403 to provide a better bespoke solution.

Flange facing can be used on a multitude of applications, which is why the use of our 3D laser tracker that captures measurements and allows for a more precise setup is beneficial for a wide range of industries. The direct advantage for clients is increased accuracy, faster turnaround and reduced cost.

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REDUCED COST
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Exactly What You Need

When You Need It

Flanges routinely need machining maintenance to improve joint integrity, prevent leaks and corrosion.

Field Machine Tools is keeping Australia's plants, valves and pipes precision machined and robust with their first-rate flange facing products.

With head office in Queensland, the company is one of the nation's largest stockist of onsite machining, bolting and maintenance equipment for both sale and hire with branches in Victoria and Perth.

FMT is Australia's only pure-play equipment supplier, we never compete against our customers for on-site service work.

FMT is also the Australian agent for Climax Portable Machine Tools, an impressive range of highly-sought after industrial equipment designed by a market leading manufacturer for the rugged challenges facing Oil, Gas, Chemical & Power Generation Industries.

CLIMAX pioneered the portable machining revolution in 1966. For more than 50 years they have been the innovators and technology leaders in the industry they invented. They're #1 for a reason!

Field Machine Tools Manager Michelle Mills said the Climax range included Flange Facers that had proven to be popular amongst

Australian industry for their durability and precision.

Ms Mills said clients had 29 different models to choose from, this extensive range allows operators to tackle an unrivalled range of applications from 0 to 199 inches (0 to 5054 mm).

"We have available a very comprehensive range as we understand that in industrial settings, flanges come in many different shapes and sizes," Ms Mills said.

"Being able to maintain them with a selection of machines that are synonymous in operation is incredibly advantageous for operators, because it can significantly cut down on productivity down time and the costs associated with repair.

"So we pride ourselves on offering a versatile range.

"For instance, machines like the CLIMAX FF1200/2400/3600 are designed to perform in the harshest of environments, this machine can handle flat face, raised face, RTJ, tongue and groove, lens ring, Grayloc®, and compact flanges.

Ms Mills said the CLIMAX FF5300 was also an exhibition of versatility, with a more compact swing diameter with a minimum clearance of 22.75 inches (577.9 mm).

The product's range spans from 5.7 to 40

inches (144.8 to 1016 mm), meaning it can work in a large range of applications that would usually require at two machines.

Aside from versatility, the Climax products stand out due to their performance-focused design and ability to minimise tool deflection during cutting.

The machines are rigid and provide reliable results, even over bolt-hole patterns and weld overlays, making them a preferable choice over other models.

With a user-friendly build, the Climax range boasts an abundance of features that help technicians reduce setup time and allow users to perform more work in less time.

Ms Mills said this included features like setup fingers and leveling feet, which reduced crane time by enabling quick machine alignment.

"These machines are also easier for technicians to set up, operate and transport because they are lighter and modular," Ms Mills said.

"They perform well, because they are also made well.

"These durable flange facers are built to last under demanding conditions.

"The manufacturer uses quality materials,

high-grade bearings & gears, robust motors, high-grade cutting bits or tooling.

"It won't just do its job in a showroom; it will keep providing great results for two decades and be an excellent return on investment.

"And, importantly, it's extremely safe."

Ms Mills said the range's safety features included pinch point protection, remote-controlled operations, safety interlocks and hands-free feeds to protect technician hands from moving parts.

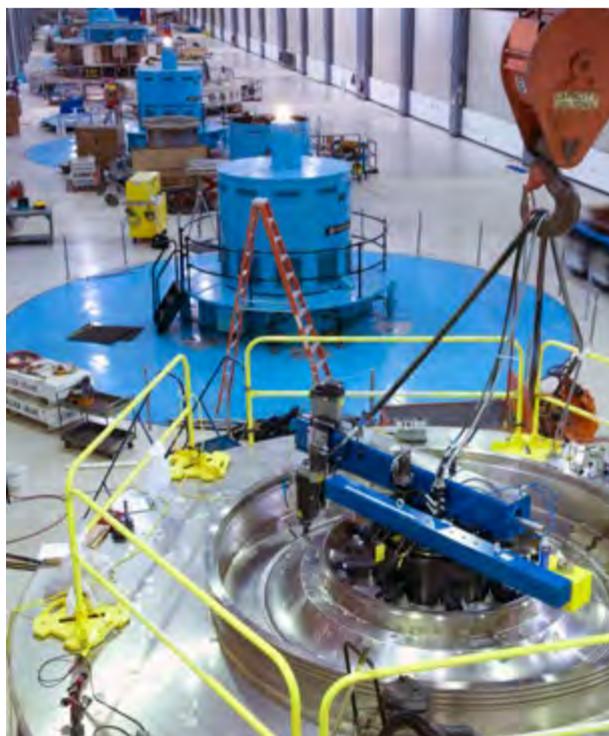
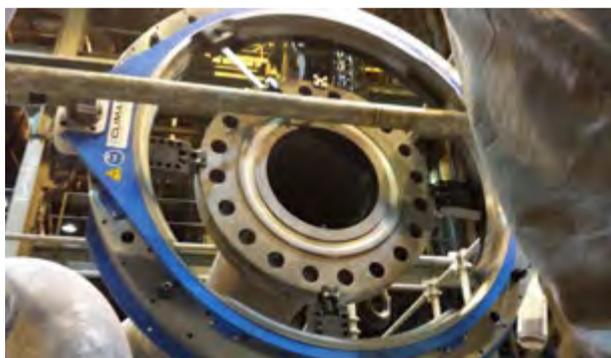
Additional measures included an emergency stop feature and a low-pressure safety system to prevent unintended restarts.

