

THE AUSTRALIAN MINING REVIEW

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MINING IN
KALGOORLIE**

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SERVICES
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TWO MINERS
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IN FOR THE **LONG HAUL**



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What stories matter to you?



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**HOT CHILI**
MANAGING DIRECTOR
CHRISTIAN
EASTERDAY

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MINE

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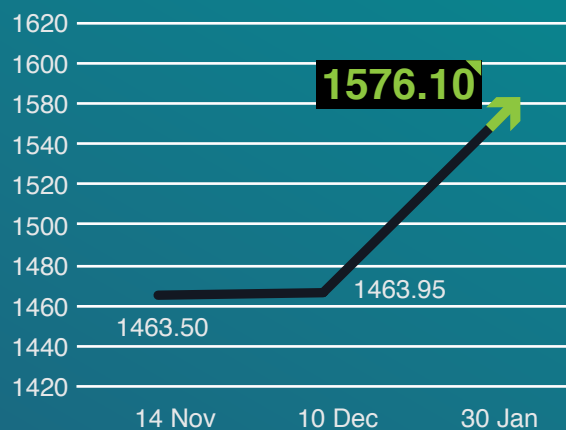


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GOLD

\$US/oz

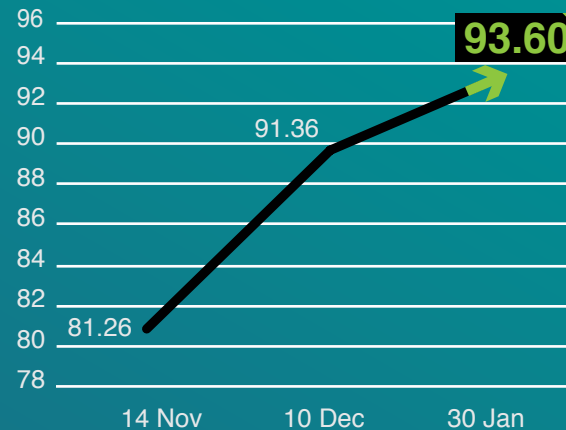
Gold continued to rise on international instability, as Brexit enters its final phase, the US/China trade war drags on and Iran and US reach a stalemate.



IRON ORE

\$US/t
62% Fe CFR China

Severe flooding in Brazil in Jan causing supply shocks has created a positive outlook for iron ore, however conditions may change with investor jitters over the coronavirus impact and drop in steel demand in China.



COPPER

\$US/t
LME Price

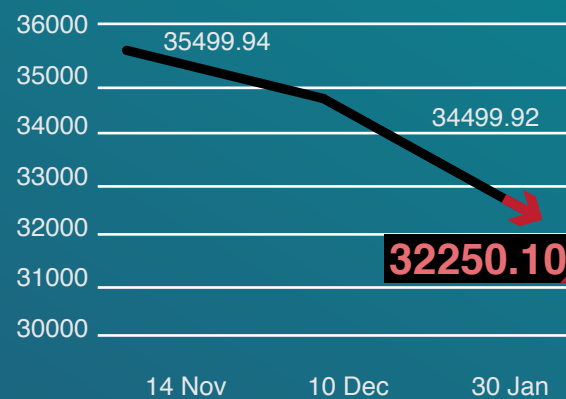
The effect of the coronavirus in China has seen copper plummet to its lowest price since October. This continues a long losing streak with prices falling for nine consecutive sessions.



COBALT

\$US/t
LME Price

The closure of Glencore's Mutanda mine in DRC thanks to the low cobalt price may correct the oversupply and give an impetus to the market.



ALUMINIUM

\$US/t
LME Price

Indonesia continues to increase national production aligning with a growing export demand. In spite of current losses, aluminium usage is likely to increase globally, and industry remains optimistic.



ZINC

\$US/t
LME Price

Prices have dropped significantly this month as the US and China trade negotiations stabilised, but the potential of restricted supply amid tariff rumours could see prices spike again in the New Year.



LEAD

\$US/t
LME Price

Though smelter closures and increased environmental controls could lower output, demand from the automotive industry which uses lead in car batteries, may have a positive effect on prices.



NICKEL

\$US/t
LME Price

Nickel had its lowest close since July at the end of Jan, this year. With Indonesia's export ban lifted demand has tempered and the emergence of the coronavirus has spread more jitters through the market.



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Database of tailings dams

RAY CHAN
INTERNATIONAL

ENVIRONMENTAL organisation GRID-Arendal, with support from the UN Environment Program, has launched the world's first publicly accessible global database of mine tailings storage facilities.

The Global Tailings Portal was built by Norway-based GRID-Arendal as part of the Investor Mining and Tailings Safety Initiative, which is led by the Church of England Pensions Board and the Swedish National Pension Funds' Council on Ethics, with support from the UNEP.

The initiative is backed by funds with more than \$US13t under management.

Until now, there has been no central database detailing the location and quantity of the mining industry's liquid and solid waste, known as tailings.

The release coincides with the one-year anniversary of the tailings dam collapse in Brumadinho, Brazil, which killed 270 people.

After that disaster, a group of institutional investors led by the Church of England Pensions Board asked 726 of the world's largest mining companies to disclose details about their tailings dams.

Former Vale CEO Fabio Schwartsman was recently charged with homicide over the incident.

Another 15 people have been charged, all from either Vale or German company TUV, which was responsible for signing off the safety of the dam.

Morrison stands by coal

RAY CHAN
WA

PRIME Minister Scott Morrison is standing by the Australian coal industry, despite calls from radical climate change activists to ban the export of the commodity.

Fuelled by fires ravaging the country, objectors want exports to be ceased immediately, as the world's two most populated nations, China and India, build new coal-fired power stations with Australian coal.

Such action is expected to cost Australia more than \$52b and jeopardise the jobs of 50,000 people involved in coal mining.

Mr Morrison has vowed that climate protesters would not be dictating energy or trade policy, and is sticking with the government's existing plans to reduce carbon emissions by 28pc within a decade.

"We won't embrace reckless targets and abandon our traditional industries that would risk Australian jobs while having no meaningful impact on the global climate," he said in an opinion piece.

"In short, we will continue to act responsibly on climate change, avoiding extreme responses and get the balance right."

Australia's exports were this year worth more than imports for two consecutive quarters for the first time since 1973.

China last year bought \$14.3b worth of Australian coal and is planning to expand the output of coal-fired power stations by 121GW, the equivalent of 24 new facilities.

In that period, India bought \$11b worth of coal, with the demand from Australia set to increase sharply when production



Image: Port Waratah Coal Service.

Prime Minister Scott Morrison is standing firmly behind the coal industry.

starts at the Adani Carmichael coal mine in Queensland.

While India's economy has slowed down, the government is expecting electricity capacity to surge by 22.4pc by 2022.

Mr Morrison has rejected a suggestion that ramping up renewable energy would have prevented the wide-scale fires.

He said suggesting that increasing Australia's climate targets would have prevented these fires or extreme weather events, in Australia or anywhere else, was "simply false".

In its election platform last year, the Government promised to reduce carbon emissions by 28pc by 2030.

"As part of a global effort, our government will ensure Australia keeps commitments made at the election," Mr Morrison said.

"Australia's carbon emissions are on average 50mt less per year than they were under the previous government.

"All achieved without a carbon tax."

AUSTRALIA'S BIGGEST COAL CUSTOMERS

JAPAN: \$19.006b CHINA: \$14.320b
INDIA: \$10.979b SOUTH KOREA: \$7.350b

Source: Department of Foreign Affairs and Trade (2018)

\$70m for bushfire recovery

RAY CHAN
NATIONAL

MINING magnate Andrew Forrest's philanthropic Minderoo Foundation has committed \$70m to help bushfire fighting and relief efforts.

It comprises \$10m to mobilise specialist volunteers from WA, \$10m in immediate bushfire relief funding, and a \$50m investment to support the development of a long-term blueprint for fire resilience.

The Fortescue Metals Group chairman and wife Nicola said the unprecedented bushfire season, with large fires burning across the country, had devastated families, communities, industries and wildlife.

Minderoo Foundation's Fire Fund comprises three distinct areas – response, recovery and resilience.

The foundation has committed to mobilise volunteers from WA to assist firefighting operations and recovery efforts in Queensland, Victoria, NSW and South Australia, in response to direct requests from relevant authorities and communities. At least 1250 volunteers are expected to be needed.

Travel and accommodation expenses for these specialised volunteers – including firefighters, medics, tradespeople, mental health workers and ground clean up personnel – will be covered by the Foundation.



Andrew Forrest's Minderoo Foundation has pledged \$70m for bushfire relief and fighting efforts.

Minderoo will also leverage its networks in WA to rally volunteers, equipment, supplies and funding, particularly from the resources and agriculture industries.

This response stream of work will be led by Chris Mayfield, a former member of the Australian Regular Army who spent 26 years in senior leadership positions.

He is being seconded from FMG, where he is the training and development manager.

Meanwhile, the Minderoo Foundation Fire Fund project will help support communities rebuild and revitalise

local economies in the aftermath of the bushfires.

The funding will be used to support the needs that typically emerge as communities regroup after a disaster, including repairing infrastructure, supporting local businesses, caring for wildlife and livestock or providing equipment essential to the recovery efforts.

The project will also invest in building long-term resilience by convening leading experts to develop a globally relevant national blueprint for fire and disaster resilience.

With the support of leading

international non-profit environmental organisation Conservation International, these efforts will draw on existing research and expertise in Australia and overseas and accelerate innovation to develop new approaches to mitigate bushfires.

Focus areas could include climate change, mental health, science and technology, environmental conservation, water security and land management, among others.

The Foundation will establish this project in early 2020 and launch a global effort to engage contributors and funders to raise about \$500m. Minderoo will kick start this fundraising effort with a \$50m commitment.

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IN BRIEF

Gold soars on Iran attacks

GOLD peaked to a near seven-year high of US\$1579.72 after the US launched a deadly attack against Iranian military leader Major General Qassem Soleimani.

The destabilising effect on the international market was swift, and was the latest in a string of contributing factors that has continued to drive investors to gold as a safe-haven metal to protect against market downturn.

The price spike has come after a momentary lapse in gold's momentum in Q4 2019, surging to its highest price since April 2013.

The assassination of General Soleimani has escalated international fears that tensions between Washington and Tehran could spill over into a new war in the Middle East.

The targeted attack was given the go-ahead by US president Donald Trump as Iran's covert activities in the Middle East continue to destabilise the region and frustrate Washington.

The Iraqi parliament called for the expulsion of all foreign troops from the country.

While Iran promised escalation, President Trump threatened to hit 52 Iranian sites, including important cultural sites, should Tehran retaliate.

The General was head of the elite Quds Force of the Islamic Revolutionary Guard Corps and has long been seen by Israel and the US as one of the region's most dangerous and powerful figures.

Shares tumble after outbreak

SHARE prices at BHP, Rio Tinto and FMG have all plunged on the back of the coronavirus sweeping China and penetrating beyond its borders.

Investors are expecting demand for raw materials to drop as China feels the impact of quarantined cities and workforces, and attempts to contain the spread of the deadly disease.

Prices for iron ore dropped 10.3pc down \$9.30 over the past week, cutting billions of dollars from the market value of the big three producers as demand falls away.

China Metallurgical Industry Planning and Research Institute (MPI) earlier in the month predicted a lower demand for steel, resulting in lower iron ore requirements.

However, severe floods in Brazil have also caused supply stress which cannot be replaced by Australian miners.

Iron ore shipments from WA began the year at a three-month low as a result of heavy rains after Cyclone Blake, and a conveyor belt fire at Rio-Tinto's Cape Lambert facility.

China accounts for around 70pc of global demand for iron ore.

Before the virus outbreak began to make its impact felt, US bank Goldman Sachs predicted that seaborne iron ore markets could face a deficit of 41mt in 2020, a forecast that is likely to be revised.

Super pit in Aussie hands

GERARD MCARTNEY
WA

NORTHERN Star Resources has entered into a binding agreement with Newmont Goldcorp to acquire 50pc of the KCGM Super Pit and other tenements in Kalgoorlie, WA, for US\$775m, and another US\$25m for a separate parcel of tenements close by.

Northern Star said it expects its share of the KCGM JV to add 120,000-140,000oz to its 2020 gold production at an AISC of A\$1240/oz-A\$1340/oz.

The transaction is expected to be completed by January 2020, subject to approval from the WA minister of lands, while all economic benefit will transfer from 1 January 2020.

Saracen Minerals purchased 50pc of the KCGM JV in November, 2019, from Barrick Gold for A\$1.1b.

Northern Star's acquisition will put the iconic Super Pit mine back in the hands of Australian miners for the first time in more than 30 years.

While Northern Star will inherit Newmont Goldcorp's operatorship of the Super Pit, Northern Star said that it "intends to engage with Saracen to explore the optimal operatorship model, with a view to capitalising on each partner's respective and complementary strengths".



Image: KCGM.

The Fimiston pit.

Northern Star chief executive, Bill Beament, said the acquisition would create substantial value and provide enormous short, medium and long-term opportunities.

"The purchase of a 50pc stake in the Kalgoorlie Superpit meets our key strategic objectives of generating strong financial returns and growing our gold inventory from Tier 1 mines," he said.

"This is one of the world's greatest gold systems, as shown by its 80Moz endowment and the fact that it contains up to 60,000oz per vertical metre.

"To put this in context, our Jundee mine, which is itself a Tier 1 asset, contains around 13,000oz per vertical metre.

"Both companies have established

outstanding track records of unlocking value from acquisitions and I am delighted that we will be able to pool our skills and experience to create substantial value for our shareholders and the local community through both mine development and exploration."

Production at the mine was limited throughout 2019 due to a rockslide in 2018, where more than 1mt of rock fell down the eastern wall of the Fimiston pit.

The slides, which occurred over two days, destroyed a ramp and blocked access to part of the pit causing monthly ore figures to reduce from more than 1.2mt to 0.4mt.

Remediation is anticipated to take about 3.5 years when gold production will revert to historic levels.

New Fosterville for KL Gold



Image: Kirkland Lake Gold.

A Fosterville gold bar.

GERARD MCARTNEY
VICTORIA

KIRKLAND Lake Gold has announced new, high-grade results from both its Fosterville operation in Victoria and Canadian-based Macassa operations.

Recent surface drilling at Robins Hill, Fosterville, has confirmed an extended mineralisation downplunge of the existing mineral resource, outside of the current one.

Key drilling results that confirmed mineralisation at depth were 3.7m at 24.5g/t gold, including 1m at 82.3g/t gold; and 8.8m at 11.7g/t gold, including 0.5m at 81.7 g/t gold.

Kirkland Lake Gold chief executive Tony Makuch said that the company believed there were "more Fostervilles at Fosterville" for a long time, and that Robbin's Hill had emerged "clearly" as a second potential mining front to provide feed to the Fosterville mill.

"Based on current drilling, we have already identified a large mineralised system at Robbin's Hill that we expect will support substantially higher levels of Mineral Resources and that remains open at depth and along strike," he said.

"The level of VG in quartz that we've intersected in this area compares favourably to levels seen at the existing Fosterville Mine at similar elevations.

"The presence of VG in quartz

and 500m down-plunge extension of Robbin's Hill mineralisation highlight the potential for future discoveries of high-grade, VG-bearing zones at depth similar to Swan and Eagle at Fosterville's Lower Phoenix system."

Drilling will continue at the deposit as well as a 3D seismic survey across 6sqkm to the north of the Fosterville licence.

The company announced a dividend of US\$0.06c per common share, a 50pc increase on the previous quarterly dividend of US\$0.04c per common share.

Kirkland Lake has gone from strength to strength since the discovery of the Eagle Zone in 2015, with 2019 guidance set at 950,000-1moz.

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Bounty runs dry

RAY CHAN
QLD

QUEENSLAND-BASED Bounty Mining is “exploring all options” after going into voluntary administration.

This includes selling or restructuring the business for the future, while transitioning the Cook Colliery coking coal mine to care and maintenance in the interim.

The administration appointment followed a period of depressed coking coal prices and production shortfalls following a roof accident at Cook Colliery in October last year, which damaged a CM13 continuous miner, causing a 23,000t run-of-mine loss of production for that month.

Additional indirect losses because of the roof fall were estimated at 150,000t ROM and about 135,000t of reserves, resulting in operations of one mining panel closing and the lay-offs of 21 workers.

Bounty had acquired Cook Colliery, sited in Queensland’s Bowen Basin, in December 2017 from former owner Caledon Coal.

The company upgraded the Koorilgah rail loop that services the mine and restarted operations following flood damage to the site in May 2017.

\$165m services contract for Sodexo

RAY CHAN
WA

QUALITY life service provider Sodexo, together with local Native Title groups, have been awarded a three-year contract worth \$165m for the provision of village services with global iron ore producer Fortescue Metals Group.

Assets comprise Fortescue’s major camps Hamilton, Cloudbreak and Christmas Creek, where Sodexo is working in a joint venture with Native Title groups Kariyarra Group, Palyku Group and Karlka Group, to ensure positive community engagement and quality of service.

As part of the contract, Sodexo and the JV partners will work with Fortescue to provide services ranging from accommodation to transport and wellbeing, enhancing the quality of life for workers living on site across Fortescue’s operations in WA’s Pilbara region.

Across the three Fortescue sites, Sodexo will provide a range of village services, including accommodation services management to about 3000 workers in a typical week, catering services (serving up to 8500 meals daily), industrial cleaning, retail, health and wellbeing, transport and airport management services, as well as trade-based maintenance services delivery at Hamilton.

The announcement is an important milestone for Sodexo after acquiring

Aldoro first drilling at Penny South



Aldoro’s targeting work has shown many similarities between Penny South and the adjacent Penny West deposit.

GERARD MCARTNEY
WA

JUNIOR explorer Aldoro Resources has commenced its maiden drilling at the Penny South project in the Murchison region of WA.

This preliminary 5000m aircore campaign will test the magnetic corridor, which has been interpreted as the strike extension of the Penny West Shear by Aldoro’s recent targeting work, which identified seven areas over a 2.5km strike extension of magnetic low greenstone and granodiorite assemblage.

The program at Penny South will

consist of about 100 holes at 100m x 25m spacing along 2km of strike, with sample analysis for gold and multi-element geochemistry for pathfinder elements known to be associated with mineralisation at the neighbouring Penny West and Penny North deposits.

Aldoro managing director Caedmon Marriot said that the company was excited to move ahead with the maiden campaign at Penny South.

“The first program aims to test two things,” he said.

“Firstly, for shallow mineralisation in this target corridor that hasn’t adequately been tested by historic drilling and secondly, for combinations

of gold and pathfinder elements, lithology and alteration as indications of potential deeper mineralisation to be tested in the subsequent follow up program.”

The adjacent Penny West was known as a “blind discovery”, as there were no old workings on top of the mine, which was unusual considering the regions rich mining history.

Penny West was first drilled in the late 1980s, with an intersection of low-grade gold at up to 1.5g/t, however the follow up drilling results in 1990 peaked at 339g/t.

Penny West was mined for 150,000oz at a massive average of 22g/t.



Image: Dolphin Tungsten Project.

A tungsten mine at King Island.

Critical minerals office opens

LINDA SMITH
NATIONAL

THE opening of The Critical Minerals Facilitation Office, announced by Resources and Northern Australia Minister Matt Canavan, aims to untap Australia’s rich resource of critical mineral deposits.

Based in Canberra, the new facility will be led by Jessica Robinson, a former senior official in Treasury and Prime Minister and Cabinet.

The Office bases its strategy targets actions in three areas: to promote investment in Australia’s critical minerals sector and downstream processing; provide incentives for innovation to lower costs and increase competitiveness; and connect critical minerals projects with infrastructure development.

This will be achieved by coordinating and connecting government, industry and the research sector.

Ms Robinson said her mission is to work with the sector to develop a clear,

shared vision for Australia’s critical minerals sector.

“I want to join all the different parts of the sector together, from research and development in universities, to pilot and full-scale projects on the ground, to promoting business opportunities in supply chains both here in Australia and overseas,” she said.

Planned actions include international roadshows promoting investment in the sector, \$20m of funding for projects with a specific focus on critical minerals and \$34.45m to develop technology to allow lower-grade ores to be efficiently mined.

Australia’s world-leading expertise in resource extraction and processing and renewables research adds to its attraction as a destination for investment.

By examining the lists of critical minerals published in several markets and matching those against Australia’s known geological endowment, the government hopes to work toward positioning Australia as a prime producer of critical minerals.



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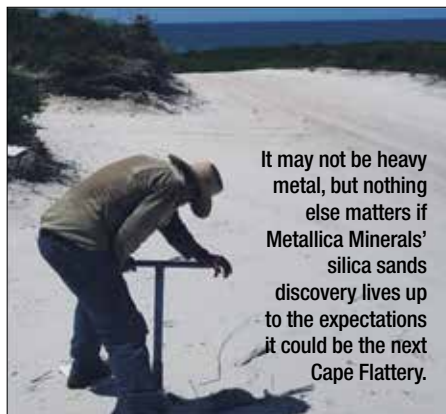
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Enter the Sandman

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QLD

METALLICA Minerals has confirmed the presence of high-purity silica sands at its 100pc-owned Cape Flattery silica sands project in Northern Queensland after the completion of an auger sampling program.

The exploration program consisted of eight hand-augured holes to an average depth of 4.75m on the eastern target area of the tenement, and the majority of the samples returned intervals of 99pc silica oxide, while drill intercepts averaged between 96.1pc and 99.1pc.

Sampling was completed at about 400m spacing along existing tracks, and the company said that priority drill sites targeted sand dunes “near established and or potential export infrastructure areas”.

Silica sands are used in a range of industries such as glassmaking, foundry casting, water filtration, chemicals and metals, as well as hydraulic fracturing and hi-tech applications such as the production of solar panels.

IMARC forecasts have predicted the demand for silica sands to increase at a compounded annual growth rate of 7.2pc through to 2022, with annual revenues expected to hit US\$9.6b.

Metallica said that its sampling program would establish access to the sand dune target area, confirm interpretations of the extent and potential thickness of the targeted sand dune, conduct low-impact sampling and confirm that the sand quality was similar to the Cape Flattery sand currently on the market.

Mitsubishi's Cape Flattery mine is the world's largest silica sands mine.

Metallica chief executive Scott Waddell said that the company was excited for the next steps, which included establishing a maiden silica sand resource.

“Metallica is very encouraged by these results that further confirm the potential of the CFSS project, expected to assist in the process for establishing an infrastructure solution to export silica sand from Cape Flattery,” he said.



Lynas' Mt Weld rare earths mine in the Goldfields.

New legal challenge for plant

GERARD MCARTNEY
MALAYSIA

LYNAS Corporation is facing a new wave of judicial proceedings in Malaysia over its subsidiary, Lynas Malaysia's rare earths processing facility.

The company said that three long-term opponents of the plant launched the judicial review proceedings in the Malaysian High Court to contest the August 2019 decision by the Malaysian government to renew Lynas' full operating licence at the processing plant near Kuantan, Pahang, on the country's east coast.

The company said that the grounds set out in the documents “relate to the processes followed by the Government of Malaysia”.

The respondents included the Prime Minister of Malaysia, 27 ministers and cabinet members, the Government of Malaysia, the Atomic Energy Licensing

Board and Lynas Malaysia.

Lynas said it had “full confidence in the robustness of the Malaysian judicial system”.

“While every case will be decided on its merits, these individuals (and persons believed to be associated with them) have lodged several previous court challenges, all of which have been dismissed.”

The company also pointed out that it had been subject to four independent scientific reviews, including two by the International Atomic Energy Agency and a report by the current government's independent scientific committee.

“All of the reviews have found that Lynas Malaysia is low risk and compliant with the laws and regulations in effect in Malaysia,” it said.

“The 2015 IAEA Report stated that fears demonstrated by those who opposed the continuation of the operations did not find any support on scientific evidence.”

Lynas has been in hot water as green groups and activists continue vigorous opposition to the plant because of the low-level radioactive waste it emits.

The company has greenlit the construction of a new \$500m cracking and leaching hub in Kalgoorlie, WA, that it says is the first step toward developing a critical minerals hub in the Goldfields region.

The project is expected to reach completion in early 2023, and the company was awarded lead agency status by the WA government on December 19, 2019.

The plant is expected to create about 500 jobs during the peak of construction and increase Lynas' workforce in the Goldfields to about 200 people.

Lynas is the only producer of rare earths outside of China.

Rare earths are used in everything from computers to cruise missiles and have become a contentious issue in the China-US trade wars.

BlackRock blacklists thermal coal

RAY CHAN
WA

BLACKROCK is the latest investor firm to call it quits on thermal coal.

In a letter to its clients, the world's biggest fund manager stated that in response to clients' concerns about the impact that sustainability factors were having on economic growth, asset values and financial markets, it would no longer invest in companies sourcing more than 25pc of revenue from thermal coal.

It marks a 180 degree turn on its previous program of aggressively buying Australian coal stocks in 2019.

In outlining its reasons for a new approach to sustainability, BlackRock stated “the most significant of these factors today relates to climate change”.

“Namely, how the global transition to a low-carbon economy could affect a company's long-term profitability.

“The investment risks presented by climate change are set to accelerate a significant reallocation of capital, which will in turn have a profound impact on the pricing risk and assets around the world.”

The company said that as thermal coal was significantly carbon-intensive,



BlackRock will no longer invest in company's making more than 25pc of their revenue from thermal coal as it looks to futureproof the portfolios of its clients.

it is increasingly exposed to regulation and becoming less and less economically viable due to its environmental impacts.

It said it did not believe that the long-term economic or investment rationale justified continued investment

in the sector, and that it would closely scrutinise businesses that were heavily reliant on thermal coal as an input.

In coal-reliant economies such as Australia, this scrutiny could extend to energy-intensive businesses such as aluminium smelters – the Tomago aluminium smelter uses 10pc of all electricity in NSW – and power generators.

“As a result, we are in the process of removing from our discretionary active investment portfolios the public securities (both debt and equity) of companies that generate more than 25pc of their revenues from thermal coal production, which we aim to accomplish by the middle of 2020,” the statement said.

“As part of our process of evaluating sectors with high ESG risk, we will also closely scrutinise other businesses that are heavily reliant on thermal coal as an input, in order to understand whether they are effectively transitioning away from this reliance.”

BlackRock's revenue threshold means that major coal producers like Glencore, BHP and Anglo American will still be avenues of investment as their coal earnings pale in comparison to other revenue sources such as copper or iron ore.

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The Groundprobe team accepts the award.

Global award for Australian geotechnical probe tool

RAY CHAN
NATIONAL

GROUNDPROBE has taken out the Technology Transfer Award at the 2019 Institution of Engineering Technology (IET) Innovation Awards in London.

The event seeks to acknowledge and celebrate pioneering innovations across the breadth of science, engineering and technology.

The technology transfer award recognises perception-shifting innovations that demonstrate effective use of existing technology from one sector to another in an alternative way.

GroundProbe was recognised for its game-changing GML technology. Successfully proven in underground mines as a geotechnical monitoring tool, the GML was adapted for civil projects where it reduces the environmental impact and cost of tunnelling through reduced shotcrete use.

GroundProbe CEO Brian Gillespie said it was invaluable for Australian-based GroundProbe to be recognised on the global stage.

"I am immensely proud of our technology team, who conceived, designed, developed and commercialised this solution for cross-industry applications, all from our company headquarters in Australia," he said.

"Across the world, GroundProbe technologies and our people that build them are making tunnels, underground and open-cut mines and tailings dams safer and improving the way we work."

GroundProbe is widely accepted as a global leader in real-time technologies that help manage risk, ensure safety and increase productivity.

The company has grown to become a global innovation powerhouse and the trusted partner of companies around the world.

The GML system is a high-speed computing and LiDAR technology that provides live feedback to aid efficient tunnel construction.

It scans the tunnel or civil project under construction, determining areas of non-compliance for real time remediation, and producing 14m point results in less than two minutes, ensuring the highest quality data is gathered in the fastest time possible.

Commercialised, patented and proven, the GML has been successfully tested in several major tunnel construction projects in Australia and is currently being demonstrated across the Nordics and Asia.



Remote operations monitored on-site at Nova.

Underground operation by internet

RAY CHAN
NATIONAL

UNDERGROUND mining services provider Barminco has successfully piloted a new operations centre that allows it to remotely operate underground equipment on a client's mine site anywhere around the world.

In what the company believes is a world first, Barminco operated a machine, working underground, from its head office in Perth at a client mine site in the Goldfields.

The innovation was made more impressive given the remote operation occurred via the internet, instead of through a fibre-optic cable, which is the method that mine owner-operators have historically used.

Barminco chief executive officer Paul said Barminco had cemented its place as one of the world's leading underground mining service providers through the use of technology and automation.

"A key initiative under our parent company Perenti's 2025 strategy is to deliver a 'technology driven future', and our ability to remotely operate underground machinery from our head office is a significant achievement in delivering on that strategy," he said.

The Barminco Remote Operating Centre (BROC) was successfully trialled in collaboration with Sandvik and Independence Group NL (IGO) in July last year.

The new system was trialled at Barminco's head office in Hazlemere, WA, for a machine located at IGO's Nova mine site, almost 1000km away.

Barminco technology and innovation general manager Darren Kwok said the trial was a great success.

"Whilst many mine sites have operators remotely operating equipment from the mine's surface, we are one of the first, if not the first service provider, to operate underground equipment on a client's site from a much greater distance," Mr Kwok said.

"BROC enables us to connect multiple sites and operators at the same time, meaning if there is an issue at any point, we have contingencies in place."



A Barminco remote loader operator at the controls.

Barminco's first trial involved the remote operation of a Sandvik LH517 loader being operated in Perth by Barminco employee, Guy Gilbert, and Mr Kwok said Barminco was now working with IGO to make BROC a permanent fixture at the Nova mine site.

"The advantages in improving the safety of our workplace and the efficiencies for our clients are enormous," Mr Kwok said.

Independence Group chief operating officer Matt Dusci said the company was thrilled to be part of the successful trial.

"At IGO, we continually look for ways to improve how we do business and deliver operational excellence," he said.

"By integrating innovative SMART solutions at our operations, such as working with Barminco on BROC, we improve the safety and wellbeing of our people, realise step change opportunities, and optimise efficiencies and productivity.

"Our future plan is to have a dedicated remote operating centre manned 24/7 where our team and our client's people can work collaboratively side by side to deliver a world class mine-site.

"Clients who work with Barminco should expect more from our business along with the broader Perenti group of companies and BROC is one such example of how we are delivering on this promise."



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New Cats boost for PYBAR

RAY CHAN
NSW

PYBAR has taken a step closer to advanced underground automation at the Dargues Gold Mine in NSW, with the arrival of a second new Cat R1700 underground loader at the diversified minerals site.

The new loader visited the PYBAR head office in Orange enroute to the mine site where it was met by executives and senior management from PYBAR and WesTrac.

The first of two new R1700s purchased for Dargues from WesTrac was commissioned at the mine during August 2019.

The new machines are equipped with Caterpillar's next generation Command for underground technology, giving them automation capabilities that will allow them to be driven via tele-remote from the surface from early 2020, realising significant productivity, efficiency and safety gains.

Command is part of the Cat Minestar integrated suite of offerings designed specifically for mining.

PYBAR chief technology officer Andrew Rouse said with the second loader now on site, the company would complete the tele-remoting set-up in time for stoping early next year.

"Our intention is to be able to tele-remote from the surface from the outset when both loaders go into full operation," he said.

"It's a milestone all three teams (Caterpillar, PYBAR and WesTrac) have been working towards and will deliver."



PYBAR executive chairman Paul Rouse and WesTrac mining business manager Neil Roberts shake hands on the new R1700 loader.

The new loaders were purchased after very successful trials at the Vivien Gold Mine in WA during 2017, which delivered impressive results, including quicker bucket loading, faster cycle times, greater payloads and less fuel burn.

These benefits were further highlighted when the Cat R1700 was tested against the R1700G at Vivien in June 2018, prompting PYBAR to place the order for the new loaders.

"We were extremely impressed with performance of the new loader during testing," Mr Rouse said.

"With the knowledge gained from the activity at Vivien we were able to carry out a rigorous analysis around the loader combinations required for

the Dargues operation with the R1700 proving to be the most cost-effective."

Since the first new loader has been put into operation, PYBAR has been preparing for advanced automation through the use of the traction control and autodig features on the new machines.

The feedback has been very positive with full buckets consistently being achieved.

The Command technology enables remote operation from the surface or underground, providing productivity and efficiency gains, improved safety of personnel, more accurate tunnel navigation, and reduced machine damage.

Caterpillar's Commercial Manager for Underground Technology, Randy Schoepke, said PYBAR has long seen the value of being on the leading edge of technology as a contractor and an owner miner.

"The new Cat R1700 loader will be a huge complement to their technology portfolio leveraging the most advanced features in the industry," he said.

"The R1700 features of traction control, live payload, Autodig, and ride control will not only provide operator comfort and productivity but also be leveraged by Caterpillar's latest generation of Command for underground, Caterpillar's remote and autonomous control system.

"When there is a requirement to remove the operator from the underground environment, the technology allows safety and utilisation to be taken to the next level.

"We look forward to our continued work with PYBAR on this project."

WesTrac mining sales general manager Jody Scott said this was the culmination of more than two years' dedication and teamwork with PYBAR to identify and test the technology that will have the most impact and benefits for them and their clients.

"Extensive testing has enabled us to fully evaluate the challenges posed by the harsh underground environments in which the machines are required to operate," he said.

"It has also allowed us to set up the machines to get the most out of their automation and tele-remote capabilities."

Miners are rapt with Rexx trucks

RAY CHAN
NATIONAL

THE revolutionary mine haul truck Rexx has been working on a new commodity as it continues to prove its versatility in different mining conditions.

Designed and developed by leading provider of specialised production services Bis, the dual powered 20-wheel dump truck is working at the Ewington mine operated by Griffin Coal in WA's Collie Basin.

Bis CEO Brad Rogers said the standout performance to date of the first Rexx unit at nickel and gold operations, as well as supportive feedback from customers, had encouraged the company to commit to construct Rexx Two.

Mr Rogers said the second haul truck would be deployed in early 2020 as part of the Bis fleet servicing a customer on the east coast of Australia.

"We have been absolutely rapt with the performance of Rexx," he said.

"It continues to tick the boxes that it was specifically designed for including range, fuel efficiency, manoeuvrability



Rexx was designed to accommodate a range of interchangeable bins to suit different commodities, as well as loading tools and tipping situations.

and conquering gradients.

"We look forward to our second Rexx truck starting work on the east coast in the near future.

"We are very proud that the initial design has proven to be on the money. We are also finalising several Rexx opportunities for miners in Australia and Indonesia, which will start to fill the manufacturing pipeline."

The three-month Rexx trial at the Griffin operations will provide the chance to demonstrate the vehicle's efficiency and capacity in a different mining environment, carrying a new ore type.

"Different commodities have different

characteristics and each mine has its own context in terms of conditions or layout," Mr Rogers said.

"Rexx was designed to accommodate a range of interchangeable bins to suit different commodities, as well as loading tools and tipping situations."

A Griffin Coal representative said that the team are excited at having Rexx on site and the initial feedback across site has been positive.

"We are excited at continuing operational activity with Rexx over the coming weeks and seeing the progress and outputs that follow," he said.

Mr Rogers said Rexx was a tangible example of the culture of customer

driven innovation which flowed through Bis.

"We look at the needs of our customers, the specific challenges they face and then develop solutions. Rexx was born out of the need to evolve in pit haulage with a sharp focus on agility, range and cost effectiveness," he said.

The development of Rexx has played a major part in Bis securing a spot in the 2019 Most Innovative Companies list and a win in this year's Future of Mining Innovation Award.

Rexx was also a finalist in the Australian Mining Prospect Awards in the Innovation category.



2006 Komatsu PC138US-2E1



2014 CAT 300.9D - choice



2014 Komatsu D155AX-7



2009 CAT 140M



10-12 Komatsu HM400-2
- 6 of 9



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HOT CHILI MANAGING DIRECTOR CHRISTIAN EASTERDAY

Hot Chili (ASX: HCH) excited the Australian stock market a week before Christmas with its announcement of significant drilling results for its Cortadera copper and gold project in South America. The project is near Chile's Pacific coastline and has the potential to achieve Tier one status in terms of the size and quality of its ore body. **Mike Cooper** spoke with managing director **Christian Easterday** about its Cortadera and Productora projects and Hot Chili's next steps.



Hot Chili MD Christian Easterday .

Q. Hot Chili has announced some significant drilling results for its Cortadera project in Chile. Can you elaborate on the importance of these results for the company?

In December we hit probably the best intersection in a run of world class results from Cortadera over a run of four or five months of exploration drilling.

We are consistently delivering extraordinary large widths of copper-gold porphyry mineralisation at around 0.5pc copper and 0.2g/t gold in addition to pinning down a very big, high grade core.

The high grade core discovered on the largest porphyry discovered at Cortadera is growing and currently averages of 0.7 to 1.0pc copper and 0.3 to 0.5g/t for gold bulk grade across our drill results.

That is certainly up there with the best recent discoveries in copper-gold globally, and something that we believe has the potential to deliver atier-one status given further successful drilling.

Tier one assets are long-life, large metal production deposits of 5mt of contained copper metal, around US\$40b in ground metal value.

We are now looking at something that a lot of people are starting to realise has a lot of the hallmarks of a pretty unique, major copper-gold discovery.

Q. Is Hot Chili going to continue with its drilling program at Cortadera, or does it plan to drill in other areas of its exploration territory in Chile?

The drilling program is driving toward a very big increase in where the metal inventory for the company is heading.

We have a quarter of a billion tonnes already in place with a pre-feasibility study complete and defined open pit reserves at around 0.5pc bulk grade [for copper] from surface at our existing Productora deposit, sitting 14km from Cortadera.

Out of the 24 top copper-gold drilling intercepts reported globally over the past two years, 20 come from South America, including four intercepts from Hot Chili's Cortadera project.

To be even in that pedigree, delivering those results speaks volumes about what



The Cortadera project's landscape view in Chile.

we have been able to do. Cortadera has transformed the company's growth trajectory and thrust Hot Chili into a position we had not anticipated when we originally acquired the project to simply consolidate critical mass to unlock the Productora development.

Cortadera is very much the centre of gravity now.

Q. What has been the reaction of investors, shareholders and industry to the news about Cortadera?

The trading liquidity of the stock and the value increase in the market capitalisation and share price over the course of last year has put Hot Chili among the top performing stocks on the ASX.

Hot Chili is putting out world class drilling results and the market capitalisation is sitting at sub-\$100m.

If things continue on the drilling front and ultimately the delivery of the resource this year, then ultimately this company has a very good chance of seeing its value continue to lift.

We have a clear pathway to establishing a potential tier-one inventory sitting in the hands of a junior.

Even at that point, some people are saying, 'that's great, but why hasn't the stock popped'.

Feedback from the industry has been very positive, and the most positive has come from engineers, geologists and CEOs of other resource companies and has been very pleasing, although we have a lot of hard work in front of us to continue driving our success in 2020.

Q. Can you explain Hot Chili's approach to developing Cortadera as a Tier one mining asset?

The company's approach this year is to continue to drive toward delivering a large first resource estimate for the Cortadera project.

I think that will be a key catalyst in the first half of 2020. Cortadera currently does not have any defined resource estimate, despite 23,000m of historic drilling activity by a previous explorer, and now an additional 12,000m of drilling by Hot Chili.

We start our 2020 drilling shortly on two large targets we have identified sitting next

to Cortadera, and positive results from these would add greatly to the potential of Cortadera.

Productora was discovered in 2011 and has a resource estimate of 0.24bt and Cortadera is looking like it could quickly dwarf that.

The company's original strategy was to link together Productora and Cortadera in a production hub.

That has now changed slightly where now we are looking at Cortadera as a standalone development, and Productora being a very handy 2.5km-long satellite pit.

Central processing from all of our assets would unlock a large, long life production base.

Q. What is the topography like at Cortadera, are there any advantages or challenges to the geographical setting of the project in terms of its mining?

Chile produces nearly a third of the world's copper production.

Cortadera is one of the most significant copper discoveries in Chile of the past decade and is certainly delivering drill results that are very rarely seen in the coastal range.

Like Productora, Cortadera is 800-900m above sea level making it good for drilling year-round, and the Pan-American highway goes through the middle of the two projects which sit 40km from port.

We don't suffer from any of the things that Andean high altitude (3000m-plus) projects have to endure.

Infrastructure advantages are one of the key drivers as to why Productora is one of the lowest capital intensive projects in the global copper development pipeline.

The area is very infrastructure-rich and Hot Chili spent many years securing its water, power and infrastructure easements.

Q. Hot Chili's copper projects also contain gold. Does the company plan to prioritise extracting one or other mineral or to mine both at the same time?

They come out together.

The majority of the ore in these deposits will be sulphide, so therefore the gold will come out in a concentrate.

Certainly, a high-grade component in

the early production profile is always good. For Productora we already have 1.5mt of copper and 1m oz of gold in place, and a large open pit reserve. At Cortadera the bulk average copper grade look to be comparable to Productora, but the bulk gold grade looks to be at least double. I guess the main difference is that Cortadera is delivering high grade drill results which give us confidence the discovery will feature both bulk tonnage high grade from surface for open pit and bulk tonnage at depth for underground development.

Q. Is Hot Chili seeking to link with other mining companies as business partners to develop its Chilean copper and gold projects?

We have an adviser that is managing discussions and we have a number of active discussions going on. It is evolving.

We have had several parties sending technical teams over to Chile, and that really heated up towards the end of last year.

We will continue to investigate whether there are suitable partners and funding opportunities to assist in advancing Cortadera towards development.

Our \$12m capital raising late last year was well supported by Australian institutional investors and by some of our largest shareholders.

There is a growing institutional presence on our share register.

We have an acquisition to fund and drilling to do, and we will finance as required.

Whether that financing involves a strategic partner now or later will be determined by how the talks go and the outcome of our continued drilling and activity streams this year.

Q. What are the next steps for Hot Chili and its copper projects in Chile, do you have a timeline for these?

All eyes are going to be on the drilling in the first six months and how that culminates in a first resource estimate for Cortadera.

We will be pushing that hard with one drilling rig on the definition and existing resource estimate.

And we will certainly have another rig to start step-out drilling on some larger targets.

It will be catalyst-driven on drilling results. We will expect to put out a preliminary resource statement in the first half of this year.

From that point the discovery will take shape and we will have a more robust view of the magnitude of Cortadera.

We have completely changed the narrative for what Hot Chili used to be, and 2019 has been that turning point.

What we do from here is very exciting when you look at the value of the company and the opportunity that lies ahead.

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— Tony Willis, Graduate Diploma of Accident Investigation

All Images: South32.

IN HIGH DEMAND

Global miner South32 is selling its South Africa Energy Coal asset and focusing instead on meeting increased demand with its Australian metallurgical coal operations – the Illawarra and Eagle Downs Projects in New South Wales and Queensland, respectively.

Illawarra Metallurgical Coal is expected to increase production to around 7mt by the end of financial year 2020 and 8mt by FY21.

EMMA DAVIES

SOUTH32 is walking the fine line between increased production at Illawarra Metallurgical Coal and reassuring climate conscious shareholders it is closely monitoring trends in consumer and market behaviour around coal.

Releasing a report titled *Our Approach to Climate Change 2019*, the company has completed decarbonisation concept studies at Illawarra Metallurgical Coal, with the aim of identifying potential decarbonisation initiatives, which can be progressed into prefeasibility planning during FY20.

However, metallurgical coal demand is set to skyrocket from 275mt (in 2017) to 372mt by 2030 – according to the NSW Minerals Council – and Illawarra is expected to increase production to around 7mt by the end of financial year 2020 and 8mt by FY21.

In the September quarter alone, the site experienced a 30pc increase in production over 2019 to 2.1mt (reported in the September quarter) after the successful completion of two longwall moves in the June 2019 quarter.

Additionally, both the Dendrobium and Appin longwalls have also continued to perform strongly, with an increase in the use of longwall automation and FY20 production guidance remaining unchanged at 7mt.

Dendrobium

This underground mine in the heart of the Illawarra region produces metallurgical coal used for steel making is expected to stay in production out to 2048.