The original manufacturer has also strengthened the product's credentials with a comprehensive after-sales service offering, including training and application support from experts.

Clients can call the manufacturer – Climax – at any time or contact Field Machine Tools for support.

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

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Innovative Products

ID MOUNT FLANGE FACERS

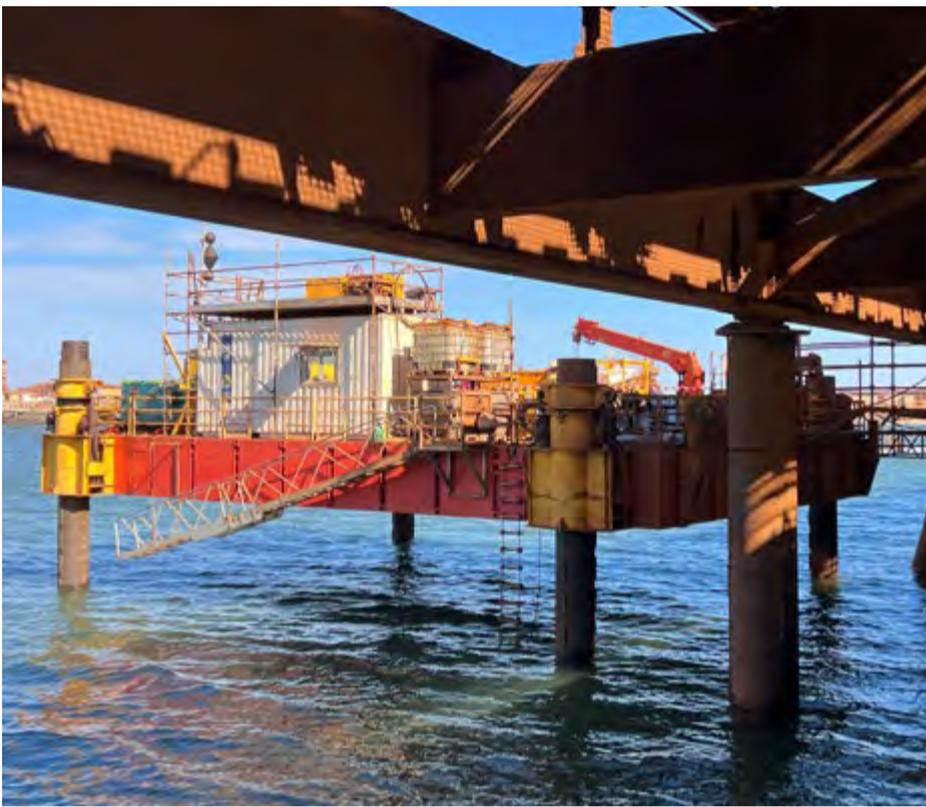
Field Machine Tools has rugged and innovative portable flange facers for 0.75 to 199 inch (19.1 to 5054 mm) diameters. Several of the company's machines can be configured for facing, milling or both. Many of the models reface, mill, bevel, square, counterbore, or cut end prep configurations for welding. For easy setup, smaller units use an integral mandrel to quickly lock into place, while the larger units can be installed with a separate mount or chuck to which the facer body is installed.

OD MOUNT FLANGE FACERS

Field Machine Tools also offers various models of OD mount flange facers to reface, mill, bevel, square, counterbore, or cut end prep configurations for welding. Also considered both rugged and portable, the flange facers are suitable for 0 to 120 inch (0 to 3050 mm) diameters. Several of the company's machines can be configured for facing, milling, or both. For easy setup, larger units can be installed with a separate mount or chuck to which the facer body is installed.

SYGMA MINIFACERS

Best suited for small flanges, this product range comprises of powerful manually operated flange facers for machining connectors in hard to reach places. The setup only takes minutes, while the machining is finished within seconds. It eliminates the need for heavy equipment compressors and other power sources while being extremely easy to operate. They are compact, hand-held and delivered in a hard case to guarantee safe transportation and storage machines wherever needed.



MINE MAINTENANCE SERVICES

In recent years Australian Barge Hire (ABH) has supported the maintenance and refurbishment of various critical overwater infrastructure. ABH's jack up barges are used to provide a stable over-water platform for the refurbishment contractor to setup up project equipment such as specialist blast and paint facilities, blast garnet and waste collection, wash down facilities and general site amenities on the barge.

as the structure (wharf or bridge) being refurbished. The stable elevated platform (not subject to tide movement, waves and current) allows simple personnel access on and off the structure using walkways. These walkways can also be designed to provide an easy solution for running multiple blast and return lines. Once the span is completed the lines and walkways are disconnected from the structure and the barge jacked down and moved along to the next work face.



The ABH jack up barges (JUB's) are typically positioned between two spans and progressively moved along the structure as works progress. ABH workboats support the JUB and ferry blast garnet and paint from shore out to the Jack up barge and back load returning waste material to shore. These critical items are lifted on and off the jack up barge using the deck crane which comes standard on ABH barges.

For more information or to request a quote, visit www.australianbargehire.com or call 02 9531 2900.

AMR



As illustrated by the photo above, if the water depth permits, the jack up barge can be elevated to be at a similar height

SUPPORTING CRITICAL OVERWATER INFRASTRUCTURE

Access over water operations with ease with Australian Barge Hire's jack up barges. These barges can be elevated out of the water above waves and tidal movements, providing a safe and stable working platform.

They are used to provide a stable platform for:

- Waste collection • Wash down facilities • Paint facilities • General site amenities

Contact:

- ✉ info@australianbargehire.com
- ☎ 02 9351 2900
- 🌐 www.australianbargehire.com



EMBRACE TOTAL CONTROL WITH PROTOBLAST

Since 1975, Protoblast has led the way when it comes to engineered abrasive blasting systems for all industries. Today, the Australian owned and operated company is still run by the same family, now in its third generation, with all equipment designed and manufactured in Picton, NSW. With over 45 years of experience, we have found time and again that the cost of logistics from outsourcing the abrasive blasting process is very often hidden and overlooked and has shown that it is, more often than not, approximately equal to the invoice value of the blasting. This has driven Protoblast to help local manufacturers become more efficient and self-sufficient by providing high quality locally made and serviced abrasive blasting equipment.

The Power of Total Ownership and Support

Working directly with the manufacturer gives you unmatched precision, ensuring uniform surface preparation and consistent results with every project. This level of control allows you to elevate your standards and deliver excellence in every detail. Protoblast take pride in offering complete ownership and ongoing support throughout your journey with them. From the initial consultation to installation and beyond, their dedicated team will be by your side, ensuring your success at every step.

Expert Guidance and Customisation at Your Fingertips

Protoblast recognises that every business is unique, with specific requirements and challenges. That's why they give you direct access to their experienced engineers and professionals. These experts possess in-depth knowledge of abrasive blasting processes and will guide you through the selection, customisation and implementation of Protoblast equipment to suit your precise needs. With their expertise at your disposal, achieving optimal results has never been more accessible.

A Commitment to Excellence

Protoblast has garnered a reputation for excellence, and their commitment to customer satisfaction is unwavering. Their team of experts is not only passionate about delivering top-of-the-line equipment but also dedicated to supporting your business throughout its journey to success. They understand that your triumphs are their triumphs, and that's why they go above and beyond to ensure your experience with Protoblast is nothing short of exceptional.

Sulzer, a long-standing customer of Protoblast, has been operating a blast chamber since its initial installation in 1992. Their blast chamber had served them well for many years, but the abrasive recovery system and the wet-type dust collector were becoming increasingly problematic. To address this concern, Protoblast upgraded its blast chamber just last year, 2023, with new dust collector and abrasive recovery system. Protoblast's recent upgrade has made a substantial impact on Sulzer's operation. According to Sulzer, **"It has done everything we expected and more, we are saving 30-40% on abrasive alone. The new system is cleaning it properly compared to the old system."**

This is a testament to the incredible results that collaboration with Protoblast can bring: enhanced efficiency, reduced operational costs, and a safer work environment for its clients. This also means that Sulzer's consistent confidence in Protoblast's ability to deliver top-notch solutions enhance their operations and efficiency.

At Protoblast, they believe in empowering businesses to achieve greatness. Their abrasive blasting equipment isn't just machinery – it's a catalyst for transformation. Whether you're seeking efficiency gains, enhanced quality, or a competitive edge, Protoblast has the solution.

Embrace the power of total control with Protoblast! protoblast.com.au



A leading Australian manufacturer of
ABRASIVE BLAST EQUIPMENT



ProtoBlast has been designing and manufacturing to suit customers' individual needs since 1975.

- ✓ ABRASIVE RECOVERY SYSTEM
- ✓ AIRLESS BLAST MACHINES
- ✓ SECTION BLAST MACHINES
- ✓ DUST COLLECTORS

The best way to prepare a surface for a coating is by using the abrasive blasting process. Whether you need to blast earthmoving equipment, turbines, structural steel or railway lines...

We have successfully completed projects for Bechtel, BHP Billiton, ThyssenKrupp and BAE Systems just to mention a few.

ProtoBlast has the experience to design and supply equipment that is fast, efficient, improves your product and saves you money ... year after year.

Do you want to take control?

Bring your blasting in house.

☎ 1300 895 381 📍 6 Bollard Place, Picton NSW 2571 ✉ sales@protoblast.com.au 🌐 protoblast.com.au

Protect Profits and the Environment with Blast Dispersion Modelling

There is no question that blasting is a crucial element of mining practises, integral to the optimisation of yield. It's a process awash with complexities, involving numerous factors to ensure it is both safe and successful. There are many aspects that can be controlled, and then there is the effect of the weather — an eternally mercurial force that can upend your best intentions. Thankfully, we have a solution for the potential of wind to send your plume in the wrong direction or rain to soak your explosives. And we can give you the best tools to support your accurate reading of the local forecast and adherence to legislative requirements.

When meteorological conditions send hazardous materials in the wrong direction

When you blast using a generic forecast, there is a much greater potential for error in the outcome. Concentrated blast plumes blown towards your personnel or over the surrounding community can severely damage both health and the environment. The last thing anyone wants is to make this kind of avoidable error, potentially spreading harm and risking relationships built with the community around the site.