In its plan for Dendrobium's future, South32 is proposing to continue mining in two underground areas within the mine's existing mining lease.

An application for the expansion project for Dendrobium is currently before the NSW planning authorities and is supported by an environmental impact statement.

The expansion is expected to create 200 jobs during its construction phase, and 500 jobs in operating the mine thereafter, creating a net economic benefit of A\$2.8b, the company said.

Dendrobium and its sister underground mine, Appin, produce mostly metallurgical coal and some by-product thermal coal.

This coal is processed at South32's

West Cliff and Dendrobium plants before shipping by rail and road to the Port Kembla coal terminal at Wollongong.

Dendrobium coal shipments go to international customers around the world including to countries like China.

South32 said in a recent production update that longwall mining in its Dendrobium mine has continued to perform strongly as a result of some automation.

A planned move of Dendrobium's longwall mining operation is scheduled for the quarter period starting March 2020 after it was moved in the October-December 2019 quarter.

Eagle Downs project

Eagle Downs is a large, high-quality and fully permitted metallurgical coal development project in Queensland with the potential to export 4.5Mtpa of coal from one longwall during the first 10 years of full production.

Subject to the outcome of the feasibility study and requisite approvals, South32 intends to construct a multi-seam underground longwall metallurgical coal mine and processing plant with a dedicated rail spur and train loadout facility.

The project was set to benefit from previous investment that had established two kilometre drifts which were around 40pc completed at the time of acquisition, as well as site infrastructure including water supply, high voltage systems, office

buildings, water and sediment dams – all of which could potentially support accelerated development of the site.

The final investment decision for Eagle Downs is scheduled for late 2020.

South Africa Energy Coal

Unlike metallurgical coal, South32's energy coal (or thermal coal) operations consist of one project, South Africa Energy Coal (SAEC).

And while the project is the main supplier to the country's energy utility Eskom (which generates about 95pc of South Africa's electricity), the company recently announced plans to sell the operation.

As of November 6, South32 has entered into a binding conditional agreement for the sale of its 91.835pc shareholding in SAEC to a wholly-owned subsidiary of Seriti Resources Holdings Proprietary Limited, and two trusts which will acquire and hold equity on behalf of employees and communities (jointly referred to as the purchasers).

The transaction remains subject to a number of material conditions after which Seriti (on behalf of the purchasers) will make an up-front cash payment of about 100m South African Rand to acquire South32's shares in SAEC.

The purchase price also includes a deferred consideration component where South32 will receive 49pc of the free cash flow generated by SAEC for a period

commencing at the date of completion to March 2024, with payment capped at a maximum of 1.5b South African Rand per annum.

South32 chief executive officer Graham Kerr said the sale was a positive for the company and the new owners.

"I am pleased to announce we have entered into an agreement with Seriti, a black-owned and operated South African mining company," Mr Kerr said.

"We ran an exhaustive and competitive process and we believe Seriti as an established operator is ideally positioned to unlock the potential of South Africa Energy Coal's existing domestic and export operations, including its significant untapped resource base.

"The sale of our interest in South Africa Energy Coal will enable the business to continue to operate safely and sustainably into the future for the benefit of its employees, customers and local communities, consistent with South Africa's transformation agenda."

The sale is an important step in the diversification of South 32's portfolio and will allow the company to focus on its Australian coal operations and the opportunities present in the growing market for metallurgical coal.

"Completion of this transaction will substantially reduce our capital intensity, strengthen our balance sheet and will improve the Group's operating margin," Mr Kerr said.



The proposed Dendrobium extension could provide 500 ongoing full-time jobs.

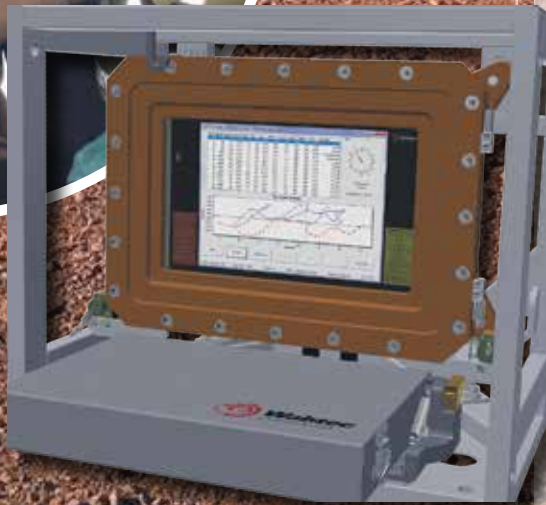


South32 chief executive officer Graham Kerr.



www.wabtec.com

NEXT GENERATION TECHNOLOGY



Wabtec's Drill Guiding System and Collision Awareness System continue to break new ground in the mining industry

Gen III Drill Guidance System (DGS)

New features include:

- USB mass storage to replace the OdaDisk for faster data transfer
- Enhanced productivity tools
- Improved in-seam drilling accuracy,
- Touch screen
- Rechargeable downhole unit – unit can be fully charged in a few hours and provide more than 20 weeks of normal operation.

Used for directional drilling in:

- Underground coal mines
- Gas drainage
- Exploration
- Dewatering
- Management of hazardous gasses
- Measure while drilling

Collision Awareness System (CAS)

Making your mining operation safer and more reliable than ever

- High integrity proximity detection
- 360° protection for vehicles, equipment and personnel
- GPS tracking and real-time monitoring
- Real-time data connectivity
- Back-to-base reporting
- Safety adherence technology
- Proven over 270 million operating hours

Safety first with Wabtec

NATIONAL

TODAY, modern mining places an ever more rigorous focus on the principles of safety, productivity and cost containment than ever before.

There are many sophisticated problems associated with these principles – all of which can be driven by breakthrough technologies.

The advanced technologies of tomorrow are being developed and implemented today, meaning miners are in a constant state of technological revolution.

Wabtec is a leader in the innovation space and continues to guide its customers, helping them to seamlessly incorporate new technologies into their evolving needs through practical, industry-leading solutions.

The company has recently launched the third generation of its famous DGS Touch.

The upgrades, facilitated by necessity, have been incorporated into this groundbreaking productivity tool that continues to improve in-seam drilling, accuracy and reliability on mine sites across the country.

The Drill Guidance System (DGS) was first developed in 1999 after the



Wabtec is a leader in the innovation space and continues to guide its customers, helping them to seamlessly incorporate new technologies into their evolving needs through practical, industry-leading solutions. *Image CH4 Drilling.*

mining industry imposed guidance to mitigate the risks of dangerous and hazardous gasses following a string of fatal outbursts.

The DGS is an Intrinsically Safe (I.S.) Measure Whilst Drilling (MWD)

survey tool for directional drilling in underground coal mines for gas drainage, exploration and dewatering applications.

The DGS has been a leading solution in hazard and risk reduction for more

than two decades and was updated in 2011 to incorporate a touch screen (DGS Touch).

The new gen-3 DGS Touch is IECEx certified and meets all of the most recent certifications based on the IEC group of standards.

It incorporates a QWERTY interface and USB mass storage, both of which enable more efficient data entry and data transfer.

Its downhole unit recharges in a few hours above ground and provides more than 20 weeks of normal operation per charge.

All of these features will drastically improve the operational performance and efficiency of the unit.

Wabtec product line manager Mark MacCabe said that the digital mining team received excellent feedback from the in-field testing at Glencore's Integra UG Coal Mine from both the customer and the end users, CH4 Drilling.

"It further demonstrates our track record of driving outcomes for our customers and improving safety and productivity for the entire mining industry," he said.

"The team is also exploring opportunities to bring the new DGS to the global market in places such as Russia, South Africa, China and India."

Efficiency in gruelling conditions

NATIONAL

SIXTEEN years ago, the main slope conveyor belt for South 32's Appin Coal mine was built in Continental ContiTech's plant in Bayswater, Victoria.

Now that the belt has reached the end of its service life, South32 has chosen Continental ContiTech once more to manufacture the new main slope belt, CONTI PreForm Splice kits and CMP belt-monitoring system.

The existing main slope belt was manufactured in Continental ContiTech's factory in Bayswater Victoria and the new belts will also be made in the same plant.

The company will be using a steel cord belt, 1000mm wide, ST6000 8.5+8.5 AS-S grade fire-resistant anti-static conveyor belt to AS4606.

Continental ContiTech's steel cord belts have been refined by generations of engineers over the past 70 years.

The cumulative result is a state-of-the-art technology that performs at maximum efficiency, even under the most gruelling conditions.

The belt's robust design ensures high-tensile strength under maximum load, as well as excellent impact resistance to reduce maintenance requirements.

Predictive maintenance is one of the single most important tools for



ContiTech brings more than 70 years of engineering pedigree to its conveyor belt design, engineering and manufacturing.

ensuring minimal downtime due to belt component failure, and minimal cost involved with the expensive repairs associated with these failures.

That's why South 32 is using the Continental's next generation CONTI MultiProtect Monitoring system to keep its new conveyor belt protected around the clock.

The CONTI MultiProtect technology uses a permanent magnet to magnetise the steel cables in belts, allowing the

sensors to build a digital map of the belt's magnetic characteristics.

The system can detect damage to the belt's steel cords, identify rips, and monitor splices by generating magnetic signatures.

An alarm function also raises awareness of any event as it occurs, allowing prompt action to be taken to minimise downtime.

The product has an image-based

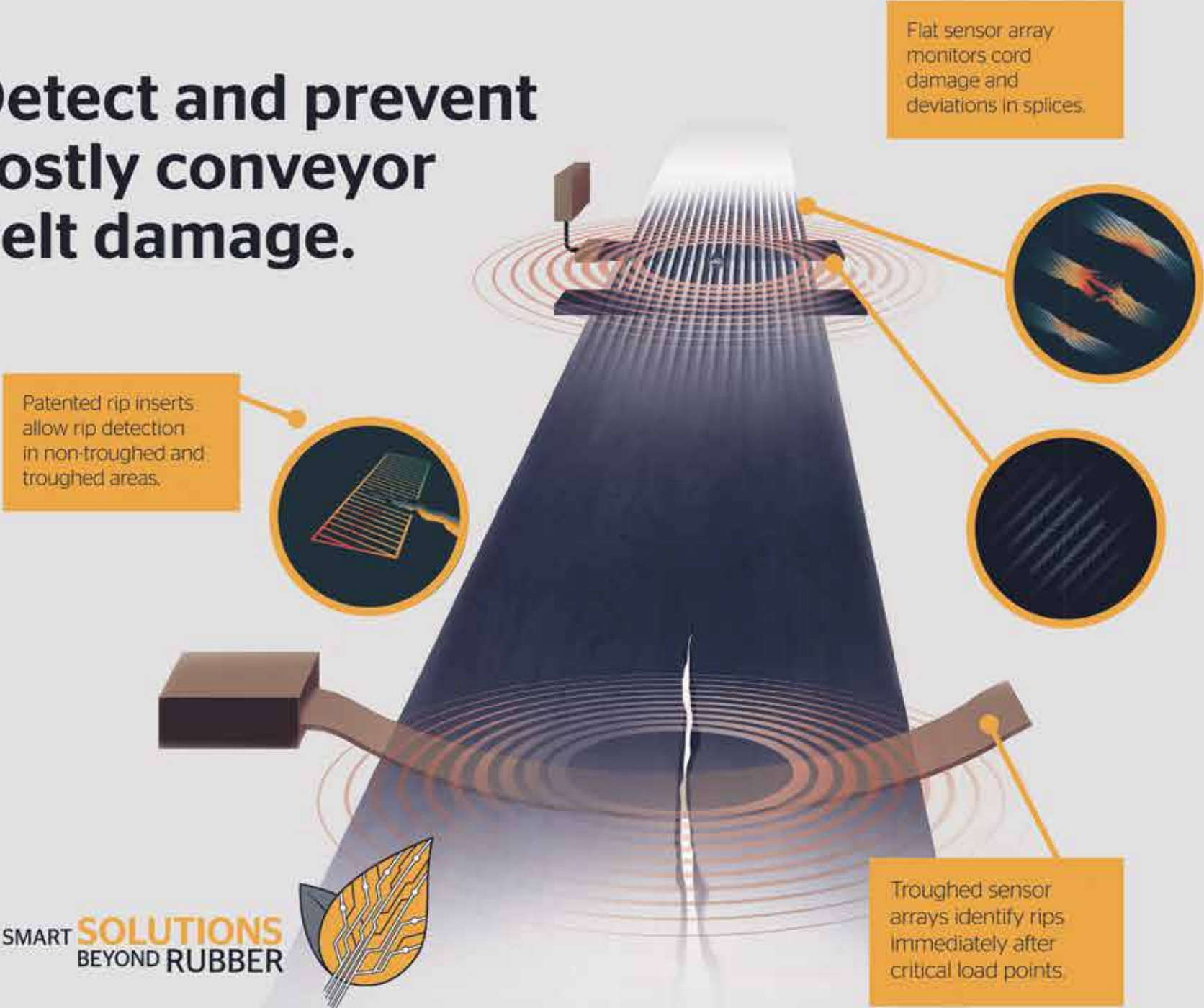
interface, interactive display, generates on-demand reports and damage impact assessments, whilst having maintenance friendly functionality.

This all translates into an intuitive, user-friendly interface that interprets data in real-time.

It can give flexible full-belt analysis, produce a belt condition risk assessment, and all monitoring can be customised to any belt condition.



Detect and prevent costly conveyor belt damage.



CONTI® MultiProtect.

Our CONTI® MultiProtect belt condition monitoring system ensures your conveyors deliver optimum availability and performance 24hrs a day, 7 days a week. With market leading technologies in the monitoring of cord damage, splice condition and innovative rip detection, Continental's range of belt condition monitoring system's help protect your conveyor asset.

Supported with real time detection of belt damage, flexible configurations and maintenance friendly functionality, Continental drives improved conveyor belt performance for your site.

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Branch manager, Peter Reed, with part of the Port Kembla Team.

Wollongong expansion for Fenner Dunlop

NATIONAL

FENNER Dunlop's NSW branch recently relocated to a massive new facility in Port Kembla, Wollongong, situated on 6000sqm of land with a 1600sqm high roof facility.

The convenient location on 2 Flinders Street, adjacent to the Bluescope Steel Plant, gives the company unparalleled access to the main roads that service the wide variety of Fenner Dunlop's many clients – from underground mining, coal washeries, steel manufacturing, hard rock mining, quarries, cement mills, foundries, plasterboard manufacturers, coal terminals, tunneling projects and many more.

The facility has two 25t overhead cranes that gives it the unique advantage of lifting capabilities that can not only store, but handle conveyor belts up to and over 25t as required; and when coupled with Fenner Dunlop Wollongong's largest stands and winders, the company can handle up to 50t rolls of belt, with the hard stand space giving a major advantage for the storage of refurbished belts and various other customer requirements.

The Wollongong branch also stocks more than \$1m worth of inventory of conveyor spares to service local industries, and if Fenner Dunlop

doesn't have the parts in stock, the team will source specialty products and have them delivered in a timely manner to customers.

Branch manager Peter Reed said that the company is fully capable of end-to-end services.

"Everyone knew Fenner Dunlop as a belting company, we are the only conveyor belting company to manufacture the complete range of conveyor belts in Australia," he said.

"In 2012 we rebranded to become Fenner Dunlop Engineered Conveyor Solutions (ECS), the company started to acquire local businesses from 2008 and by 2012 we were able to do more than belts.

"Today we are a "one-stop shop", or like we say "head to tail" business, we do everything connected to a conveyor system – from the electrics, pulleys, engineering and belts.

"The benefit of this is that our customers only have to deal with one supplier for everything.

"Although the ECS model was implemented seven years ago, we have customers that still don't know that we can do it all.

"In Wollongong, we have a fully equipped belt service branch with 36 total employees and 27 highly trained and skilled belt splicers from trainees

through to level III, leading hands, supervisors along with site-specific coordinators.

"We have an experienced management team and are supported nationally for belt supply, technical expertise or any other conveyor specific requirement.

"We are growing, and in the new year looking at taking on at least another four new employees."

When South 32 needed a belt install and splice completed in 24 hours at its Westcliff Washery Plant on CV1-45 conveyor, it called on the Fenner Dunlop Wollongong branch.

The project included the installation of a new drive pulley and alignment, supply and install of 660m of 1200mm wide belt in one reel and splicing on the system.

Customer feedback was that Fenner Dunlop's 50t belt stand really proved the point of difference for the project.

"It could hold the 4.8m-long belt reel in the stand" he said.

"The branch equipment was really put to the test, and we were able to install the belt in one length meaning there was only one splice, less downtime and less risk of splice issues with a single, continuous length of belt.

"The project was led and completed

100pc in-house by Fenner Dunlop's Wollongong service team."

Looking forward in 2020, the company will be working with its new neighbour, Bluescope Steel, after being awarded the contract for the Blast Furnace 501 belt installation and splicing.

This involves installing a 76T mega roll of belt onto the conveyor system during a 48hr shutdown.

The project will begin in March 2020 with much of the pre work already started, and the Wollongong branch will team up with Belle Banne Conveyor Services and utilise its specialised equipment and engineering services to complete the project in a safe and timely manner.

And Mr Reed said that the company will continue to work with South32 again in the near future.

"Fenner Dunlop has been awarded the installation and splicing of a large South32 drift belt, a major steel cord belt installation and splicing project which brings together three distinct areas of the Fenner Dunlop business nationally, Belle Banne Conveyor Services Project Group along with Jon Adam Brodie from our Mackay Project team leading the splicing and supported locally by Fenner Dunlop Wollongong," he said.

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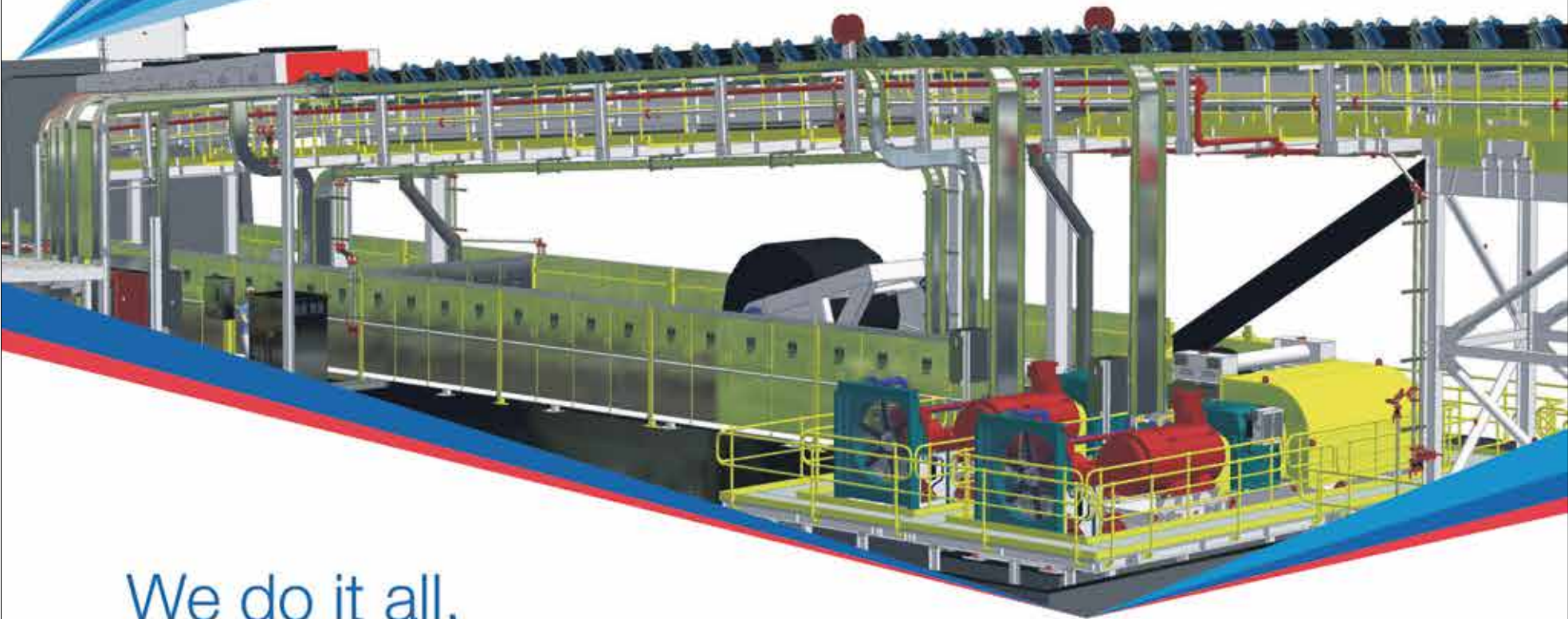
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Improving safety and efficiencies

NATIONAL

C&C Industries, established in 1984, is renowned for the design and manufacture of the Koenigs Visual Field Isolation Switch.

C&C Industries general manager John Koenig said the switch proudly displays the family name.

“Our founder Colin Koenig said if you make a good product give it your name and stand by it,” he said.

“Now with more than 22,000 units around the world, I have increased our warranty to an industry best of 10 years worldwide guarantee.”

Based in Wollongong in NSW, the company's services include designing and manufacturing Koenigs Visual Isolators, Koenigs IP66 Enclosures and water jet profile cutting.

The company's state-of-the-art Koenigs Visual Isolators have helped improve mining safety for years, protecting the lives of workers performing installation or maintenance work on electrically powered equipment.

The system comprises quality Australian-made Koenigs IP66 Enclosures; a multi pole configuration (three to nine poles) with up to two auxiliary contacts per switch; 316 grade stainless steel and bronze padlockable handle construction; IP66 protection rating; easy to see colour coded main switch contacts; and a large viewing window with optional incorporated internal 24VDC LED lighting.



C&C Industries has been servicing the mining industry for more than 35 years.

It also includes a mechanically interlocked door to switch mechanism preventing the door from opening with the switch on and preventing the operation of the switch with the door open.

C&C Industries works with a large number of mining companies, including Illawara Coal, Rio Tinto, BlueScope Steel, Coal & Allied, BHP, FMG, Newcrest, Boddington Gold, Yancoal, South 32 and more.

The company also exports its products to Papua New Guinea, Mongolia, the United Arab Emirates, South Africa, and the US.