Internal factors, such as the material being blasted, the type and condition of the explosive, and the blast design information, can influence the dispersion of the dust cloud. Then, there is the primary external influence of the weather. Understanding this influence and taking the local forecast into account when running blast simulations promotes certainty. A generic forecast is often built on the observations of weather stations miles from your site; this decreases their accuracy substantially. The most precise weather forecasts, especially for wind speed and direction, come from detailed on-site observations and proven forecasting models. It's this kind of precision — as well as ingesting your on-site parameters and environmental observations — that form the foundation for our blast dispersion modelling.

Blast simulations using environmental monitoring and site parameters

Weatherzone Business, a DTN[®] company, created Blast Dispersion Modelling as a solution to the complex needs of the global mining industry. It provides a scientific, visual understanding of blast events, expected trajectory, and pollutant concentrations. This foresight allows you to make informed critical decisions on when to blast. Precise weather forecasts with data points every 250m, both horizontally and vertically, are taken into account. The model is also completely customised to each site. Such customisable parameters include the separation of particle size into different bins, the input of surface

geology at the mine location (fractions of clay/silt/sand), site topography, and your licence and legislative requirements.

Simulations can run before the blast days with a risk outlook for projected outcomes of up to two weeks. It provides real-time, highly accurate dust cloud modelling that allows users to visualise where any lifted particulate matter (such as P10) will be transported to. Integration of dust monitors and tapered element oscillating microbalance (TEOM) help improve forecasting accuracy. You can foresee weather conditions for each simulated blast, confidently determining the optimal blast window that minimises atmospheric diffusion and impact on the local community.

A logical traffic light system guides your planning

You can foresee weather conditions for each simulated blast, confidently determining the optimal blast window that minimises atmospheric diffusion.

An integrated Fume Management Zone (FMZ) tool adds to the depth of your blast planning. A logical traffic light system indicates whether your simulated blast creates pollutants above or below pre-set thresholds at any virtual or existing monitors. You can create FMZs within the system, making it simple to plan and mitigate against risk. All these details are easily visualised in clean and informative reports, allowing you to justify your decision-making on when to blast.

The ability to gain post-blast observations buys precious time. This time can optimise the coordination of dust suppression efforts, improving their efficacy and your site's environmental compliance. Ensuring compliance and reducing the likelihood of particulate matter gone awry will ultimately protect people and the environment, as well as profits. When a blast is detonated, and the conditions are just right, no money is wasted on repeated blasts, lengthy clean-ups, or legal retributions.

Simulations can run before the blast days with a risk outlook for project outcomes of up to two weeks.

You can foresee weather conditions for each simulated blast, confidently determining the optimal blast window that minimises atmospheric diffusion.

Access reporting to meet your licence and legislative requirements

Our cloud-based, fully auditable report trails assist you in fulfilling your licence and legislative requirements.

Automated generation capabilities bring together the forecast, weather station, and monitor data into clean and informative reports. As blasts are executed, supervisors and managers can add their pre- and post-blast observations, ensuring requirements are met and communication is clear. Blast simulation reports are archived for one month. This allows environmental officers to retrieve previous forecasts to understand the projected conditions and what information underpinned any decisions made. This valuable capability assists with internal audits and provides answers when investigating concerns raised in external complaints. The reports are easy to access and intelligently presented, ensuring complete comprehension.

Choose Blast Dispersion Modelling that drives informed critical decisions

Weatherzone Business, a DTN[®] company, are here to give your site the best chance to detonate safely and effectively. With this entirely customised solution, nothing is left to chance, and decision-making is streamlined. You have complete foresight based on your unique requirements and environmental monitoring. Reduce the environmental, safety, and financial risks associated with the local forecast and gain the power of predictive dispersion modelling. Talk to our industry experts and transform your approach to blast planning, protecting the environment and your profits.

Explore our comprehensive suite of [mining solutions](#), tailored to your site and operational scope. **AMR**

Get in touch

1300 883 650

sales@weatherzone.com.au

business.weatherzone.com.au



powering smarter weather decisions

SITE SAFETY - LOCKOUT STAY SAFE

GROUP LOCK BOXES OF ALL SIZES
One person, one lock



If more than one person is working on the same plant, each person should attach their own personal padlock to each isolation point to prevent the equipment being operated.

The isolation procedure should identify common lock out points to ensure energy cannot be restored while someone is still working on the plant.

To avoid the need for multiple locks on each lockout point, a group lock box will often be used.

Group lock boxes are a great solution for isolating energy points when a large team is working.

Using a group lock box allows you to dramatically reduce the number of locks required on a job, as well as limiting the weight on each isolation point by eliminating the need for lockout hasps and multiple padlocks, plus it provides a quick overview of who is still working without going to each energy point to check.

Under this system each lockout point is locked by only one lock (usually the supervisor).

The keys to the locks of the plant's lockout points are placed inside a Group Lock box, which is locked by all the individual locks of people working on the same plant.

As each worker's task is completed, he or she removes their own personal lock.

When all locks have been removed, an authorised site supervisor verifies all workers are out of danger before reactivating power supplies or equipment.

There are many options available when it comes to group lock boxes and their sizes.

Currently Cirlock stock options from 16 to 84 padlock holes, also in varying designs to suit the needs of the job.

Larger group lock boxes also include storage hooks for padlocks when not in use and instruction holders can be fitted to some models.

Group lock boxes play an important part in site safety and efficiency.

Now with even a custom-made option available there are no excuses for compromising site safety and all employees can be kept safe using the most up to date equipment to enforce the most stringent procedures on your site.

Contact: sales@cirlock.com.au
Tel: 07 5445 2910
www.cirlock.com.au
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CIRLOCK LOCKOUT / TAGOUT EQUIPMENT

LOCKOUT EQUIPMENT

GROUP LOCK BOXES

When multiple people need to work on the same equipment, a Group Isolation Box is often used. The equipment is Locked Out by a maintenance padlock (or a supervisors padlock), the key is placed inside the Group Isolation Box and all workers place their keys on the outside of the box preventing access to the Equipment Key until all work is complete. It keeps each team member safe and also eliminates the need for multiple padlocks on individual isolation points.

LOCKOUT PADLOCKS

Cirlock's Lockout Tagout Padlocks come in 8 different colours, with various shackle sizes and shackle types (Non-Conductive and Stainless Steel) and can be keyed differently, keyed alike or master keyed, to suit your requirements.

Cirlock Padlocks are available for immediate dispatch.



See our full range on our website: www.cirlock.com.au
lockout@cirlock.com.au | 1300 889 738



COMPLETE SUPPORT FROM THE GROUND UP

Jetcrete is Australia's leading ground support specialist to the mining industry. Using the most advanced and innovative techniques, as well as specially adapted placement materials, Jetcrete delivers all surface and underground shotcreting and concrete spraying services to mine sites.

Jetcrete understands that no two mine sites are the same. With more than 40 years experience across the industry, the Jetcrete team has seen it all and can help navigate through any underground or above ground challenge.

The company manufactures about 271,000m³ of concrete each year and has installed 440,000m of cablebolts.

Its fleet of 183 mobile concrete trucks are ready to service any Australian mining operation, backed by a team of 500 personnel across the country, and can establish sites in remote areas in a matter of days.

UNDERGROUND SHOTCRETING

Jetcrete provides a complete service and one-stop shop solution for all stages of underground shotcreting.

These include excavation, onsite concrete, shotcrete and CAF manufacture, drains, high walls, bulkheads, vent walls, as well as the supply, delivery and installation.

The company's reputation for high-quality work across mine tunnels, portals and shafts has earned them a solid following in their field.

Jetcrete is trusted by and partners with mining majors including BHP, Glencore, Northern Star Resources, Newcrest Mining and Gold Fields.

A CUT ABOVE THE REST

Over the years, Jetcrete has introduced most of the modern technologies used for shotcreting in Australian mining, such as overhead wet shotcrete, robotic shotcrete units, hydroscaling and most recently the industry benchmark for shotcrete thickness measurement – shotcrete scanner.

The Perth-based company is the first and only shaft lining contractor in Australia equipped to safely operate in niche and

highly-specialised ERZ1 hazardous environments.

The shotcrete solutions provider is also capable of delivering surface and underground civil infrastructure works including earthworks, concrete slabs, heavy vehicle workshops and site offices.

WIDE ARRAY OF SERVICES

Along with shotcreting, Jetcrete provides a wide array of services including:

Concrete manufacturing: Jetcrete owns 16 batch plants, enabling mine sites to access 24-hour concrete, CAF and shotcrete manufacturing.

Delivery: A fleet of 75 underground agitators allows Jetcrete to support any site, including remote and hard-to-reach sites.

Ready Jet® Drum Blasting: Remote-controlled, high-pressure cleaning system for agitator drums eliminates the need for workers to enter confined spaces within the concrete mixer drum and reduces cleaning time by up to 75%.

Remote shaft lining: Jetcrete is the leader in remote shaft lining with three units in Australia, and further capacity in Indonesia and North America.

Cable bolting: Jetcrete is currently the largest Sandvik cable bolter operator in Australia.

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

Civil construction: Jetcrete's capabilities include heavy duty workshops, mine site offices, machine foundations and slabs, drainage and culverts, earthworks and high wall stabilisation. **AMR**

JETCRETE'S WOMEN IN MINING DAY

This month saw Jetcrete hold the latest event in their Women in Mining event series at the Byrnedcut Group's purpose-built Training Centre at their Perth Airport Head Office.

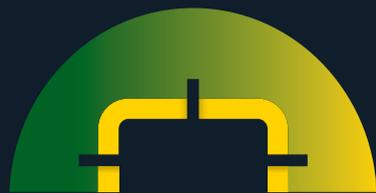
The event welcomed a group of women in to explore various pathways and careers in mining. The afternoon was filled with career information, hands-on experiences with VR technology, simulator mining equipment and a panel talk that was led by incredible women already working for Jetcrete and Byrnedcut.

The ongoing event series is designed to invite women who are new to mining and remove some of the stereotypes (including gender stereotypes) that are commonly associated with the industry.

The event included presentations by female Jetcrete and Byrnedcut employees from the group's Western Australia operations covering topics such as how they got into the industry, a day in the life of a female tradie and how they felt working in a male-dominated environment. Attendees also got some practical exposure through the Jetcrete's VR shotcreting simulator and Byrnedcut's various mining equipment simulators.