“Our main customer base is the heavy industrial and mining sectors, supplying to a large number of customers throughout Australia,” Mr Koenig said.

“With the use of CNC machining technology and waterjet profile cutting

capabilities, our team of highly skilled engineers and tradesmen ensure products are manufactured to the highest quality and tolerance.”

The experienced team can also provide custom design solutions to cater for any “out of the ordinary” requirements.

More information can be found at: www.ccindustries.com.au or by calling (02) 4272 5344.

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Email: sales@ccindustries.com.au

Phone: (02) 4272 5344



C & C Industries Pty Ltd
42-44 Doyle Ave
Unanderra, NSW 2526

South32 funds for fire relief

RAY CHAN
WA

AS the disastrous bushfire crisis continues to unfold in Australia, South32 has pledged \$500,000 to the Australian Red Cross in support of disaster relief.

It brings the miner’s total donations to organisations dealing with the crisis to \$1 million since November 2019.

South32 CEO Graham Kerr said it was “heartbreaking to see the continual tragic loss of life and property as a result of these devastating fires across Australia”.

“Our thoughts are with all who have been impacted and our gratitude goes to the emergency service workers and disaster recovery organisations whose tireless efforts of courage and dedication to protect and restore their communities is extraordinary,” he said.

South32 has also made in-kind donations of face masks for smoke protection, and across Australia many of its staff have been involved in raising funds and volunteering to support the effort.

South32 will continue to match employee contributions to a number of supporting organisations including Australia’s largest wildlife rescue organisation, WIRES (NSW Wildlife Information, Rescue and Education Service Inc.), Buy A Bale, which supports Australian farmers, and the Australian Red Cross.



South32 CEO Graham Kerr said the effects of the devastating fires was heartbreaking.

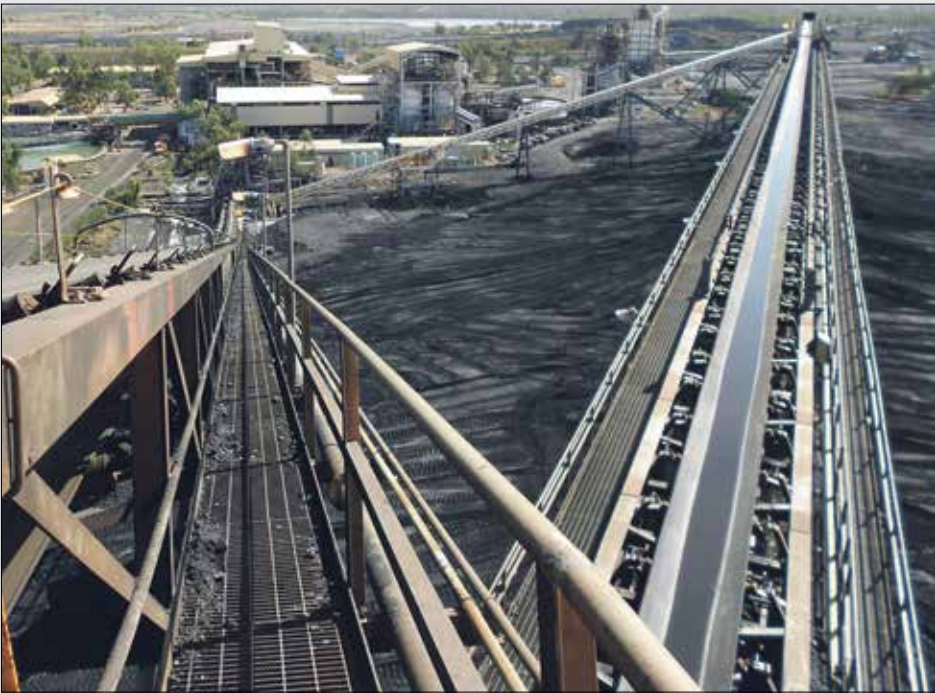
South32 had donated \$500,000 to the NSW Rural Fire Service and the Rural Fire Brigades Association Queensland Inc in November to support front-line fire-fighting efforts.

The donation will help regional brigades purchase equipment to assist with firefighting and mitigation, firefighter health and safety, and fire service mapping tools.

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Allfab provides clients with a diverse range of services, from shutdown support and supervised shutdown teams, to specialised asset management and capital works

Quality, integrity, experience

NATIONAL

SINCE becoming incorporated in 1976, Allfab has demonstrated an ability to adapt to new and challenging environments.

For more than 40 years, its enthusiasm and professionalism has not wavered and it continues to be committed to exceeding the expectations of clients.


Allfab has worked within, and alongside, some of Australia’s most recognised organisations, including Bluescope Steel Port Kembla, Caltex


Australia, Hatch, Downer Group, Port Kembla Coal Terminal and South 32.

The company continues to provide the clients with a diverse range of services from shutdown support and supervised shutdown teams, to specialised asset management and capital works .

Great work takes great people and Allfab is committed to providing the right person for the right job.

All its employees and management underpin its belief that quality, integrity and experience matter.

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Signs make safety a priority

NSW

SAFETY and communications are high priorities for all mining operations.

Signarama Wollongong specialises in providing clear and durable signs, banners, poles and tapes for rugged and remote mine sites in and around the Sydney region.

Well-placed, visible signage is an effective way to ensure a safe working environment for all mine personnel.

Signarama offers high quality, heavy duty products that allow the correct signals and information to be easily identified by mining, construction and other teams as they move around potentially dangerous situations.

Signage is particularly important during shut-downs, maintenance and construction phases, when new staff who need to be familiarised efficiently and quickly with safety instructions, hazardous areas and other dangers may be frequenting the mine site.

All Signarama's display products come in highly visible and durable formats which are suitable for underground and open pit locations at each stage of the operation.

Conveniently located on the Princess Highway, Signarama is a specialist in mining and reflective signage, and also offers a huge range of other related products including building signs, outdoor signs, vehicle signs, digital printing, custom fabrication, illuminated signage and much more.



Signarama offers a complete range of signage for mining operations. Image source: Signarama Wollongong.

Signarama Wollongong also offers a digital catalogue which assists with the process of choosing and ordering the products for immediate production.

Custom signs can be made in the format most suitable to the hazard and location and company experts can provide advice regarding the most appropriate sign designs for the purpose.

Signarama has a standard range of widely used products available including:

- No entry
- First aid

- Fire extinguisher
- Blast area
- Hazard
- High voltage
- Caution
- Drill site
- Give way
- Flammable gas

Signarama is known for a fast and reliable turnaround and quick delivery of the signs needed for any job.

Emergency and unexpected situations can be provided for efficiently with signage materials delivered and installed at the earliest convenience.

For mining companies planning on promoting their brand at conventions or conferences, Signarama also has a wide range of promotional corflutes and banners for display.

The correct safety messages clearly displayed will ensure a safe environment for all onsite personnel at any mine site.



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***DIGITAL CATALOGUE AVAILABLE UPON REQUEST**



No room for error in safety

NATIONAL

MISTAKES are not permissible when mining safety is concerned.

The lives of workers and the reputations of the companies who hire them are sacrosanct.

Starting with ISO 9001 Certification, Zokal set out to create systems that would leave no room for error.

Zokal founder and CEO Jim Prout has no tolerance for sloppy systems.

As chief chemist for Monsanto-owned Australian Fluorine Chemicals in 1976, he was confronted with workplace safety issues and decided to create what were possibly the first real safety procedures in the industry.

When he started Zokal, Mr Prout applied the same stringent systems and procedures to all their activities.

By 2004, Zokal achieved quality assurance accreditation and was registered for QA ISO 9001:2000, H&S 18001- AS/NZ 4801 and Environmental 14001 with DAS (Direct Assessment Services) Registrars.

When Zokal began servicing CABA equipment 15 years ago, Mr Prout took the same approach.

Zokal not only cleaned and refurbished equipment but also decontaminated it from fungi and mold, even though little



Zokal knows that mistakes cannot happen when it comes to safety of workers and brings a no-tolerance approach to bad systems.

was known about the devastating effects of fungi poisoning at that time.

CABA suits were then vacuum sealed to prevent decontamination and allow mine workers to easily spot leaking equipment.

Zokal has cleaned, serviced and decontaminated more than 20,000 suits without a single instance of equipment failure.

Each individual piece of equipment is also tracked from the time it leaves the mine until it is returned, ensuring delivery on time, or ahead of schedule.

More recently, Zokal has applied these same stringent procedures to five and 10-yearly refurbishments of quickfill (refill) stations for CABA recharging.

Zokal's entire management team are certified in quality management systems and internal auditing.

They regularly audit and assess the policies and procedures for all subsidiary companies so clients can be confident that Zokal operates efficiently, delivering products and services on time every time.

IS YOUR CABA CONTAMINATED WITH MOULD AND FUNGI?



Since 2005, Zokal has cleaned, sanitised, serviced and vacuum-sealed over 20,000 CABA suits without any equipment failure.

We pioneered an effective cleaning system which includes:

- A purpose built cleaning area with a self-draining floor,
- Purpose built soaking tubs and hot water high pressure

cleaning for CABA sterilisation

- Two positive pressure, dust-free laboratories for CABA service.
- A large stock of spares and parts for quick service turnaround
- An SAI approved gas cylinder test station and
- Two medical-grade, compressed air recharging facilities.

Zokal maintains ISO 9001 accreditation, which ensures that our systems are audited annually and are effective.



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Experience the PESPK difference

NSW

PIPE & Engineering Supply Co. in Port Kembla (PESPK) does just what its name suggests — supply pipes, fittings, hoses, valves and more to the Wollongong area and beyond.

With unbeatable product knowledge, its team of engineering supply and fire protection experts will help find the right solution for a project, large or small.

“We’re enthusiastic guys from the Port, with a genuine interest in finding solutions to companies’ problems, and driving efficiencies for operations and minimising downtime,” PESPK chief executive Glen Gibbons said.

“We have a fully stocked store in the heart of the Port, and also provide on-site consultations.

“Our professional technicians can come to you and thoroughly inspect your equipment to get to the root of the problem — then provide exactly what you need to be up and running again in no time.”

PESPK’s Wollongong engineering supply team can also perform mining equipment and valve repairs, fixing equipment correctly the first time.

Products in stock include carbon steel line pipes that are suitable for a high temperature service, as well as commercial/structural pipes, pumps, valves, fittings, fire supplies such as fire extinguishers, gaskets and more.

“For your convenience, Pipe &



The PESPK workshop is in the heart of Port Kembla.

Engineering Supply Co. will deliver your order of parts right to your door; give us a call today to organise your order, you won’t be disappointed,” Mr Gibbons said.

Interested parties are invited to visit PESPK’s website where they can view all

the relevant product specifications with information available on dimensions, weight, and pressure temperature ratings.

The PESPK team are also happy to answer any questions you have via phone, email or at their Port Kembla workshop.

The workshop is open 7.30am to 4pm Monday to Friday, with afterhours service also available.

More information can be found at: www.pespk.com.au.



At Pipe & Engineering Supply Co. Port Kembla, our philosophy is to create buzz in the mining community with our innovative designed, lightweight premium quality pipes, pumps, valves and fittings, and out-of-the-box ideas. We love helping people!

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Airnorth the master of the northern skies

NATIONAL

AIRNORTH is Australia’s second longest operating airline, mastering the northern skies for more than 41 years.

The airline’s operations are based in Darwin and include both scheduled and charter services to more than 20 destinations, including domestic services across the Northern Territory, WA, Qld and Victoria and internationally to Dili, Timor-Leste.

Airnorth maintains a modern jet fleet designed to successfully support the demands of its regional communities, businesses and customers, now operating 220 scheduled departures.

The company is a crucial part of the social and economic fabric of the Northern Territory and serves as a vital partner to many of its valued clients within the major resources, oil and gas industries, and to more than 330,000 flying customers each year.

The company is committed to providing safe, reliable and comfortable air travel for its customers across the Airnorth network.

In 2019, Airnorth was awarded contract extensions with OM Manganese, Jadestone, Conoco Phillips and the NT Government to continue transport services to Bootu Creek, Truscott-Mugalalu, Timor-Leste and ports along the Northern Territory’s Centre Run.

These extensions highlight the industry’s confidence in Airnorth’s capability to service large contracts, and continues to reaffirm its



Airnorth maintains a modern jet fleet designed to successfully support the demands of its regional communities, businesses and customers.

position as a formidable airline within the industry.

Airnorth chief executive Daniel Bowden said the team at the company was proud of the service it had delivered over the past years.

Mr Bowden said the team were thrilled to be recognised with contract extensions, which would allow the business to provide continued support to these major industry partners as it moves into another year.

“As part of Airnorth’s commitment to the territory, we employ more than 250 Northern Territory staff and invest more than \$50m per annum back into the local economy by supporting suppliers, stakeholders and contractors,” Mr Bowden said.

Airnorth continues to grow and evolve with the everchanging demands of the aviation industry - adapting routes and services to meet the needs of its customers.

True to its Territorian roots, Airnorth

remains nimble, determined, relaxed, and straightforward as always, building on its 41-year history servicing the top end and regional Australia.

Airnorth enters 2020 with much enthusiasm and energy as it continues to build upon obtaining new charter contracts with prominent mining, oil and gas conglomerates.

More information can be found at: www.airnorth.com.au.

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Nexus goes the extra mile

NSW

NEXUS Mining is more than just a provider of contract mining workers and equipment to the underground coal-mining sector; it goes the extra mile to offer innovative solutions to its many clients.

Started in 2017 in the Illawarra region of NSW, the company has grown its workforce to 400 workers and has trained more than 100 new entrants to the underground coal mining industry.

The company has extensive industry experience across a range of mining fields and expert knowledge of safety, project and financial management.

Nexus Mining strives to tailor its mining contractor services to its clients' needs, and its team-based approach to work is focused on accountability, career opportunity and collaboration.

Safety is paramount for the mining services contractor, which clearly communicates to all workers and stakeholders its expectations for their compliance with safety regulations to anticipate any potential issues.

Specialised contracting services provided by the company include sourcing supplementary labour, roadway development and pre-drive recovery road support, longwall mine support and longwall relocations, and engineering projects.

Other contracting services provided by the company are miner services, equipment rental, conveyor installations



Nexus Mining workers receive a safety briefing at a mine site.

and ventilation device installation.

The company provides contracting services to two different mine sites in the Illawarra coal mining area: Peabody Energy and South32.

Nexus Mining has a range of personnel at its disposal to deliver its package of mining services to clients including, under managers and deputies, mechanical and electrical coordinators, diesel and

equipment maintenance specialists and project managers.

More information: Nexus Mining, phone number: 02 4225 8489, or visit website www.nexusmining.com.au.

MORE THAN JUST MINING

Nexus Mining is a privately owned contracting company, based within the Illawarra Region of New South Wales. The company was established in 2017, and has been operating within the Southern Coal Fields.

With a growing portfolio and an employee base of 400, Nexus Mining provides innovative labour and project solutions to the Underground Coal Market.

We achieve success by providing services tailored to our clients' needs, whilst striving to become the sectors employer of choice by leading teams based on accountability, career opportunity, and collaboration.





As part of Phase One, more than 40mt per annum of iron ore will be produced.

EMMA DAVIES

THE \$3.5b Koodaideri iron ore mine in WA is progressing to plan with engineering, procurement and construction activities on schedule for first production in late 2021.

Koodaideri will deliver a new production hub for Rio Tinto's world-class iron ore business in the Pilbara, incorporating a processing plant and infrastructure including a 166km rail line connecting the mine to the existing network.

This includes construction of a new bridge in the Pilbara to carry the Great Northern Highway traffic over the proposed Rio Tinto Iron Ore Koodaideri Rail Line.

The bridge project, funded by Rio Tinto and managed by Main Roads, is expected to create a minimum of 40 local jobs with a \$23m contract awarded to a joint venture between ACCIONA Geotech and Clough Projects (ACJV) for roadworks and bridgeworks.

WA Transport Minister Rita Saffioti said an average of 721 vehicles per day use this section of Great Northern Highway, around two-thirds of which are heavy vehicles.

"This project will significantly increase efficiency and improve safety for road users by eliminating the road/rail conflict," she said.

"Rio Tinto has acknowledged the potential risk to the public with their rail operations and are to be commended on their proactive approach to engage Main Roads to construct a new bridge - the safest possible crossing infrastructure for the travelling public."

The works include the construction and realignment of 3.6km of Great Northern Highway and a new intersection at the Rio Tinto mine access road to the Koodaideri project which is expected to be completed in June 2020.

Phase 1 of the mine construction is currently underway, and along with mine infrastructure, an airport, mine support facilities and accommodation for employees will be built with engineering firm Worley contracted for the the engineering, procurement and construction management for the project.

Throughout the construction period, Rio Tinto expects to employ more than 2000 people with 600 permanent roles created once the mine is operational.

The project will increase the higher-value lump component of the Pilbara Blend (subject to market conditions) from the current average of about 35pc to around 38pc.

It's anticipated the ore will help sustain Rio Tinto's existing production capacity by replacing depletion elsewhere in the system.

A \$44m pre-feasibility study into Koodaideri Phase 2 is also underway — which could increase annual capacity to 70mt and help the company achieve its long-term goal of 360mt of iron ore shipped from Australia in 2022.

Autonomous operations

Koodaideri will feature technology already in use across Rio Tinto, such as autonomous trucks, trains and drills, and implement systems connecting all components of the mining value chain for the first time.

The development will consolidate everything Rio Tinto has learned from its studies into finding advanced ways to extract minerals while reducing environmental impacts and improving safety, known as the Mine of the Future™ program.

Rio Tinto chief executive Jean-Sébastien Jacques said that the operation has been designed to utilise an increased level of automation and digitisation which Rio Tinto expected would significantly enhance productivity, safety and maintenance of the new mine.

"Koodaideri is a game-changer," he said.

"It will be the most technologically advanced mine we have ever built and sets a new benchmark for the industry in terms of the adoption of automation and the use of data to enhance safety and productivity."

Innovations for the project include a digital replica of the processing plant, accessible in real time by workers in the field, fully integrated mine automation and simulation systems, advanced automation including an automated workshop, and numerous data analytics capabilities and control loops to optimise production and reduce downtime.

Global equipment manufacturer Caterpillar will provide state-of-the-art heavy machinery for Koodaideri which will be integrated with Rio Tinto's Mine Automation System (MAS) - which collects and enhances data created by the



A camp and airport will be part of the mine infrastructure.

company's mining operations, to improve productivity across Rio Tinto's entire iron ore network.

As part of the Mine of the Future™ program, the two companies will also be studying the potential for increased levels of automation of heavy mining equipment at the mine in the future.

Rio Tinto Iron Ore chief executive Chris Salisbury said the partnership would help make Koodaideri the most technology-enabled and innovative mine in the Pilbara iron ore network.

"Technology is rapidly changing our mining operations as we harness innovation to make our operations safer, smarter and more productive," he said.

Rio is also investing in skills and training for the new roles the autonomous technology will require in the workplace.


"The development and adoption of technology will continue to change the way we work, and we remain committed to providing opportunities for new roles, new skills, redeployment and retraining," Mr Salisbury said.

"Our partnership with the Western Australian government and South Metropolitan TAFE is working to develop the first nationally recognised certificates in automation, helping to ease the industry's transition to the mines of the future."

Mr Salisbury said the leading-edge technology will deliver a step-change in both safety and productivity for the company.

"Subject to final approvals, Koodaideri will incorporate all of that knowledge to enable us to build the smartest, safest and most efficient mine we've ever constructed," he said.

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Image: Newmont Goldcorp.

The 2020s will kick off with a bang in Kalgoorlie. The Super Pit has changed hands with both KCGM JV partners selling their shares in the mine, and Lynas will bring rare earths to the region as it begins construction on its cracking and leaching plant.

The Super Pit. Image: Newmont Goldcorp.

GERARD MCARTNEY

THINGS in Kalgoorlie have changed a lot since Paddy Hannan first struck gold in 1893.

The gold rush of the late 1890s sparked the boom and bust cycle that has come to dominate WA's economy for more than 120 years.

Vast fortunes have been made and lost by ambitions prospectors and the Golden Mile, as it came to be known, kickstarted a seemingly endless gold rush that is still very much alive and well today, 127 years later.

At the turn of the decade, the iconic Super Pit changed hands with both JV partners, Newmont Goldcorp and Barrick Gold, selling their 50pc interests to Northern Star and Saracen Minerals respectively, putting the KCGM JV back into the hands of Australian miners for the first time since the 1970s.

And while gold may continue to define the future of Kalgoorlie for many years to come, one of the defining commodities in the US-China trade wars, rare earths, looks set to play a large part in that future too.

As the world prepares for the EV revolution and the US defence department looks to shore up supply of the 17 rare earths elements historically controlled by China, Lynas has settled on Kalgoorlie for its new cracking and leaching facility after it was expelled from Malaysia in 2019.

Super sale

The Golden Mile, once considered to be the richest square mile on earth, was comprised of the Ivanhoe, Great Boulder, Golden Horseshoe, Chaffers, Hannan's Star and Boulder Main Reef leases.

In the 1980s, Alan Bond bought up the majority of those leases and transformed the vast subterranean labyrinth of underground tunnels into his massive open cut brainchild – the Super Pit.

The pit has been hugely successful since operations began and was the largest mine in Australia until it was overtaken by Newmont Gold Corp's Boddington gold mine in 2012.

To put it into perspective, of the 60moz-plus produced on the Golden Mile over the last 127 years, about a third of it has been pulled out of the Super Pit.

“To put it into perspective, of the 60moz-plus produced on the Golden Mile over the past 127 years, about a third of it has been pulled out of the Super Pit.”

With record-breaking gold prices from 2019 continuing into 2020, any fears around the feasibility of the Super Pit were allayed, and ownership of the mine changed hands as the new decade rang in.

Both KCGM partners Newmont Gold Corp and Barrick Gold sold their individual 50pc shares to Northern Star Resources and Saracen Minerals respectively.

While the 7moz asset has a 12-year minelife, Newmont Goldcorp has released a resource upgrade that was expected to lift the mines inventory significantly.

On November 25, 2019, Saracen Minerals finalised its \$750m acquisition of Barrick Gold's 50pc share of the KCGM joint venture that operates the Super Pit.

This strategic move meant that Newmont Goldcorp was unable to exercise its pre-emptive rights to match bids for Barrick's half of the mine.