Attendees were a mixture of apprentices, university students, people currently working on mine sites but not in mining roles and people looking to change industries. The feedback from attendees was very positive, with many agreeing that they "enjoyed the personal accounts of the mine life by current employees and the virtual reality experiences".

Jetcrete and Byrnedcut will continue to run the Women in Mining event series in 2024 with locations such as Brisbane, Townsville and the South West next up in the roadshow. For 2024 date announcements, make sure you're following @jetcreteozptyltd and @byrnedcutaustralia on Facebook.



JETCRETE

Complete support from the ground up

As Australia's leading ground support specialist to the mining industry, Jetcrete uses the latest techniques and specially adapted placement materials to provide a shotcreting service for clients across the country.

With more than 40 years in the industry, Jetcrete has extensive experience in all aspects of concrete spraying. We are capable of providing a complete service for all stages of underground shotcreting service including onsite concrete, shotcrete and CAF manufacture, delivery and application.

Jetcrete is also capable of delivering specialist ground support services including shaft lining, cable bolting and resin injection.

Find out more about our services and careers, visit:

jetcrete.com.au

2023 ... ANOTHER MILESTONE FOR AUSSIE PUMPS

Australian Pump Industries (Aussie Pumps) celebrated their 30th year in business in March 2023. This dynamic Australian company continues to develop great products for the Australian mining industry. Their philosophy is simple. Analyse what the customer needs, research existing methods and, come up with something which provides a safer, faster and smarter solution to meet the requirements.

2023 resulted in a number of milestones apart from the 30th anniversary of the company.

Here we celebrate some of those major breakthroughs that have served the Australian mining industry so well over the last three decades.

MONSOON PROTECTION ... AUSSIE FLOOD BUSTERS

Seeing flood catastrophes cause major disruption to mining operations made Aussie's Chief Engineer realise there was a requirement for simple, virtually maintenance free pumps, that could move loads of water fast.

Aussie's solution was the big 6" QP60TD self-priming pump delivering 240,000 litres per hour. This simple pump, provided a maximum delivery head of 35 metres

and the ability to draft water through a 7m vertical lift.

At the time of its launch, it surprised the market with its versatility, low cost and uncomplicated design.

"A big open impeller operating within the pump housing and a monstrous priming tank designed into the cast iron body gave us phenomenal efficiency in moving large volumes of dirty water fast", said Aussie Pumps' Chief Engineer, John Hales. "It's now equipped with E-Stop, battery isolation, heavy duty lifting bar and fire extinguisher for mine site applications", he said Hales went on to comment that it was the performance of the pump and its simplicity that won over the market.

"We fitted it with an oil lubricated Tungsten carbide seal, a wear resistant volute and the ability to handle 40mm spherical solids. The easy clean out port can be opened up and the pump internals cleared of obstructions in a matter of minutes", Hales said.

It has a 60 litre fuel tank integrated to the pump skid, enabling the Kubota diesel engine that powers the pump to have a run time of ten hours between refills. The machine was developed initially for Australia's mining industry but has since been used on construction sites, public works duties



Aussie Pumps production team celebrated the company's 30 year anniversary earlier this year.

for local government and of course for flood mitigation!

BIG FLOOD FIGHTER

Requests for even bigger capacity pumps, but in the same simple, "wet prime" design, resulted in the introduction of Aussie's big 6" Deutz powered pump. Called the Aussie MQ600TD, it will produce a maximum of 6,000 litres per minute, that's 360,000 litres per hour or 8½ million litres per working day.

The pump is perfectly matched to the 80 hp Deutz air cooled engine. That four cylinder, electric start engine also boasts a LOFA Control System that monitors oil pressure and temperature, and manages V-belt failure shutdown.

The pump is designed for the toughest of applications on mine sites handling both contaminated and abrasive liquids. It is also fitted with an oil lubricated Tungsten Titanium Carbide seal as standard equipment. The impeller is a 'big throat' design with clean out port built into the front of the body for easy clearance of chokes.

"It's a monster with an integrated 152 litre fuel tank that enables it to run without refuelling for up to ten hours", said Hales.

Like the smaller 6" pump, this unit comes with as either a heavy duty site trailer mount or skid mount, both with integrated lifting bar.

The control panel is shock mounted in a water resistant housing and includes an hour meter, ammeter, tachometer and alternator failure light.

The response of the mining industry was significant. These pumps are now being used on alluvial gold mines not just in Australia but throughout the South Pacific. "They do a mighty job and are all based on our experience and feedback from the field", said Hales.

PORTABLE FIRE PUMPS

The Aussie Fire Chief is a portable high pressure fire pump with a reputation for quality and performance. Supplied for non-mine applications with Honda engine, it was also quickly adapted to suit a Yanmar or Kubota diesel engine drive.

"No mine wants a fire on a machine or in the processing of the product", said Hales.



Mud tank fitted with an Aussie 2" compact, hydraulic pump.

"We took a standard diesel powered Fire Chief and modified it into our Mine Boss configuration."

Fitted into a heavy duty stainless steel frame, complete with integrated lift bars, the unit is equipped with E-Stop and battery isolation and of course the proverbial essential safety fire extinguisher.

From a single impeller Fire Chief, with 75 metre head and 450 litres per minute flow, the company developed twin impeller pumps. The capability of these "twins" means they can also be used to move water long distances, and even for plant wash-down.

The popular Mr T twin impeller fire pump has now evolved into a 3" x 3" pump that will shift 12,000 litres an hour, at 80 metres head. It sounds incredible but it turned out to be a real breakthrough for the mining industry.

AUSSIE GOES HYDRAULIC

14 years ago, Aussie Pumps introduced their range of hydraulic drive, cast iron semi trash pumps. The first units were 2" x 2" with a delivery of around 600 litres per minute and heads of around 25 metres. Today the product range has grown substantially with big 4" pumps delivering 2,200 litres per minute and built with big open impellers to handle solids in suspension.

The hydraulic motor means that these pumps can be driven from the hydraulics systems of water carts or drill rigs. These pumps are now found on exploration rigs, water well rigs and even vertical boring machines. The hydraulic concept really works as it means there's no small engine requires maintain.

KEEPING IT CLEAN

Contact with the mines taught the Aussie team that there was a real opportunity for a top-quality range of high pressure water



blasters. The company was already building machines for the commercial market but realised that the "Mine Boss" concept could also be applied to pressure cleaners. The result is a range of heavy duty range of machines built for mining applications from 2,000 psi all the way through to 7,300 psi! Some of these machines are class B and require operator RTO certification under Australian Safety Standards AS/NZS 4233.1

These machines are used for a wide range of applications from corrosion control at the mine processing plants, cleaning down mobile equipment and even hydrostatic testing where required.

JETTERS FOR MINES

The company discovered that there are a wide range of maintenance applications in mining that require regular cleaning out of pipes and tubes.

Once done with rods, this was both a dangerous and labour intensive process. Aussie's range of high pressure Jetters, originally designed for commercial applications, were converted over to diesels for mine spec compatibility.

The Mine Boss Jetter range now includes pumps that deliver 5,000 psi and 25 litres per minute or, optionally, 31 litres per minute at 4,200 psi. There's not much that will stand up to those kinds of pressures.

Aussie's big 6" MQ600TD on site managing water levels



Aussie's hydrostatic testers enable the integrity of pipes, pumps and valves to be determined and leaks to be identified.

The kit includes lightweight, 5,000 psi rated sewer hose and a variety of jetting nozzles suited for various chokes.

HYDROSTATIC TESTERS ... INTEGRITY COUNTS

Pipelines must be structurally sound and able to withstand their maximum operating pressure. Their integrity is tested by filling with water and increasing the pressure up above the maximum allowable operating level. The pressure is then held for up to 8 hours. Any drop in pressure indicates an issue to be resolved. By blocking of sections of the pipe in turn with inflatable plugs,

the location of the leak can be determined.

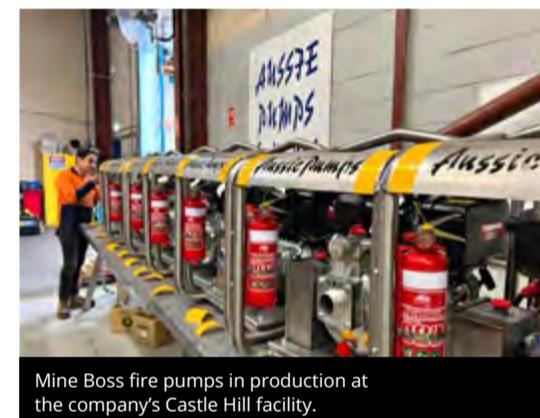
Feedback for the market led to Aussie developing a range of hydrostatic test units with flows to 150 litres per minute and pressures up to 500 BAR (7,300 psi).

For high pressure applications, as required for gas pipelines, the heart of the system is a 'Big Bert' Bertolini pump. These heavy duty triplex pumps are slow speed and designed for continuous running applications.

Aussie hydrostatic testers are fitted with an adjustable regulator that enables the operator to set the required pressure. They are equipped with a double lock off valve system and two pressure gauges. This enables the operator to isolate the pump from the job and check the line pressure is maintained.

The units are trolley mounted for ease of movement on site. The standard range uses top quality industrial diesel engines. The range also includes petrol, hydraulic, electric and flame-proof electric drive units.

Machines with pressures of up to 40 bar are commonly used for testing water supply lines and similar relatively low pressure systems. Aussie Pump use rugged diaphragm style positive displacement pumps to provide pressure and flow for these applications. This



Mine Boss fire pumps in production at the company's Castle Hill facility.

means they can be used to fill the pipes and well as pressure test them.

Hydrostatic testing is also very effective in proof testing pumps, valves, pressure vessels and other liquid system products. For example, Aussie Pumps uses them to test for leaks after assembling or servicing pumps.

SO WHERE FROM HERE

The company has achieved its goals in becoming a major supplier to what is Australia's most essential industry. Their success is based on listening to customers, absorbing, questioning and developing products that will be safer and more efficient than current methods.

"Our job is to support the industry and learn as we go. For example, drill rigs are essential for the mining, but, in spite of our success in that area we are still learning about how to build the perfect mud pump!" said Hales. **AMR**

Further information is available online at www.aussiepumps.com.au or by calling 02 8865 3500

GOING ABOVE & BEYOND

THE GOLD STANDARD IN DRUG & ALCOHOL SCREENING

While urine may be considered the gold standard in drug and alcohol screening (DAS), there are situations where a different solution is required in order to keep workplaces safe.

Australian Clinical Labs toxicologist Dasun Suwandaradne says the company is about to launch on-site saliva testing for drugs.