The transaction was completed with a \$400m drawdown under a \$450m senior secured term loan, and after Saracen had also received consent from the WA minister for finance, Aboriginal affairs and lands.

Production guidance, according to Newmont Goldcorp, remained at 245,000oz, at an AISC of \$1470/oz.

Saracen chief executive, Raleigh Finlayson, said he was confident the asset would be in production for many decades to come.

Three weeks later, Northern Star Resources finalised a deal to acquire Newmont Goldcorp's 50pc stake in the Super Pit, meaning that for the first time in more than 30 years, it was back in the hands of Australian miners.

The offer, about US\$800m (A\$1.165b), will see the company inherit Newmont Goldcorp's status as operator of the mine.

Northern Star chief executive, Bill Beament, said that the acquisition would create enormous short, medium and long-term opportunities.

“The purchase of a 50 per cent stake in the Kalgoorlie Super Pit meets our key strategic objectives of generating strong financial returns and growing out gold inventory from Tier-1 mines in Tier-1 locations,” he said.

“This is one of the world's greatest gold systems, as shown by its 80moz endowment and the fact that it contains up to 60,000oz per vertical metre. To put this into context, our Jundee mine, which is itself a Tier 1 asset, contains around 13,000oz per vertical metre.”

The transaction was finalised on January 3.

A rare opportunity

After a protracted battle with the Malaysian government around processing rare earths from its Mt Weld mine in WA, and a particularly heated hostile takeover from Wesfarmers, Lynas has resolved the ongoing problem by settling on Kalgoorlie as the site for its new critical minerals hub, where it will build a cracking and leaching plant.

The plant is expected to cost about \$500m, with Lynas sub-leasing an industrial property from the City of Kalgoorlie Boulder, which has welcomed Lynas' planned investment.

Lynas chief executive, Amanda Lacaze, said that the company was expecting to build the plant with enough capacity for other rare earths miners to use the facilities.

Uncle Sam will also pour money into the plant, which will be the US military's first investment in large-scale rare earths production since the Manhattan Project to construct the first atomic bomb in World War Two.

Rare earths have been at the centre of much debate as trade tensions between China and the US refuse to subside.

China dominates the rare earths market, and specifically the heavy rare earths sector, controlling about 80pc of the world's

production.

Rare earths are a crucial component in smartphones, laptops and other consumer technology, used to make the powerful magnets needed in electric motors, and they are essential to the advanced technologies used by modern militaries.

They are used in everything from night vision goggles to cruise missiles.

Goldfields mental health services facility

2020 will see the construction of the much-anticipated Goldfields 10-bed mental health step-up/step-down service on Davidson Street.

The WA State Government has pledged \$10.48m for dedicated public mental health services in the Goldfields.

The residential facility aims to support people with mental health issues as they continue to live within the community in the hope of stemming escalation of mental health issues, reducing the need for hospital admission, and to take the pressure off the emergency department at the Kalgoorlie Health Campus.

“Uncle Sam will also pour money into the plant, which will be the US military's first investment in large-scale rare earths production since the Manhattan Project to construct the first atomic bomb in World War Two.”

Mental Health minister Roger Cook said that providing more support for and treatment options was a priority.

“This new mental health service will offer an additional service that can support people in the Goldfields region to manage their mental health, close to home,” he said.

“We are continuing to work to give Western Australians the support they need to manage their mental health issues early on, improve their health and wellbeing.”

A WA Government-funded study in 2018 found that 33pc of FIFO workers experienced “high” or “very high” psychological distress in their day-to-day life in comparison to 17pc among non-FIFO workers.

High-pressure dust suppression

WA

THE increasing volume of material being mined using more efficient and larger machines has led to new challenges for the industry.

There has never been a greater focus on safety and the environment, and it's imperative mining companies are going above and beyond to meet industry regulations and expectations.

With an extensive background in hydraulic components and repairs, WT Hydraulics is working at the forefront to improve the safety of workers and mitigate the environmental impact of mining activities.

According to WT Hydraulics managing director Kraige Cooper, increasing the volume of material flow increases the generation of airborne dust particles.

“At WT Hydraulics, we’ve recently installed DYNASET HPW High Pressure Dust Suppression systems to mobile crushing and screening plants in the Goldfields area,” he said.

“This helps remove the fine airborne dust particles that this type of equipment creates – a win-win for mining operators conscious of decreasing safety and environmental risks at their operation.”

WT Hydraulics’ DYNASET HPW dust suppression system develops the required water pressure of more than 120 bars, which reduces the water drop size to less than 160µm producing thick water fog.



WT Hydraulics stocks the DYNASET HPW High Pressure Dust Suppression system.

This leads to extremely low water usage; no mud and cleaner work sites; a small drop size reaching every dust particle and its weight rising dramatically; clear air; good visibility; and better breathing air.

The company can design the system to utilise the power available on the existing equipment and supply the components and labour to install the DYNASET HPW Dust Suppression system to any mobile mining machine.

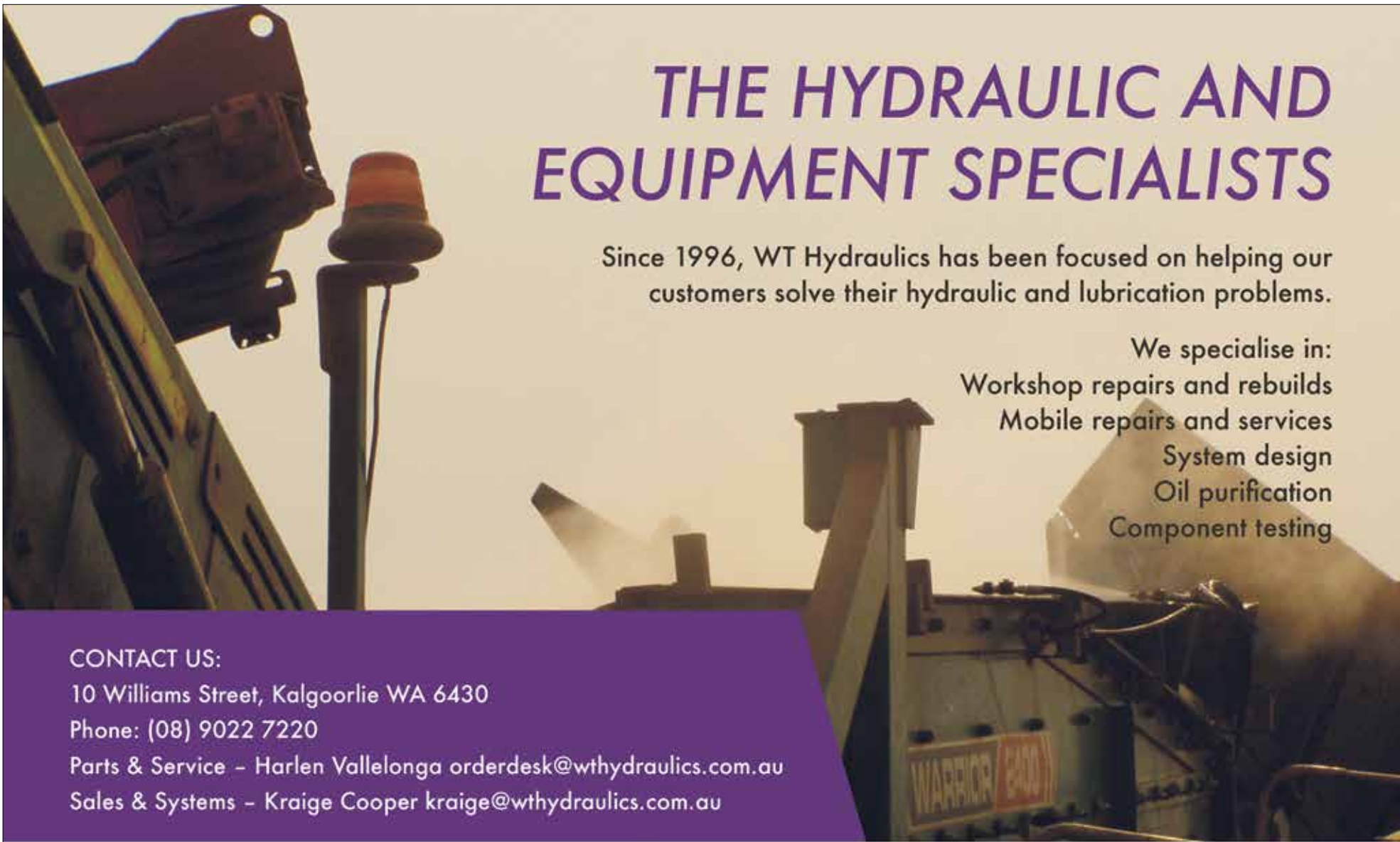
WT Hydraulics is also a service partner for HYDAC Australia and distributor of Sterling Hydraulics, Parker Hannifin, and Festo pneumatics, with a large range of products available including filtration, valves, diverters, flow regulators, pumps, motors, generators, washer components, and more.

The company has been in business for more than 20 years, starting out in 1996

to help clients solve their hydraulic and lubrication problems.

Some of its core clients include RUC Cementation Mining Contractors, BHP Nickel West, Byrncut Australia, and Raglan Drilling.

More information on WT Hydraulics and its product range can be found at: www.wthydraulics.com.au/products/feature-product-1/.



THE HYDRAULIC AND EQUIPMENT SPECIALISTS

Since 1996, WT Hydraulics has been focused on helping our customers solve their hydraulic and lubrication problems.

We specialise in:

- Workshop repairs and rebuilds
- Mobile repairs and services
- System design
- Oil purification
- Component testing

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Parts & Service – Harlen Vallelonga orderdesk@wthydraulics.com.au
Sales & Systems – Kraige Cooper kraige@wthydraulics.com.au

The hydraulic and lubrication system experts

WA

FLUID Line Services has established itself as the leading supplier and service provider of hydraulic and lubrication systems to the drilling, mining and processing plants in the Goldfields.

Starting up in Kalgoorlie in 1989, the company has extensive experience in hydraulic and lubrication engineering, and is one of WA's leading designers, builders, and suppliers of hydraulics and lubrication products and systems.

Its Kalgoorlie and Forrestfield workshops are the among the best equipment facilities in the state to provide component repairs, rebuilds, and equipment manufacturing.

It employs in-house engineering and 3D CAD design technology, and has an oil cleanliness laboratory.

Fluid Line Services is also the leading Parker distributor in WA and the only authorised build centre for Parker commercial units, gear pumps, motors, and flow dividers.

For more than quarter of a century, the company has worked with some of Australia's largest resource companies and manufacturers to keep their equipment working, maximising productivity and minimising disruption to production.

The diverse customer base includes major resource companies in the oil and



A 300 kW pump test bench.

gas, iron ore, gold, and nickel mining industries.

FLS also provides oil flushing rigs for hire, up to 5000 l/min, and an extensive mobile equipment fleet.

Hydraulic and lubrication systems:

- Systems design
- Systems manufacturing, and installation
- Consulting and technical advice
- System upgrades and refurbishment

On-site maintenance:

- Extensive range of filters, components and spares

Services and capabilities:

- Component repairs
- System manufacture and installation
- Circuit design
- Field services including maintenance and flushing
- Power packs, control systems, kidney



A closed loop pump tested to 350 bar.

loop filtration

- Powered flushing carts and skids
- Mineral processing plant hydraulics and lubrication
- Mobile equipment hydraulics and lubrication systems
- Drilling-rig hydraulics and enhancements

Hydraulic distributors:

- Parker Hannifin hydraulic equipment and filtration products
- Danfoss hydraulics
- Eaton hydraulics, IMI (Norgren) pneumatics, Boss hydraulics — torque and high pressure tooling, Alemlube.

Oil flushing carts (with and without integrated pumps)

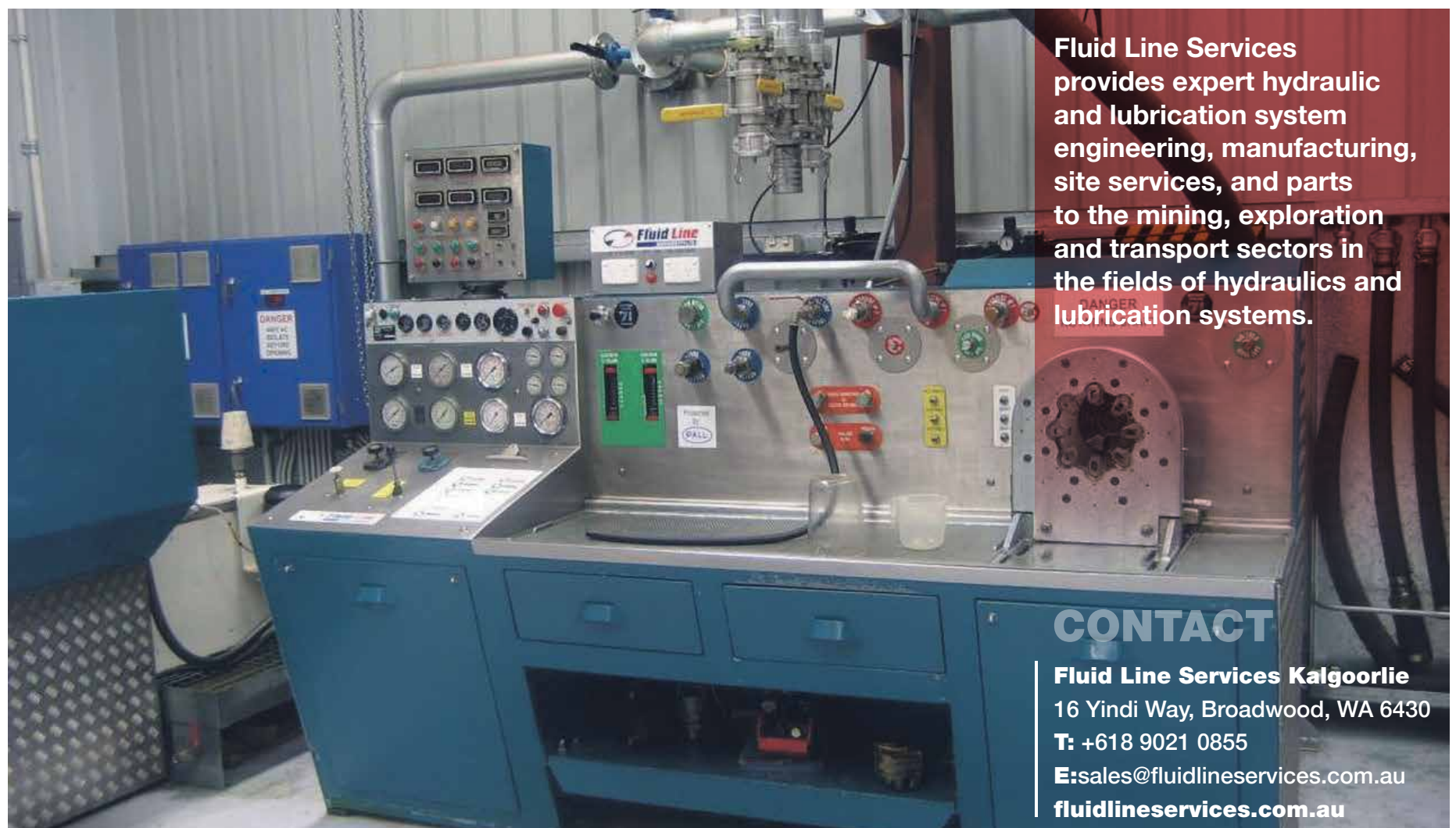
- Oil transfer pumps
- Oil purifiers for removal of water
- Large oil reservoirs for removal and storage
- Data logging test equipment for on-line monitoring



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NATIONAL

WHEN you're running a large mining operation, putting on fresh, delicious food daily for staff in the mess hall is a must.

You want to keep your staff happy with a nice array of options to suit all dietary requirements.

From an operational perspective, you also want to work with a supplier you can trust that has experience delivering food to the most remote corners of the country.

With an operating history dating back to 1864, national food services provider PFD is a proud contractor to the Australian mining industry.

With branches in more than 70 locations around Australia, the company is the food supplier of choice for mining, delivering the largest range of fresh seafood and meat, together with frozen products, dry goods, paper products and cleaning solutions.

"We have everything you need, in a one stop, to help make your business a success," PFD Food Services Kalgoorlie branch manager Dianne Denman said.

"Each day our fleet heads out delivering fresh, frozen and dry goods along with paper and cleaning products to over 55,000 businesses across Australia.

"The PFD fleet is the largest privately-owned food service fleet in Australia so chances are you have seen one of our 800 purpose-built trucks on the road making its deliveries."

PFD's Kalgoorlie branch can deliver



PFD has branches in more than 70 locations around Australia.

frozen goods such as meat and seafood, fries, burgers, dumplings, onion rings, vegetables, pies, pizza, desserts and more to mining operations around the Goldfields region.

It also has chilled goods such as cheese, meats, milk and butter, as well as a large selection of pantry items including cooking oil, cereals, sauces, hot drinks, condiments, fruit juice, pasta and more.

PFD's trucks are purpose built/multi

temperature vehicles designed for multi temperature control with freezer and chillers in one truck, that can carry up to 10t with the capacity to move from one up to 14 pallets.

"We have a national pallet capacity of over 5500, meaning we can move that in a day," Ms Denman said.

"Our new trucks have the highest emission rating on comparative market and are built with safety, driver and

company efficiencies in mind."

The company has a streamlined online ordering system making it easy for a purchasing team to submit orders.

"We also have a rewards program for our regular customers," Ms Denman said.

More information on PFD's delivery services can be found on its website www.pfdfoods.com.au, by calling the branch direct at (08) 9021 2492 or emailing kalgoorlie@pfdfoods.com.au.



At PFD, we deliver the largest range of fresh seafood and meat together with frozen products, dry goods, paper products and cleaning solutions.

Our 70 locations around Australia:



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We've got everything you need, in one stop, to help make your business a success.



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(to contact your local PFD branch)

www.pfdfoods.com.au

VM Drilling services on right track

NATIONAL

MORE than 15 years ago, in 2004, VM Drilling was established as a one-rig company in Boulder and grew organically to the reputable mid-size company it is today.

These days, the business is operating up to nine rigs out of Kalgoorlie and possesses extensive experience within the mining industry.

VM Drilling focuses on servicing grade control and first pass exploration drilling as an efficient, cost-effective alternative to traditional air core/RAB operations.

The company has demonstrated success utilising versatile ROC series Atlas Copco machines for in-pit grade control and first pass exploration projects.

The business has been built with a total solution philosophy for resource companies.

It specialises in track-based drilling services and now boasts four Atlas Copco ROC L8 drills, four Atlas Copco D65 SmortROC drills and one Hydcro 800 track-based RC machine.

A recent strategic review saw the company shift its focus to specialising in providing quality, cost-effective grade control and first pass exploration drilling services.



VM Drilling focuses on servicing grade control and first pass exploration drilling as an efficient, cost-effective alternative to traditional air core/RAB operations.

With its depth of knowledge and practical know-how, VM Drilling can achieve this vision with its use of the versatile, small footprint Atlas Copco ROC series drill rigs.

BM Geological Services director,

Darren Mapleson, said that he had used VM Drilling since 2004 and would continue using them into the future.

"I have found the company to be professional, supportive with flexible scheduling, have an ability to deliver on

target metres and be cost effective," he said.

"Its ROC L8 rigs provide the in-pit mobility and versatility required to drill the trickiest of holes.

"VM Drilling delivers this with a sound approach to safety."



THE BUSINESS

www.vmdrilling.com.au

VM Drilling is a well-established drilling services provider with more than 50 full time employees and a solid management team that has been providing innovative, professional drilling solutions to the Australian mining industry since 2004. Our operational base is located in Kalgoorlie-Boulder, Western Australia where we strive to contribute to the local community and employ staff who live in the city.

VM Drilling offer drilling services to clients throughout Australia and with an internal transport division we are able to cost effectively mobilise our equipment and freight to virtually any location.

VM Drilling's difference is in our uniquely versatile approach, utilising fit-for-purpose equipment to assist our customers to achieve their goals.

The right specialty service, when and where it's needed most.



EQUIPMENT



CAPABILITIES

- Track based grade control drilling to 54 metres
- Full pit coverage with articulated mast and boom setup
- RC track based exploration drilling to 800 metres
- First pass exploration/air core and slimline RC
- Internal transport company to reduce mobilisation costs
- Internal engineering company for innovative solutions

TESTIMONIALS

"I have utilised and relied upon VM Drilling since their establishment in 2004, having drilled thousands of safe, efficient metres in that time, primarily in the West Australian gold sector. VM's eye for continual improvement means sampling quality and work efficiency is second to none and well supported. Their fleet is well maintained which means every job is done with minimal downtime and maximum safety. This equates to cost savings for their clients. When I need an RC job done right the first time, VM is my first choice."

Ben Pollard
Director - Cadre Geology and Mining

"I have used VM Drilling since 2004 and have found them to be professional, supportive with flexible rig scheduling, have an ability to deliver on target metres and be cost effective. They deliver this with a sound approach to safety. Their ROC L8 rigs provide the in pit mobility and versatility required to drill the trickiest of holes. I highly recommend using VM Drilling for any grade control programme."

Darryl Mapleson
Director - BMGS

08 9093 3916 | 29 Clancy St, Boulder, WA
operations@vmdrilling.com.au | vmdrilling.com.au



Simon Thomas from BHP South Flank will be one of the speakers at this year's conference.

RAY CHAN

THE new century marks the 23rd year of the annual Global Iron Ore and Steel Forecast Conference, to be held in March 18-19 at the Westin in Perth, WA.

This year's event will focus on industry growth and developments, optimising value, managing and improving iron ore quality, developments in innovation and automation, and process improvements.

It will also look at the role of renewable energy in reducing carbon footprints of businesses while also lowering energy costs and improving their bottom line.

The event looks set to continue its role as

the premier event for the global iron ore and steel industry.

Join hundreds of iron ore executives, project directors, analysts, engineering firms, industry suppliers and many more under the one roof for two days of presentations, discussions, networking functions and private meetings.

Key issues to be addressed at the 2020 event include:

- Iron ore and steel market outlook and updates
- Project updates and expansions
- Optimising value – technology developments
- Revolutionary decarbonising technologies – opportunities to reduce reliance on costly

fossil fuels and their carbon footprint

- Renewables' increasing important role in attracting project investment and maintaining a "social licence" to operate
- Innovation and automation – the future of growth, IOT, remote operation centres, new productivity developments

The impressive range of speakers include Simon Thomas, South Flank, BHP; Paul McTaggart, Citi Research; Peter Kerr, Mount Gibson Iron Limited; Mark Eames, Magnetite Mines; Craig Jennings, Woodside Energy; Quentin Hill, Carpentaria Resources; Bill Johnston MLA, Minister for Mines and Petroleum; and Xiaoxuan Sun (David, Sinosteel Australia).

This year's Conference will also be run

concurrently with the 21st Mineral Sands Conference.

Global trade tensions and international economic uncertainty have impacted zircon producers and the difficult market conditions expected for at least the next six months create a challenging environment for the mineral sands industry.

However, a strong demand for high-grade titanium products has put a more positive slant for the outlook beyond the next six months.

Once again this well-established event will deliver a comprehensive analysis and insight of the latest industry updates from industry players.



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Image: Newmont Goldcorp.

THE HUNT FOR THE NEXT CALLIE

The Tanami Desert is a hive of activity. With the expansion of Newmont Goldcorp's operations greenlit, the company has pushed its operations in the region out to 2040. And explorers continue to report high-grade results as they continue looking for the next big find.

GERARD MCARTNEY

THE world's largest gold miner, Newmont Goldcorp, has given the go-ahead for the expansion of its Tanami gold mine in the Northern Territory, which will boost the company's Australian gold output to 1.7moz in 2021, and 1.8moz in 2022 as the company continues to optimise operations across its portfolio.

The company is planning to invest about \$US700m-\$US800m in capital costs that it expects would push the mine life out to 2040.

The infrastructure upgrades would increase the annual output at Tanami by about 150,000-200,000oz for the first five years beginning in 2023.

The company also said that it would reduce the operating costs at the mine by about 10pc and produce 1.5mt of ore through the expansion.

But Newmont Goldcorp is not the only player in the Tanami region, with a hive of exploration activity in the area hoping to uncover the next 1moz discovery.

Greenfield exploration in the area has been spearheaded by Prodigy Gold, a Perth-based explorer that holds many tenements in the Tanami region.

The company believes there are many more 1moz deposits in the area, and is aggressively exploring its 100pc-owned tenements, while also entering farm-in JVs with Newmont Goldcorp and IGO.

Tobruk farm-in

In May 2019, Newmont Goldcorp Exploration, a wholly-owned subsidiary of Newmont Goldcorp, entered a \$14.5m exploration farm-in and JV with Prodigy Gold for the

exploration of the Tobruk project.

The Tobruk project covers the prospective Tanami group rocks that host Nemont Goldcorp's Callie gold deposit, and several smaller deposits including Groundrush and Titania-Oberon.

In a statement, Prodigy Gold said that the project's potential for the discovery of a significant new gold deposit was further enhanced by the analogous structural setting to known Tanami deposits, "including tightly folded stratigraphy, Tanami parallel faults and drill-defined anomalous geochemistry positioned on the margins of magnetic features".

Under terms of the agreement, Newmont Goldcorp Exploration would sole fund up to \$12m in exploration expenditure to earn up to 70pc interest in the Tobruk project, and to provide a total of \$2.5m cash payments to Prodigy, in the form of \$1.5m within 20 days of signing, and \$1m on election to proceed to phase two.

Phase one of the earn-in would see Newmont Goldcorp manage the project with the option to earn a 51pc stake in it by spending \$6m on exploration over a four-year period, although the company may withdraw during phase one after spending a minimum of \$2.5m.

To proceed with phase two and acquire a 70pc interest in the project, Newmont Goldcorp would make an additional cash payment of \$1m within 20 days of electing to proceed, and spend an additional \$6m on exploration within a three year period, or define a JORC resource of more than 500koz.

Prodigy Gold managing director Matt Briggs said that the company was excited to begin working with Newmont Goldcorp.

"We are very pleased to be partnering with the world's largest gold miner to fast-track the exploration of our Tobruk Project in the

Tanami Province, a region which is considered the exploration destination of choice for several major gold producers," he said.

"Newmont Goldcorp has a long and successful history in the Tanami area including developing the nearby Callie Gold Mine into a world-class gold deposit, and we are looking forward to leveraging Newmont Goldcorp's extensive technical knowledge as work gets underway at Tobruk this quarter.

"Prodigy Gold now has in excess of A\$33m in funding agreements from JV partners to accelerate discovery across the company's entire exploration portfolio, including JVs with Independence Group (70/30) and Newcrest Mining (earn-in stage) that have already generated high-quality targets which are currently being drilled.

"Further, we remain committed to unlocking the value of our 100pc-owned projects and the cash payment received from Newmont Goldcorp as entry into the Tobruk JV allows this strategy to continue at pace."

Hyperion project

Prodigy Gold's 100pc-owned Hyperion project is located 19km north of the Groundrush pit, and 58km northeast of the Central Tanami processing plant site.

In December 2019, Prodigy Gold reported the results for 32 aircore drill holes completed during October.

The holes defined extensions to the mineralised structures about 600m to the south of the existing gold resource, which the company said demonstrated the strong potential for the resource to extend further south.

In a statement, the company said the drilling was "aiming to grow current Indicated and Inferred resources of 4.93Mt at 1.95g/t Au

for 310koz and to progress discovery of new standalone projects".

It said there would be "follow-up aircore and diamond drilling planned to test the southern extensions of the Hyperion Project in 2020".

Bluebush project

Prodigy Gold's 100pc-owned Bluebush project is a large-scale target area about 50km northeast of the Callie mine, and has a number of prospects the company is exploring, including Capstan, Indefatigable, Hornblower and Wild Turkey.

Prodigy Gold said that it has the same structural setting and rock sequence as the Callie deposit, with the Capstan the priority exploration target.

In the latest results, the company reported multiple intersections and more than 0.05g/t gold from 62 air core holes completed at the Capstan North and Hat prospects.

The highlighted intersections included 6m at 0.52g/t from 36m; 3m at 0.58g/t from 57m and 3m at 51g/t from 69m; 6m at 0.47g/t from 45m at the Hat prospect; and 3m at 0.25g/t from 36m at Capstan North.

Prodigy managing director Matt Briggs said that the results were some of the best the company had received from air core drilling for the field season.

"Gold anomalism on this target extends for over 3km of strike and 500m wide on the drill sections recently completed," he said.

"Given recent drilling has continued to extend the existing gold anomaly at Hat, we are not eager to generate a more precise understanding of the controls and potential scale of this gold structure so we can optimise bedrock drilling to be completed at the Prospect during the 2020 field season."

In for the heavy haul

NATIONAL

MLG Oz is a privately owned and operated business headquartered in Kalgoorlie, WA, with operations located throughout the Goldfields and regional Australia.

MLG commenced operations in 2000, as a small contractor providing silica mining and haulage services for BHP Billiton and has since expanded to include crushing and screening, quarry products, bulk transport services and fully integrated mine-site solutions.

From its family foundations, MLG Oz continues to work on the philosophy of 'keeping it simple'.

"We strive to provide a high-quality of service with minimal fuss and we pride ourselves on our ability to fulfil our obligations to our customers on time, and in an economical, safe and efficient manner," MLG OZ managing director Murray Leahy said.

The team at MLG Oz pride themselves on providing an industrial leading standard of operations across regional Australia.

"We strive to deliver services with zero negative impact on our customer operations, and provide an industry leading standard of service," Mr Leahy said.

"We believe that productivity and safety are intrinsically linked and in order to achieve long term sustainability in one



MLG Oz has extensive experience in hauling and supply chain solutions.

you need sustainability on both."

MLG Oz has extensive experience in hauling and supply chain solutions.

"We have a growing fleet ensuring we

are able to provide our customers with all their requirements on short lead times at competitive pricing," Mr Leahy said.

MLG Oz works in collaboration with

clients to tailor and customise operational solutions.

More information can be found at: www.mlgoz.com.au.



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MLG provides comprehensive supply chain solutions with a focus on efficient, safe and productive outcomes.

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- CONTRACT CRUSHING AND SCREENING • CONSTRUCTION MATERIAL SUPPLIES

Images: Adani.

ADANI ON THE RIGHT TRACK

After spending years overcoming resistance from environmental groups to its gigantic Carmichael coal mine in Queensland, Adani Australia continues to steadily work to link up the project to rail and port infrastructure. But there are still some hurdles to clear such as locking in enough rail capacity for the mine's exports, and meanwhile the clock is ticking for its target date of the middle of next year for initial shipments to international customers.

Construction starts on the Adani mining and rail project in Queensland.

MIKE COOPER

TIME continues to tick down to Adani Australia's deadline of late 2021 for first coal exports from its giant Carmichael coal mine located in central Queensland's unmined Galilee Basin coalfield.

Adani finally received approval for its Carmichael mine and rail project from the Queensland government last year, more than a decade after the Indian-domiciled company had first submitted its project application to Queensland planning authorities in the late 2000s.

An Australia-based spokesperson for Adani Mining said that the project was proceeding to schedule.

"We look forward to the completion of the mine and rail construction in 2021, and for our first coal to also be exported later that year," the spokesperson said.

"The Carmichael mine will produce 10mt of coal per annum."

Rail infrastructure will be critical for the project which had an original mining capacity of 60mtpa for thermal coal, now scaled back to an initial 10mtpa.

Adani needs to link its Carmichael mine to the port of Abbot Point in northern Queensland where it operates a coal shipments terminal and is planning to build another.

Without access to adequate rail capacity to deliver coal from its mine to port, Adani may find it difficult to ramp up production at its mine beyond 10 mpa and to ship coal in meaningful volumes to overseas customers.

To address the issue of rail capacity, Adani has received approval to build a 189km rail line to connect Carmichael mine to the existing Central Queensland Coal Network used for railing coal exports to the ports of Hay Point and Abbot Point.

The Adani Mining spokesperson said construction of the railway has started.

"Works on the Carmichael Project are well underway and the construction schedule is on track, with more than 200 people onsite

and about 50 pieces of plant and equipment, including bulldozers, scrapers, graders, compactors, water carts, and tractors," he said.

"Construction activities on the mine site include, but are not limited to, land clearing and surveying, fencing works, civil earthworks and other construction activities including building roads, pads, site office establishment and dam construction."

Adani has placed equipment orders with manufacturers and engineering firms for its rail project, demonstrating its commitment to see the Queensland coal project through to completion.

Siemens is to provide rail signalling systems for its Carmichael rail project, and Martinus Rail is contracted to lay the rails for the new system.

"We have also awarded more than \$500m in contracts on the line and rail project, with more to come, ensuring works will continue to ramp up over the coming weeks and months," the spokesperson said.

Rail capacity required

The rail network will have a handling capacity of 40mtpa for Adani coal exports, and more than enough to cover its Carmichael mine's start-up production rate of 10mtpa.

However, the CQCN serves existing export coal mines in the Bowen Basin coalfield of Queensland and most of its rail capacity has already been committed to them.

These Bowen Basin mine operators have signed long-term contracts with the system's operator Aurizon to secure capacity in its CQCN for their coal exports.

As a result, their coal exports will have priority in the rail system over those of newcomer Adani, raising the possibility that Adani could face a severe bottleneck at the point at which its coal trains leave its rail network and enter the CQCN.

This is unless Adani can secure adequate capacity for its 10mtpa of Carmichael coal exports on Aurizon's railway.

The Adani Mining spokesperson said the

company is still working on securing shipment capacity on the CQCN for its thermal coal exports..

"We are progressing with our connection to the existing rail network as per standard regulatory processes that are in place to facilitate rail connections," he said.

Rail infrastructure is critical to Adani for another reason, as the Indian company has traditionally taken a holistic approach to its coal business.

This is because Adani prefers to have some measure of control over most if not all aspects of the supply chain for this commodity.

In India, Adani is the largest importer of thermal coal into the country through its extensive trading operation, and the company also has interests in ports in India and power stations.

The company explained its integrated approach to its coal supply operations in its last annual report.

"Adani group has evolved as a diversified conglomerate based in India having global operations with primary interests in the energy sector, while the company continues to operate as the flagship company of the group," the report stated.

"The group was primary involved in the coal logistics business and gradually it has backward integrated its operations in domestic and overseas coal mining through the company, along with forward integration in ports, logistics, power generation and transmission through various other group companies."

Coal market weakens

Time is a critical factor for the Adani thermal coal project in another way.

Delays to the Carmichael project have not only added to the cost of the mine – Adani said it has already spent \$3.3b on the project since 2010 – but have delayed the start of its coal shipments.

Boom time prices for thermal coal on international markets at around 2012 have

given way to a depressed market where current prices for the mineral are in the doldrums.

Lower international thermal coal prices may affect the profitability of the Carmichael mine which has relatively high shipping costs to market because of the mine's 400km distance from railhead to port.

These additional costs have to be covered by sales prices for thermal coal sold on the international market otherwise the mine's viability could be affected.

The market for thermal coal is unlikely to change for the better in the near term, at least according to official Australian government forecasts.

According to the Australian government's Office of the Chief Economist in its December 2019 Resources and Energy Quarterly update, the outlook looks flat for the key thermal coal benchmark price centred on Australia's Newcastle port.

"The Newcastle benchmark thermal coal spot price is forecast to drift from an estimated average of US\$74/t in 2019 to US\$72/t in 2021, as supply continues to outpace demand," the report stated.

The Asian seaborne market for thermal coal remains well supplied from mines in Australia and Indonesia, and Russian coal producers in Siberia have been shipping more product to Asian customers through enlarged export facilities on Russia's Pacific seaboard.

Australian export volumes of thermal coal going into the seaborne market are expected to grow to 214mt in the 2020-2021 financial year, from 209mt in the 2019-2020 year.

More Australian export volumes supplied to an already slack thermal coal market are likely to weigh on seaborne prices of the commodity at a time when Adani's Carmichael mine starts its exports.

The Australian government's Office of the Chief Economist stated that although there is a large pipeline of potential projects in Australia, "weak prices and growing challenges in developing greenfield projects could weigh on final investment decisions and export growth beyond the outlook period".

Prioritising social licence to operate

NATIONAL

SOCIAL licence to operate is a hot topic in the mining industry, now more than ever before.

The public want to feel an operation is adding value to the communities in which it operates, be meeting industry best practices, and minimising any potential risks to the environment.

In response, Everick is one of a new wave of businesses that are making social licence a central part of its operations.

Everick Foundation is a not-for-profit organisation whose aim is to help to preserve and promote Australia's cultural heritage through direct action or developing partnerships with supporting organisations.

Within the mining sector, Everick achieves this through facilitating collaborations between miners and Aboriginal communities, shifting the focus from compliance to a more mutually beneficial approach.

Often this involves using cutting-edge technology to explore and manage high value heritage that is in proximity to, but off mining leases.

"We hear so much these days about 'social licence' in the mining sector. But achieving this in a credible and authentic manner can be challenging," Everick director Tim Robins said.

"What our Foundation offers clients such as Adani is another way of authentically



Everick Foundation facilitates mutually beneficial partnerships between mining companies and local communities.

connecting with communities to develop trust in their projects.

"A lot of our industry partners are surprised how little resources are required to generate genuine and really meaningful outcomes for the communities in which they operate."

Western Kangoulu traditional owner Jonathon Malone agreed, stating mining takes an undeniable toll on Country.

"But if we work together with miners, we can see some really positive social, economic and heritage outcomes," Mr Malone said.

He cited the work undertaken with Everick Foundation on a Western Kangoulu

stone arrangement as an example.

"Not only were we able to tell the story of a highly significant site, we were able to use this process to develop relationships with nearby mining companies," Mr Malone said.

Traditional Owner Kelvin Dunrobin has been involved with increasing Indigenous Participation with mining companies.

"These relationships have led to exciting opportunities for our labour hire company, On Country Workforce Solutions and environmental consultancy, Woongal Environmental Services," he said.

When engaging with Indigenous communities, miners have generally kept

heritage management, native title and economic outcomes separated.

"Of course, this is not how our Indigenous communities often see the world" Mr Robins said.

"Our experience is that they see these issues as interlinked, the combination of which allows them to decide whether they will support a mining project on their Country."

As a result, the Everick Foundation has a strong focus on supporting Indigenous communities to achieve economic outcomes.

"We do this through capacity building, assistance with governance documentation and introductions to the top tier contractors our consulting arm works with on a regular basis," Mr Robins said.

"This often results in outcomes that all parties can be proud of, just like the work On Country Workforce and Woongal are doing right now."

Mr Robins said Australia's rich and complex Indigenous culture is amongst the oldest living culture anywhere else in the world.

He added the mining sector is in a unique position to make a constructive contribution to the research, documentation and preservation of Australia's Aboriginal cultural heritage. These engaging projects support local Aboriginal communities, promote reconciliation and create a legacy for the future.

More information on Everick Foundation and its services can be found at www.everick.com.au.



EVERICK FOUNDATION



MISSION

We assist communities to record, protect and celebrate Australia's unique cultural heritage.

HOW WE DO IT

We connect communities with industry partners, universities, government agencies and heritage experts. Together, we use cutting edge archaeological techniques and emerging technologies to discover and protect Australia's significant heritage.



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Photogrammetry & 3D Models



Community Training & Capacity Building

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FIFOZero co-founders George Helou and Blake Wood at Rio Tinto's Tom Price mine.

GERARD MCARTNEY

FLY In Fly Out (FIFO) worker Blake Wood and business partner George Helou are on a mission to eradicate suicide among FIFO workers.

Their program, FIFOZero, aims to teach workers practical problem-solving skills in order to confront issues of mental and emotional stress they say are exacerbated through the isolation that often comes with FIFO life.

Mr Wood worked in the FIFO sector for nearly nine years before he was forced to face his own demons.

He struggled from panic attacks, chronic anxiety and suicidal thoughts and, after the suicide of a close colleague, he was driven to do something about it.

After taking Mr Helou's EP7 seven step program, the two developed FIFOZero, a nuanced response to the challenges of engaging FIFO culture in a serious discussion of preventative mental health measures that can stop workers reaching crisis point.

Mr Wood said that FIFO workers are twice as likely to suffer from mental distress, but a lot of people also thrive in the FIFO industry.

Mr Helou believes that the key to eradicating suicide in the FIFO industry is to prevent crisis before they happen.

"FIFOZero is actually very doable – it's not a stupid, lofty goal," he said.

"If you understand why people get pushed so far that it becomes an option, you realise that there are so many things along the way that could have been identified to prevent it.

"One of the things that became very clear for us was that the mining industry had to follow good practice, that they provide professional services for workers who are in trouble – psychologists, counselling, EAP.

"The thing was that FIFO workers were not in a hurry to use those services because of how they thought they might be perceived.

"So we've identified ways to go deeper into the problem.

"If we can shift the thinking to a problem-solving approach, we can equip people with a set of practical tools that allows them to deal with life pressures before they build up and blow out."

"FIFOZero is actually very doable – it's not a stupid, lofty goal. If you understand why people get pushed so far that it becomes an option, you realise that there are so many things along the way that could have been identified to prevent it."

The main skill FIFOZero teaches is to understand that the first step to solving a problem is to look at it objectively and identify when a wrong perception may be at the heart of a problem.

Mr Wood likened the ability to look at a problem objectively to the skills needed to work a trade.

"We're working with people on the ground to help them deal with their problems in a practical way," he said.

"A lot of the training I had seen before was for leadership to identify when a worker is struggling, rather than to give workers the

tools to help themselves."

A 'site activation' involves a three-step process that starts with workers on the ground, management and is also integrated into the OHS, just as Take5s and other safety initiatives are.

Stage one involves a preliminary workshop dedicated to helping people understand the pitfalls of extreme perceptions.

Stage two is a four-hour workshop that helps workers and management create an 'environment of practical problem solving'.

Stage three actually builds mental safety into the safety book, something that Mr Helou believes is just as important.

The duo use humour to break down barriers and expose the absurdity of extreme perceptions, while driving home the serious ramifications of inhibited responses to stressors in peoples' lives.

"We keep it tangible," Mr Helou said.

"We're hitting home that its normal to have struggles in your life.

"We want to normalise it, if you're having relationship problems of course you're going to feel down about it – that's okay."

While the response to the program has been positive, the pair said that the credibility of the program could only be established through a continued and concerted effort to change the culture.

Mr Wood said that the industry was able to make so many leaps and bounds in workers' physical safety culture because of industry-wide backing from top down.

"We got there with safety by immersing the community in a constant repetition of principles and standards," he said.

FIFOZero is teaching workers the practical life skills needed to deal with the stressors and pressures faced while working away from home. The organisation has developed a three-step program that aims to prevent workers reaching the point of crisis, and to change the culture around mental health in the FIFO industry.

"But with mental health programs, they might be run once a month, once a year, and so the community is not engaging with the ideas and the importance of looking after emotional wellbeing – people just think of it as another box-ticking exercise."

In 2019, FIFOZero made headway with Rio Tinto, activating six of its mine sites in WA, and the company has its sights set on Mackay with GNS Engineering keen to take the program on board in a one-day three-stage activation.

And in 2020, Mr Wood will be returning to FIFO work.

He said that his perspective had shifted after learning the skillset needed to understand his emotional wellbeing.

"I honestly am going back with a completely different relationship to it," he said.

"Some people struggle, some people thrive, I used to struggle and now I want to thrive.

"No one starts a FIFO career hating their job, they are excited about the opportunities it will bring them.

"So we've got to learn how to keep and maintain that enthusiasm."

Early in 2021, FIFOZero will be launching a sophisticated \$1.2m app, designed to reinforce the principles and tools taught in the seminars while allowing direct access to professional help at any stage.

The app is anonymous at an individual level, and will help mine management to monitor the efficiency of programs like FIFOZero in the camp through the use of big data to assess the overall wellbeing of workers at the mine.



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Mine watches make unique gifts

NATIONAL

IF you are looking for a unique and highly valued reward or gift for staff, check out the range of custom printed and manufactured time pieces from Miners Watch.

With such features as Lost Time Injury (LTI) Free rewards, incentives, service awards or gifts for VIPs, the watches are a cost-effective way of making a lasting impression.