"Saliva can be offered to clients depending on worksite needs," he said.

"It offers an alternative matrix where typical urine setups might be logistically challenging," he said.

"In urine testing, you need to have a separate toilet, the taps must be closed off, nothing can be in the toilet while the testing takes place, and the toilet water needs to have blue stuff added to it.

"There are various setups required which can be quite tedious if a client's premises doesn't allow that.

"With saliva, you don't need that kind of protocol – we can just go to site and do the collection."

Australian Clinical Labs offers confirmation from an on-site non-negative result and provides further laboratory-based screenings and confirmations depending on the client's needs.

Mr Suwandaradne says saliva testing negates privacy issues surrounding urine testing.

"The donors will always be facing our collectors and there are no real opportunities for donors to fake the system," he said.

"Both parties will be in the vicinity or view of each other the entire time."

Mr Suwandaradne adds that saliva testing is used for

the same drug classes as urine but there is one distinguishing factor.

"The majority of them they are looking at the parent drug rather than the metabolites as with the urine," he said.

"We do have the addition of oxycodone in saliva which we currently do not test for in urine.

"Because the mouth has a lot of blood vessels where the drugs diffuse from into the saliva, the levels calculated in saliva are similar to that of what is in the blood for most of the drug classes.

"This will allow for additional information, such as, estimating more accurately when someone has taken a particular drug and the likely level of impairment."

How does this work? What is involved for clients?

Australian Clinical Labs offers rapid lab-based drug screening and confirmation in both urine and saliva, in accordance with both AS 4308 and AS 4760. The company also offers lab-based alcohol screening.

In recognising the fast-paced operational and productivity needs of mining clients, the company provides on-site drug screening in urine, on-site saliva screening and on-site alcohol breath testing.

Instant DAS kits and saliva kits can be supplied for these on-site collections and testings.



ToxWipe 7 is Australian Clinical Labs' preferred on-site testing device for saliva.

ToxWipe 7 is Australian Clinical Labs' preferred on-site testing device for saliva.

"The collector will use this device to swab the mouth and it will provide a rapid on-site negative or non-negative response on-the-spot," Mr Suwandaradne said.

"If the result is negative, all is good, but if the person tested returns a non-negative, the collectors on-site will send me the person's saliva collection, where our team will do confirmation testing on the LCMS instrument in our laboratory."

The entire process for saliva testing takes a few hours – this includes the setup and cleanup – but the individual sampling itself take about 15 minutes.

The instrument run time can vary depending on the number of samples.

"We have the ability to do everything in a day," Mr Suwandaradne said.

"We are able to get the sample extracted, run on the instrument and provide the client with the results the same day for an additional fee as it will require some extra resources in term of staff time."

Drug and alcohol testing is paramount to keeping workplaces safe and reducing the risks of accidents or injuries due to workers being affected by drugs or alcohol.

Rapid turnaround time & always one step ahead
Australian Clinical Labs can assist

companies with providing a safe work environment for all employees.

"We have a team of qualified, experienced and highly professional personnel that we can mobilise whenever we need to go to site or office to perform urine and saliva DAS, as well as breath alcohol testing," Mr Suwandaradne said.

"We also perform blood collections on-site for immunity screening or biological monitoring and we are able to provide this service for both large- and small-scale operations."

The toxicology department of Australian Clinical Labs consists of clinical experts, including Mr Suwandaradne and Dr Tony Mak, that are on-hand to help businesses with any toxicology-related queries.

Along with performing drug screening in both urine and saliva, according to their respective Australian Standards, the team also tests for alcohol in urine along with other drugs that a client may request.

"We are continuously improving our evaluation methods to ensure authentic screening," Mr Suwandaradne said.

"We consistently investigate other markers in urine, keeping our clients one step ahead of the game when it comes to this kind of integrity testing."

Australian Clinical Labs offers rapid turnaround time, quality analysis and reporting and have the ability to test for other drugs that are not routinely included in the AS 4308 standard list of drugs.

"Our commercial team are more than happy to answer any queries and can assist in catering solutions that suit the needs of individual organisations," Mr Suwandaradne said.

"We value long-term partnerships and strive to provide a service that is unparalleled every time." **AMR**

AUSTRALIAN CLINICAL LABS TOXICOLOGIST DASUN SUWANDARADNE BSC(HONS) MSC

Dasun Suwandaradne is a toxicologist with almost 15 years' experience within the field of toxicology (both forensic and workplace). This includes senior roles both in Australia and the United Kingdom.

Dasun has previously worked as a senior examiner at LGC Forensics (now known as Eurofins' Forensic Services) in London, before migrating to Australia to take on the role of chief scientist (toxicology, special chemistry and trace elements) at Laverty Pathology.

Dasun's main projects have included:

- improving the efficiencies for urinary drugs of abuse testing to AS/NZS 4308:2008;
- revalidating oral fluid analysis for drugs of abuse in accordance to AS/NZS 4760:2019; and
- analysis of synthetic cannabinoids using high resolution mass spectrometry set up.

Dasun has brought his expertise to the role of scientist-in-charge (toxicology) for Clinical Labs WA, with a focus on expanding drugs and alcohol services (DAS) including saliva testing.



Australian Clinical Labs' toxicology department does confirmation testing on the LCMS instrument in its laboratory.



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