Selection is easy with a range of sizing, model ranges and logistics, even to remote mine sites anywhere in the world. The watches will be valued for many, many years due to their high quality components and manufacturing standards.

The company can print or engrave mine site or company logos (and any other text required) onto the dial or case to make a long-lasting valued gift.

All the mining watches are crafted with solid stainless steel cases to ensure long life, great water resistance that will perform, and will hold their quality and appearance for many years to come.

In above-ground environments, quartz analogue movements are often used as they do not generally create a safety danger.

These watches are manufactured from high quality stainless steel cases and run the best Japanese movements and batteries from Seiko Instruments, Seiko Epson, Time Module and Citizen in either three-hand format with date, or full chronograph versions.

The company's underground coal mine-safe watches use a 21 jewel Citizen Miyota automatic wind analogue

movement that has no battery or electrical power source or reserve.

This lack of electrical current satisfies the mine safety requirements for dangerous goods in underground mines that may contain methane gas.

They are fitted with glass case backs so visual inspections can easily be made to ensure the watches comply with mine safety and work and safety requirements, and are all built to 5ATM/50m/150 feet water resistance.

An in-house design service is available to assist with watch selection and logo design, backed up by world-class repair and diagnostic facilities in both Hong Kong and Australia should they ever be needed, with fast turnarounds.

Specialist staff are on call to provide technical advice on all aspects of watch design, logo placement and manufacturing, while being totally committed to best environmental and sustainable practices in the supply chain.

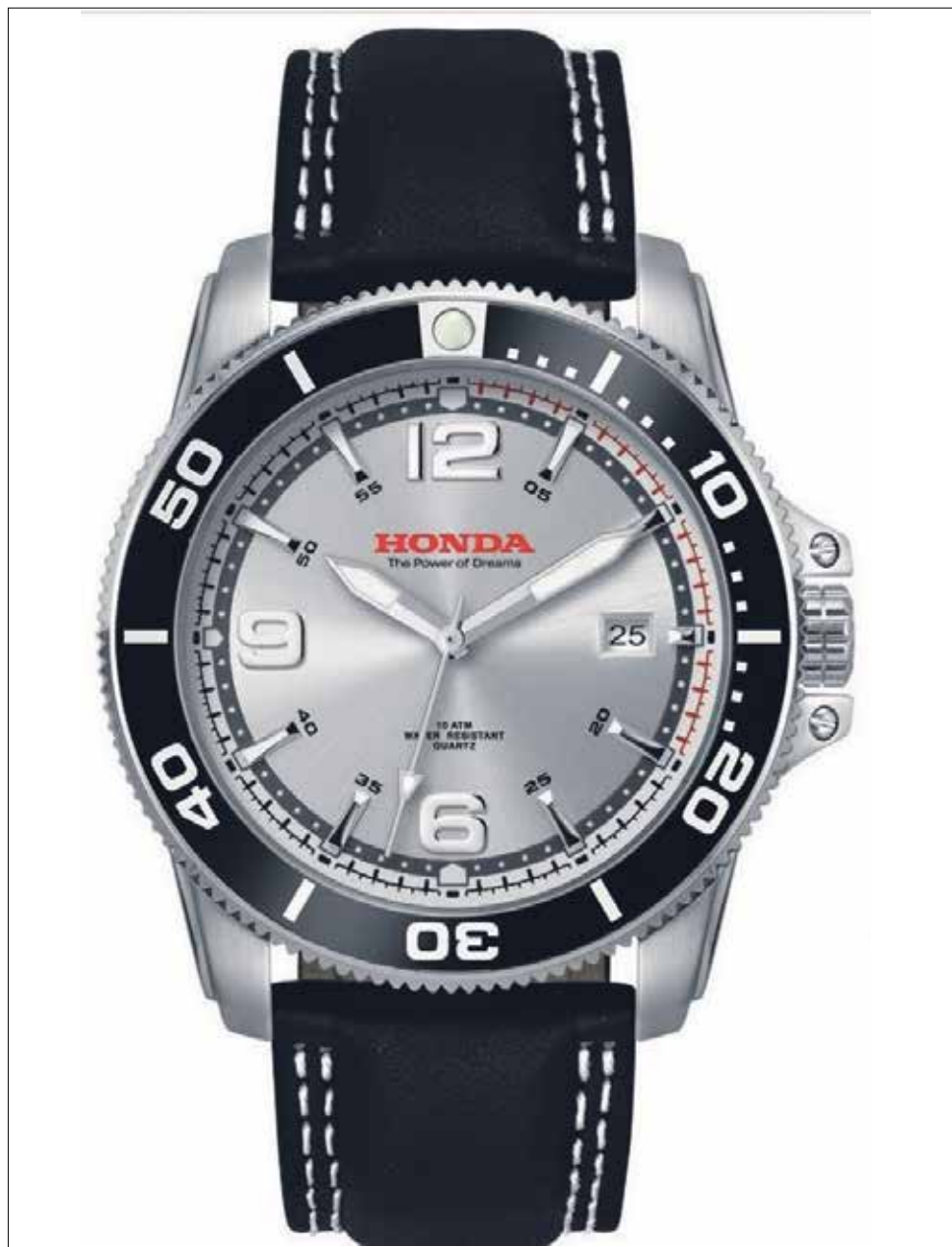
The company's watches are used by many of the world's coal miners such as BHP Billiton, Xstrata, Peabody, Rio Tinto, Vale, DML and many more.

Miners Watch can also manufacture the watch components to client specific requirements, such as custom colour or material bands, dials, hands, case colours and packaging.

Case backs can be laser engraved with logos and even serial numbers can be included, while packaging be custom printed or embossed.

The company aims to produce the best possible product for its clients and offers a three-year guarantee on all their watches.

For more information, visit the website: www.minerswatch.com.



The Hunter Underground Coal Miner's watch, with Citizen automatic wind movement and single date.



Wren Oil produces no waste, reduces the need for oil imports and its product has a significantly smaller carbon footprint, thus reducing the demand on natural resources

Innovative oil re-refinement

WA

FOR nearly 40 years, Wren Oil has been offering hydrocarbon waste management services to Western Australia's mining, automotive, industrial and agricultural industries.

Located near Bunbury in WA, the Wren Oil team specialises in the collection and processing of waste oils with a fleet of specialised collection tankers through

to the latest re-refining technology that achieves total re-use and a high-quality product.

Wren Oil re-refines waste oil for reuse as lubricant oil – its best and highest use and a cradle-to-cradle solution.

Wren Oil business development manager Peter Matthews said that the company's extensive experience in the industry give it the competitive edge.

"Waste oil is hazardous waste, we are

the experts to assist your business with the collection and removal of waste oil for recycling throughout Western Australia," he said.

"We can re-refine up to 80m litres of waste lube oil a year, meaning 100pc of Western Australia's annual waste lube oil production can be re-refined to remove heavy metals and carcinogens rather than industrial burning of waste oil.

"Lubricating oil doesn't wear out – it just gets dirty and the additives in the oil

lose effectiveness over time."

Central to Wren Oil's operating practices is a continuous investment into leading-edge re-refining technology and the latest environmental practices to ensure the highest standards and service delivery to clients.

As a pioneer in innovative, non-destructive re-refining, Wren Oil has become the supplier of choice for waste oil services, including the Australian mining industry.

Innovation in steel casting

NATIONAL

ONE of the oldest metal foundries in the southern hemisphere, Castings Tasmania is ready to write the next chapter of its history after upgrading to the latest castings modelling technology.

Founded in 1834, Castings Tasmania has received matching grant funding from the Federal Government to invest in 3-D scanner technology and modelling software to boost productivity and expand its technical capabilities.

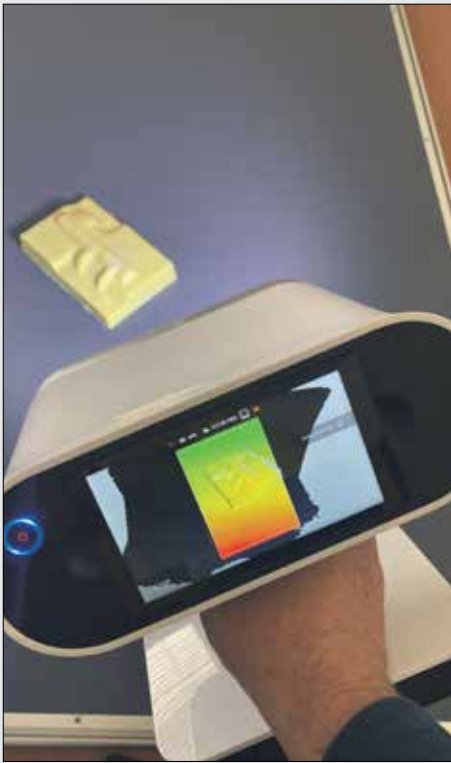
The goal of the funding project is to increase Castings Tasmania's pattern shop capacity, resulting in a quicker turnaround on tooling lead times, and greater accuracy in pattern making.

A state-of-the-art Artec Leo 3-D scanner allows Castings Tasmania's design team to quickly build a digital model or prototype of any casting that can easily be adapted to a finished product.

The Artec Leo 3-D scanner is the first of its kind to offer onboard automatic processing, enabling the company's design team to scan castings and components offsite.

Castings Tasmania can use the 3-D scanner to also reverse engineer existing castings that have gone out of production.

Custom-made products can be manufactured by Castings Tasmania's



The Castings Tasmania showcase 3-D scanner.

experienced design staff to customers' exact specifications using another piece of its latest equipment, a CNC Router.

The foundry has attracted a lot of new work thanks to the new scanner and pattern-design technology, leading to increased output, and the recruitment of extra staff.

Another piece of technology acquired by the company is its SOLIDCast and

FLOWCast 3-D modelling and graphic technology.

SOLIDCast software simulates different types of metal pouring scenarios, allowing customers and staff to visualise the entire casting process for their product.

Product designs can be fine-tuned using the SOLIDCast system to predict the best possible castings.

FLOWCast is an add-on technology to SOLIDCast that enables users to simulate the flow of molten metal through gating systems to fill casting moulds, allowing the detection of potential product defects.

Simulated castings reduce product lead times, improve casting quality, and save costs by building virtual castings in a fraction of the time taken for traditional casting methods.

Foundry capacity

The Launceston-based workshop has a melting capacity of 3500 dressed mass tonnes (dmt) per annum, and has produced close to 4000t at peak capacity.

Castings Tasmania contributed greatly to Australia's industrial effort during the First and Second World Wars and became part of the industrial giant Boral in the 1980s, before passing through the hands of Azon Group in the 1990s and then on to Bradken in the early 2000s.

Tasmania-based investors bought the foundry in 2016, and changed its name to Castings Tasmania, then sold to present owner Recycal Group in 2019.

Recycal has invested to upgrade Castings Tasmania's equipment to cement its reputation as one of the most efficient foundries in Australia.

Castings Tasmania operates a modern pattern shop, two alternate melting furnaces, two post and rail heat treatment ovens and a low temperature pre-heat oven.

The foundry's specialty is producing quality steel castings ranging from 50kg up to 3t in short lead times and at competitive market prices.

Production from Castings Tasmania include parts for underground trucks, such as axle housings, cross beams, tilt levers and specialised castings for the rail industry.

Steel casting products are shipped daily to Melbourne for trans-shipment to other destinations in Australia.

Sales service from the company has been revamped, ensuring a smooth end-to-end customer experience from design and drafting stages up to casting and finishing.

More information: Castings Tasmania, phone: 03 9873 1133, email: yvette.seddon@recycal.net, or visit www.recycal.net.



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castings
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Corrosive liquid mine pumps

NATIONAL

MANY mines are filled with corrosive liquids that cause wear on equipment.

Australian Pump Industries' new cast 316 stainless steel self-priming centrifugal pump has been introduced to handle corrosive liquids in mining applications.

The new range of mine pumps are close coupled electric drive and feature high efficiencies for both high and low head applications.

The pumps are designed to answer a serious need in mining and chemical industries for cost efficient, ISO9001 quality products capable of handling contaminated and corrosive liquids.

Aussie Pumps product manager, Albie Bester, said that the product was developed for mine tailings and other difficult mine liquids, including light slurries.

"We perceived a major market opportunity for a top-quality stainless-steel pump at a realistic price and built strictly in accordance with our quality culture," he said.

The first pump to be introduced is a 5.5kW 3in pump that delivers a maximum flow of 1100lpm with the added ability to handle solids to 16mm.



The G3TMK-A/ST, when applied to a tanker, is vital for dust suppression on mining sites during dry and windy seasons.

Like all of the Aussie GMP range, the pump is self-priming with the ability to draft water from depths of six metres.

The maximum pump head is 40m, making it ideal for high pressure water transfer or even machinery wash down.

Power for the machine comes from a 5.5 kW TEFC three-phase, two-pole electric drive motor.

Pump and motor are installed from the factory on a heavy-duty steel base for ease of installation.

Optional stainless steel or hot galvanised steel bases are available on request.

Mr Bester said the pump's big advantage for miners is its ease of repair

in the field and simplicity of operation.

"Even changing the seals is simple," he said.

"The pump is close coupled to the motor with a 316 stainless steel stub shaft.

"Disassembly of the pump body from the motor is a matter of minutes giving access to the pump chamber for clean out or service."

The secret of the pump's excellent self-priming characteristics are the big "shoulders" in the priming tank incorporated in the unit's design.

The high mounted suction port also helps fast self-priming without the need for additional aids like vacuum pumps or compressors.

The pump is available in nickel, aluminium and bronze as well with a semi trash version available in the cast iron configuration.

Seals are heavy duty mechanical style with Nitrile elastomers.

Optional Viton and silicon carbide are also available on request.

The first pumps were sent to Kalgoorlie where they are being used for mine tailings and wash stand applications in high PH level liquids.

Further information including a free mining guide is readily available from Australian Pump Industries or Aussie Pump Distributors throughout Australia or www.aussiepumps.com.au.

Fire pump for mine safety

NATIONAL

MINE operators regard portable firefighting apparatus as an essential kit on sites, not just for saving lives but protecting plant and equipment.

With the current fire conditions across the country, Australian Pump Industries' range of mine-safe lightweight portable fire pumps are in high demand.

The unique Aussie Pump Fire Chief in Mine Boss configuration includes a super heavy duty, hot galvanised steel frame mounted on anti-vibration mounts.

The mounts providing a sturdy platform for the pump and diesel engine and reducing wear on components.

Aussie Pump's Chief Engineer, John Hales, said the Aussie Fire Chief has an established reputation for performance and quality.

"We up spec'd this pump with features to add safety for use high risk mine environments," he said.

The pump has been engineered with a big single piece impeller and volute that are perfectly matched to the engine capacity.

This enables the pump to produce a maximum head of 60m and 400lpm max flow.

The company beefed-up the frame to 38mm and incorporated a centre mounted balanced lifting bar that make these 70kg pumps easy to move on site.



The Aussie Fire Chief is available in Aussie Mine Boss configuration offering improved mine safety and pump protection.

The Mine Boss configuration also includes battery isolation in a lockable galvanised steel cabinet with emergency stop as a standard feature.

A top quality fire extinguisher is fitted to the frame to comply with the industry and the company's standards.

Power is supplied by a single cylinder Yanmar 4.8hp air cooled electric start diesel engine.

"We chose Yanmar diesels for this kit because they are regarded as the finest lightweight, portable diesel engine on the

market," Mr Hales said.

"They are reliable, powerful engines that are backed with a two-year warranty with support from a national Yanmar service centre network."

The pump features a flanged three-way outlet for fire system installations but this can be replaced with a 2in outlet port to maximise performance.

The 2in flanged suction port is fitted with a robust check valve designed to allow the pump to prime fast, first time, every time.

The pump's integrated priming tank, incorporated in the sculpted body, means fast priming through a vertical lift of 7.6 metres.

"These pumps fitted to trailer mounted water tank also make great mobile washdown units and have been supplied to mine sites in the Hunter for this application," Mr Hales said.

Further information is available from Australian Pump Gold Distributors around the country or online (www.aussiepumps.com.au)

Mine rehabilitation and TSF monitoring made easy

Decipher is a Software-as-a-Service company delivering award winning cloud solutions.



Mine rehabilitation

Decisions about mine closure in Australia have tended to have little consideration of how the land might be used post-mining. However, this is beginning to change particularly with increased stakeholder pressure, environmental concerns and regulatory changes. To help the industry implement best practices, Decipher is enabling their clients to drive progressive mine rehabilitation through their platform, DecipherGreen.

Alongside 50 other partners such as Alcoa, BHP, Rio Tinto and the WA, Queensland and Northern Territory Governments, Decipher recently signed on to support a bid for the establishment of a national Cooperative Research Centre for Transformations in Mining Economies (CRC-TiME) in WA. This unique coalition will bring scale and coordinated investment in research that will deliver transformational change in mine closure and provide all stakeholders with tools and technologies to make better decisions in the future.

Tailings storage facilities

In response to the catastrophic tailings dams collapses in 2019, the Church of England spearheaded a global enquiry that called upon 727 extractive mining companies to disclose information in relation to their tailings facilities to form a public database. Mining companies were presented with the massive challenge of assembling datasets that were often large, complex and stored over several locations – not to mention data that was lost with staff turnover.

Decipher assisted with the management and audit of mining companies' tailings storage facilities by providing a platform that acts as a central repository of tailings data, assists with the global enquiry reporting, and enables the clients to identify trends, risk management and ensure compliance.

About Decipher

Born within the Industrials Division of Wesfarmers, Decipher aims to improve sustainability and productivity across:

- Mine rehabilitation
- Tailings monitoring
- Waste management
- Agriculture

The DecipherGreen platform

- Backed by regulatory technology
- Satellite derived earth observation data
- Central repository for historic data
- Reporting suite and corresponding environmental evaluation
- Enables clients to meet environmental obligations and compliance, giving them the data needed to plan for closure, rehabilitation and TSF monitoring



Contact: 1800 332 474 | www.decipher.com.au

Geomine on expansion trail

NATIONAL

AFTER its successful track record in accurately modelling coal resources in Australia, Australian geological consultancy Geomine is seeking to apply its specialised expertise in providing clients with tailored solutions to coal and other mineable commodities.

Geomine company spokesman Marko Seppanen said that while the geological consulting firm has acquired many clients among coal companies in Australia, it now sees exciting opportunities to expand into new areas and possibly new longer term partnerships.

“Our core business is in supporting our corporate and Australian-based coal mining and exploration clients,” he said.

“However, we believe there are some strong synergies with other commodities, particularly in the area of geological database validation and some site-based services.

“We are also interested in developing new relationships with international clients.”

Geomine’s technical analysis can provide important information on the extent and quality of a company’s mineral resources for publication, that are used in official company documents such as annual reports and technical papers, and is reported in line with the JORC industry code requirements.

The published geological information



Photo of an excavator with a flat tooth bucket carefully mining a thin coal seam, and a photo of a lump of coal held in a hand.

is used to classify minerals resources and ore reserves according to different levels of confidence in geological knowledge and technical and economic considerations.

3-D modelling of geological deposits and JORC resource reporting are two aspects of Geomine’s business model.

Other avenues of business for the Queensland-based firm include database validation, geological interpretation, quality assessment, mine geology support and reconciliation and training.

“Through our work on multiple Australian projects, our team have become highly skilled at database validation, coal seam correlation and the development of geology models, which in turn are used for assessing project potential and for life of mine planning,” Mr Seppanen said.

Geomine has provided mine geological support to many clients in NSW and Queensland, including training company geological personnel, geotechnical

observations, and generating geological models for detailed mine planning, particularly for improving horizontal control in drill and blast activities.

The consultancy firm has a focus on providing bespoke and value-based solutions to the geological challenges faced by their clients.

Further information on Geomine and how to contact the firm is available on its website at www.geomine.com.au.

Custom drill rig gig for JSW

WA

LEADING drill contractor JSW Australia has formed a strategic alliance with German drill rig manufacturer BBurg to develop customised drill rigs specifically suited to local conditions.

The partnership with BBurg, one of Europe’s leading and most innovative rig developers, also supports the ongoing evolution of the JSW fleet.

JSW chief executive officer Jeff Branson said BBurg’s customer-driven engineering approach, which tailors rigs to specific applications, resonated with the contractor as it supported its ability to provide customised drilling services to clients.

The first product of the new alliance is the HD2500RC, a leading technology rig developed to tackle challenging terrain at the FMG Solomon site in the Pilbara.

Anticipation is building for the deployment of the first HD2500RC rig on site early next year with a second planned for delivery later in the first half of 2020.

“The terrain at Solomon makes the preparation of drill pads difficult and expensive, which created an opportunity for a high-powered, small footprint drill rig,” Mr Branson said.

“With many years of experience working at the Solomon site and having experienced the challenges posed by the terrain, we shared ideas and



A CAD drawing of the new rig.

concepts with BBurg, which provided the foundation for the development of the new rig.

“BBurg’s knowledge and experience in the development of top hammer and down-the-hole machines for mining applications has enabled us to custom-build a rig that is ideally suited to the site conditions, and we are excited about putting it to work on site.”

The HD2500RC has the following key features:

- Low footprint with width of 3.5m
- High power with capacity to push 1150 cfm of air at 500psi down the hole
- Rod handler to increase productivity and improve safety
- 330m of rod capacity on board
- Full wireless remote control

The alliance with BBurg is part of a broader JSW strategy to ensure that its fleet is continually upgraded and

improved to meet the changing needs of the market.

“The HD2500RC is the first of several new rigs that we will be introducing in the near future,” Mr Branson said.

“Our fleet is reviewed and upgraded regularly and we are excited about the new rigs that will be added, making the latest technology available to our clients and supporting the achievement of their objectives”.

About JSW

JSW Australia (JSW) is an industry leader in customised drilling services.

Founded in 2010, JSW is one of Australia’s largest and safest drilling companies.

The company is headquartered in Perth, WA and has established operations and infrastructure nationwide.

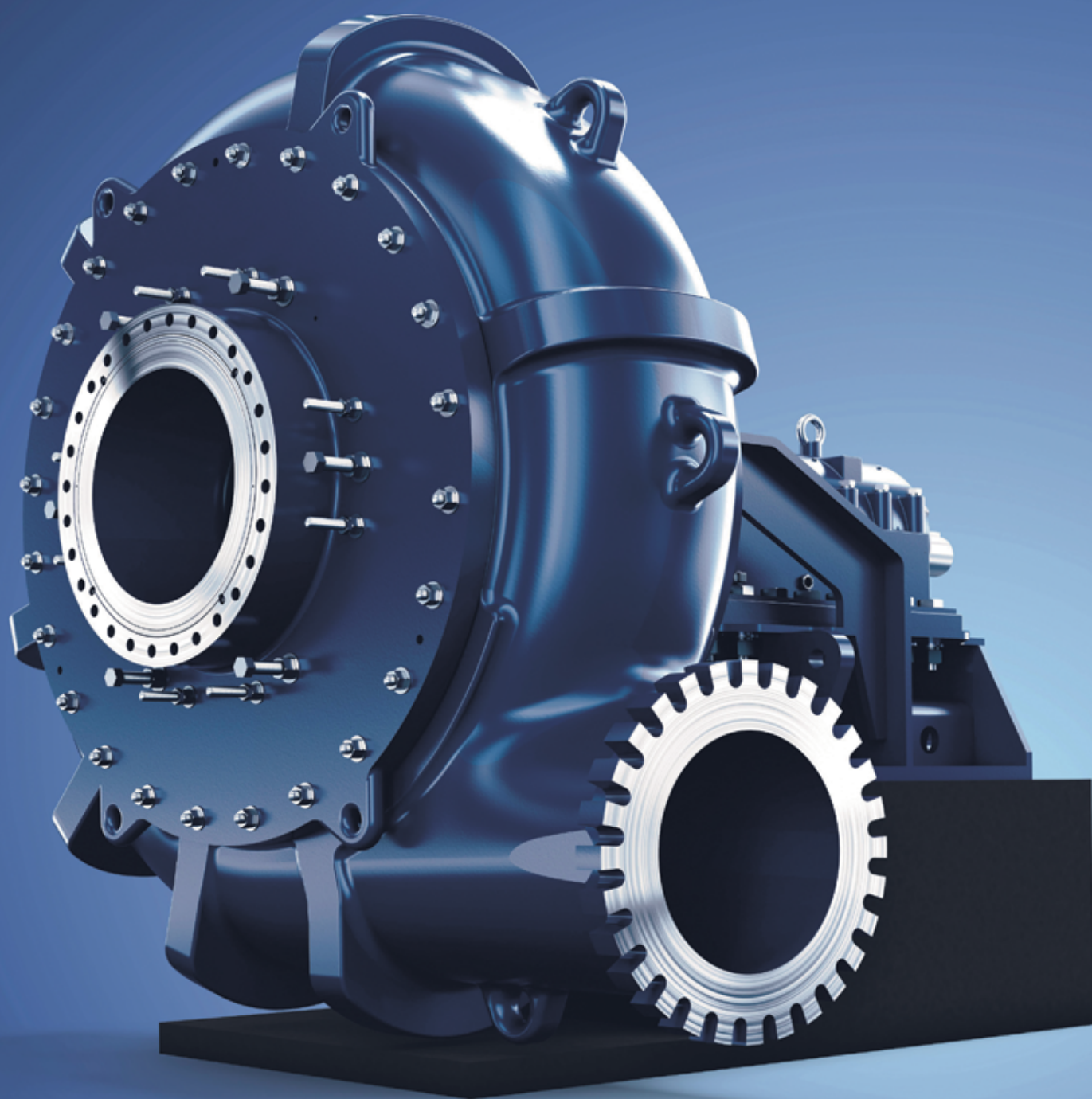
JSW challenges boundaries and embraces technology to produce better solutions for its clients.

The company strives to set the benchmark in innovation and drilling automation to deliver optimum project outcomes with best-for-project solutions.

JSW brings together:

- a fit for purpose fleet;
- industry-leading drill automation;
- experienced teams; and
- an exceptional safety record.

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The KSB GIW® MDX is equipped to tackle the most extreme slurry pumping duty conditions. With its patented wearing parts and material technology, the MDX matches operating cycle times with scheduled mill outages meaning fewer disruptions and increased operational efficiency.

Learn more at www.ksb.com.au

GIW® Minerals





Steady as she goes

ADIA is the voice of the Australian drilling industry.

NATIONAL

CONFIDENCE is returning to the mining industry, which the Australian Drilling

Industry Association (ADIA) hopes will be followed up by consistency.

According to ADIA chief executive Peter Hall, while no records were being broken, “things are ticking over”.

“And if it keeps going the way it is, members are going to be pretty happy with their 2020,” he said.

Mr Hall said that investing back into equipment would require higher pricing to get rigs automation-ready and to keep them up to date with the latest cutting edge safety equipment.

“We would just love to see some consistency and certainty return to the industry,” he said.

“It would boost everyone’s confidence to invest back into the equipment.

“The majority of our members are sitting at about 70-80pc utilisation, so they’re pretty comfortable, and everywhere I go, the outlook is positive for 2020.

“This year, we’ve seen about a 10pc increase in utilisation of drill rigs which is a slowing from the past two years, but growth is still flowing.

“You never know what’s around the corner, but the majority of contractors are looking pretty optimistic for the new year.”

If results from the September quarter can be used to gauge the new year, the ABS has indicated a positive outcome for the exploration sector, with overall exploration expenditure continuing to grow.

The trend estimate increased by 5.4pc (\$34.4m) to \$671.6m, the estimate being 21.4pc higher than the September quarter in 2018.

The largest contributor to this rise was WA, up 7.2pc (\$28.5m).

And relationships between drilling contractors and mining companies continue to improve, even if only incrementally.

Many drillers do however have regrets over the contract awarding shifting from the geos and exploration people, over to the procurement departments, feeling that this is damaging relationships.

Today’s drillers are a far cry from the, crew who learned-on-the-job and did long stints in the field, conditions that garnered them a reputation among geos as being the cowboys of the industry.

They may not wear a suit and tie, but they are every bit the highly skilled professional with a high degree of technical knowledge.

The rigs themselves are now more advanced and complicated than ever before, and the introduction of automation and remote control into the drill rigs will see the level of technical sophistication required by drillers increase dramatically in the coming years.

The entrenched bad blood toward drillers has been a difficult process to break down, but the next generation of contractors has the ability to influence the industry in a very positive way.

ADIA is the peak body representing the drilling industry in Australia.

It is made up of individuals and companies who are dedicated to improving the skills, safety, and overall professionalism of the drilling industry.

ADIA is the voice of its nearly 800 members and provides collective representation of the matters that affect their businesses and livelihoods.

Members have advanced the professional standing of the industry by opening a dialogue with state and federal agencies, industry bodies and the wider public, and ADIA has assisted its members in increasing their skills and knowledge through regular training courses and seminars.

More information: www.adia.com.au.

THE VOICE OF AUSTRALIAN DRILLING

Our members are active in the resources industry. They are the drilling contractors and suppliers who are at the forefront of drilling technology that increases safety, productivity and business outcomes.



T: 08 6305 0466 // E: info@websiteaddress.com
www.adia.com.au



ADIA chief executive Peter Hall.

Kwik-ZIP products support mining

NATIONAL

NATIONAL equipment manufacturer Kwik-ZIP produces a value-adding component for many diverse industries in its centraliser and spacer system, which has been deployed to the waterwell and environmental drilling, civil construction, ground engineering and oil and gas sectors in Australia and overseas.

The company's Australian-made centraliser and spacer system is manufactured from Kwik-ZIP's engineered thermoplastic blend and was developed to solve support, grading and centralisation issues in the pipeline, vertical drilling, and ground engineering industries.

In the trenchless industry, Kwik-ZIP's products are used in under-road and under rail cased crossings, and in slip lining applications for spacing, supporting and insulating water, gas and sewerage pipes.

For the oil and gas industry, centralisers are often used in oil and gas production wells of extreme depth and subject to varying temperatures, or in waterflood and water-injection wells.

Centralisers play an important role in ensuring a well casing is centred in a borehole during the installation stage, in turn assuring that the required grouted thickness is achieved around the casing.

Another purpose of centraliser and spacing products is to ensure a

pipeline casing stands away from the wall of a borehole during the grouting process to reduce the potential for cross contamination.

An additional reason for requiring a uniform cement grouted annulus around a centralised casing is to avoid transmission of potentially harmful fluid via the annulus.

An incorrectly grouted production casing can allow vertical leakage of saline or contaminated surface water into fresh groundwater sources.

It can also allow inter-aquifer connection and the transfer of different quality groundwater between otherwise confined aquifers.

In the case of a PVC casing, the installation of centralisation systems can prevent collapse due to temperature spikes affecting pipeline grouting during the grouting curing process.

According to a company spokesman, the importance of using a suitable cement or grout envelope to adequately protect production casings from aggressive formation water has been highlighted in recent water well remedial works and replacement bore programs.

"Such protection is important where budget constraints require the use of mild-steel production or pump well casing instead of the superior inert alternatives of FRP and stainless steel," he said.

Australian regulations require casing centralisers or pipeline spacers to meet

certain construction standards and sewerage codes and Kwik-ZIP's products are a cost efficient and simple solution for clients.

Included in the company's product range is the HDX and HDXT casing spacer series which is suitable for medium to heavy weight pipe in cased crossings.

This product is compatible with all types of pipe material from steel to concrete and minimises friction during the installation process.

Another Kwik-ZIP product is the HD series of casing spacers used for trenchless and cased crossings, and has additional applications in grade control for wastewater and sewer pipelines, and is also applicable for use in the drilling industry.

Kwik-ZIP has accreditation for its products from the Water Services Association of Australia, and they comply with the South-East Queensland Water Supply and Sewerage Design and Construction Code.

The Melbourne Retail Water Agencies includes Kwik-ZIP's spacers on its approved products list.

The company supplies clients in Australia, New Zealand, the UK and US, and ships products from its warehouse facilities in Sydney, Texas and Leicester.

Kwik-Zip's website at www.kwikzip.com has additional information on the company and its products, along with its contact information.



Kwik-ZIP HD Series centralisers on 20-inch casing.

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**INERT CENTRALIZER & SPACER SYSTEMS
FOR THE DRILLING & CIVIL CONSTRUCTION INDUSTRIES**



Kwik-Zip Centralizers for all your casing, screen and drop pipe applications

- Suits diameters 0.70" (18mm) up to 63" (1600mm) and above
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- Integrated rubber pads (HD Series) to prevent slippage
- Rapid and simple on-site assembly
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Applications include:
Pump Riser, Drop Pipe, Production Well Casing & Screen, PIP, Pipeline Cased Crossing, Rock Bolts, Soil Nails and much more

Accurate drilling with DDH1

NATIONAL

DEEP drill holes are the culmination of time-consuming and costly work, including mapping, geophysics, geochemistry, seismic and shallower drilling to refine small targets or target areas.

DDH1's directional drilling techniques ensure reliable spatially accurate intersections of planned drill targets.

The company recognises that deep hole drilling is a costly business and those costs have been preceded by significant investment to refine drilling targets.

Missing targets is not just about the cost of the hole but includes project costs when a critical decision is based on a drill hole result.

Multiple intersection directional drilling

These same techniques are valuable for drilling multiple intersection core holes with up to 35 evenly spaced intersections drilled from a single parent hole.

In many mines, development does not allow an ideal underground drilling platform for drill programs that are significantly ahead of mine workings.

In others, sustaining an underground drilling operation may overload mine services of ventilation, power and water limiting mine production.



DDH1's directional drilling techniques ensure reliable spatially accurate intersections of planned drill targets.

Mine service holes

Miners are increasingly using DDH1's directional drilling expertise to drill mine service holes to accurately break into mine workings.

Uses include cable drop holes to run high

voltage electrical cables direct from surface rather than running down declines.

Another use is paste fill holes drilled directly from a paste plant to intersect current workings.

Potential accuracy is about one metre over a kilometre and the directionally drilled

core holes are opened from 20-600cm and cased with oilfield casing and grouted back to surface.

The deepest mine service hole drilled in a single pass is 1450m with multiple successful projects completed in excess of 1000m.

First pass exploration

DDH1, through its subsidiary Strike Drilling, offers a complete suite of drilling services, including first pass air core drilling with Strike's track and truck-mounted crossover air core/RC rigs.

These machines have taken air core drilling to another level by using 6m drill rods, KL rod handlers, hands-free breakouts and stationary cone sampling systems.

This concept of using one drill rig for both air core and RC is proving very popular allowing program flexibility and saving on mobilisation costs.

When deep RC drilling is required, Strike's powerful 685 Schramm rigs are the industry standard.

Iron ore specialist

Ranger Drilling has recently merged with DDH1 and are the group's specialist iron ore RC and core drillers.

Primarily operating in the Pilbara, Ranger's systems and procedures are geared the most exacting standards expected in that industry segment

All drilling services from first pass air core to the deepest mineral drill holes in Australia can now be sourced under a single contract or individually from DDH1, Strike or Ranger.

Regardless of the service required, there is common commitment to safe personalised service delivery and technical competence.

The Value Of Experience



WE ARE AUSTRALIA'S PREMIER AND MOST SUCCESSFUL DEEP HOLE DRILLING BUSINESS

DDH1 employs the industry's most experienced operators to provide technically innovative drilling services.

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Discover a new way to explore your core.
3D entire core analysis.



Major milestone for Swick

NATIONAL

SWICK Mining Services is on track to achieve a major milestone in 2020 of 12,500,000m of core drilled.

To put this achievement into perspective, this is the entire distance through the centre of the earth; a passenger jet would take almost 14 hours to fly this far.

The huge feat can be attributed to more than two decades of drilling services to the mining industry both here and abroad.

Since 1997, the company has provided drilling services to some of the most well-known and respected global companies in Australia, Europe, and North America.

Its core services include underground grade control drilling, underground exploration drilling, navigational drilling, underground centre return reverse circulation drilling, geotechnical and geophysical drilling, engineering/service/paste hole drilling, water control drilling, and gas control drilling.

Swick managing director Kent Swick said the company's long tradition of culture, productivity and safety were key attributes that attracted its key clients.

"We currently employ about 700 personnel across our drilling operations, and support services," he said.

"The key part of any business is its people, and we really try to make sure our crews feel supported and part of a bigger family no matter where they are in the world, as well as investing in our staff in training and development."

The company recently developed a purpose-built induction facility for entry level drillers, with a simulated underground environment which



Swick's mobile drill rigs are the most versatile, and the most powerful mobile rigs in the market.

can mirror the daily activities of its underground crews, but in a supervised environment.

Swick's safety culture and best practices are also continually recognised throughout the industry, and have won numerous awards, including the 2018 Mining Contractor of the Year award as recognised by Australia's Mining Monthly.

Research and development was another key focus.

The company has a strong engineering capacity with an in-house research and development team and dedicated test facility, including a high-powered dynamometer for rig and component testing and a drilling test facility where large granite slabs are drilled regularly.

Mr Swick said that the company's strong drive to innovate and industry best practices has made Swick Mining Services one of the world's largest mineral drilling contractors to date.

"We have gone beyond the development

of a powerful underground rig by now adding operational drilling system innovations as well," he said.

"Our focus on higher power and increased depth capacity allows our clients to have a wide range of scope available to be drilled by the same Swick rig.

"This saves the effort of mobilising different sized machines for different programs, and the Swick drill crews only have to know and be certified on one type of rig."

Swick's dedicated deep drilling division, DeepEX, has the capability of drilling 2000m-plus holes from underground, reducing the reliance on large expensive surface coring rigs drilling through hundreds if not thousands of metres of waste to hit a mineralised target zone.

In addition, Swick owns a mineral analysis company headquartered in Stockholm, Sweden, called Orexplore, which has developed world-first scanning instruments and associated software that allows for non-destructive analysis of core and provides a unique insight into the rocks sample's structure, texture, chemistry and mineralogy.

Orexplore recently launched in Australia and can replace traditional laboratory services with accurate on-site analysis of rock drill cores, providing significantly more detail than is available from any other source.

"The Orexplore product is amazing," Mr Swick said.

"Geologists, metallurgists and engineers can now take advantage of a suite of instantaneous information to help discover, mine and extract valuable mineral resources."

More information on Swick's services can be found at: www.swickmining.com.

Drilling further and faster

NATIONAL

FOUNDED in 1985 and headquartered in Finland, Robit manufactures, sells and services a wide range of quality drilling consumables for the mining, construction, and water well industries around the world.

With manufacturing facilities in Finland, Australia, South Korea and the UK, Robit is an international company with active sales networks in 115 countries.

In serving the global mining industry, Robit offers a comprehensive range of top hammer and down-the-hole drilling consumables for both surface and underground applications.

Robit's focus is on driving value through productivity.

This is reflected in the design and quality of all Robit products, but probably best demonstrated in Robit's innovative,



Robit's Evolution Bit series and Diamond Button series are game-changers in drilling performance.

next-generation drill bit designs which help drilling consumable performance keep pace with increasingly productive, automated drill rigs.

Robit Evolution bit series

The Evolution bit series is the result of a systematic approach towards crafting the world's best button bits.

After extensive world-wide testing, the Evolution series has proved itself with improved rates of penetration and wear life – with bit life increasing by 20pc and button sharpening intervals increasing by as much as 60pc.

Robit Evolution bits come with features unique to Robit, and the heart of the bit design is in the unique head design with optimised flushing characteristics.

The Evolution technology is offered throughout the bit range, from 45mm upwards.

Robit Diamond Button series

Automation in mining is here and the trend towards remote drilling is increasing at pace.

The drivers for this are productivity and safety.

Autonomous drilling removes the risk of constant manpower in hazardous, harsh environments, and opens up opportunities for multi-rig, single-operator drilling.

The challenge for autonomous drilling however is the need to change drill bits frequently.

Standard bits might last 50-80 drill metres before they need sharpening, but each production cycle might require 250-400m of drilling.

Every bit change pauses the production cycle – moreover, it places personnel in harm's way.

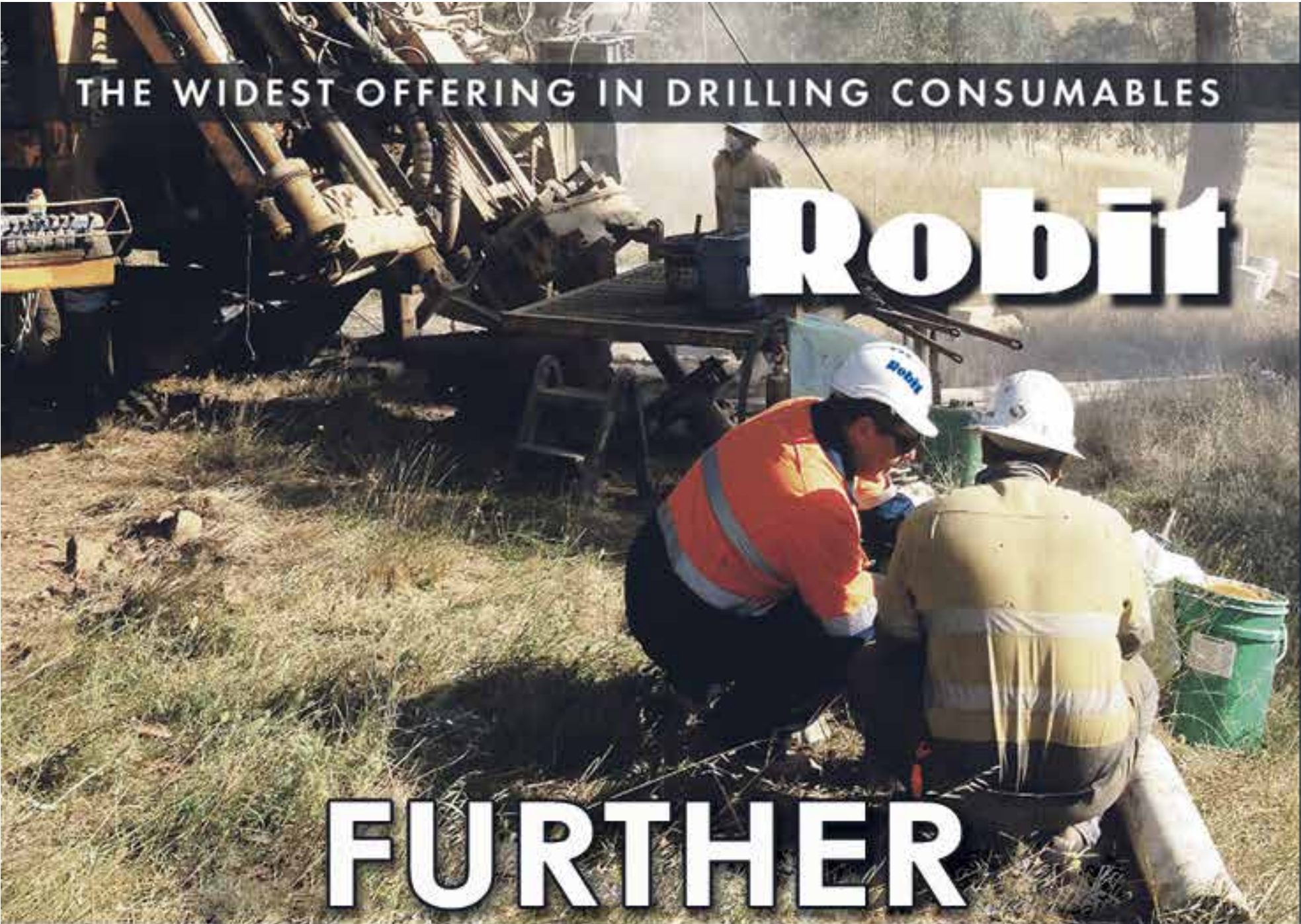
Robit's new Diamond Button bits enable continuous remote drilling of the production cycle without loss of hole diameter.

Actual drilling time per shift is significantly increased while reducing personnel exposure to working areas, thus increasing total production and improving safety.

Costly and hazardous bit sharpening operations can be eliminated or reduced.

Fewer bit changes also means a reduction in the total number of bits needed in the drilling circuit and stores, with an associated reduction in manual handling and total supply chain burden.

For more information visit: www.robitgroup.com.



FURTHER
FASTER



Innovative drilling solutions

WA

PROFILE Drilling is a privately owned, Perth-based company offering reverse circulation mineral exploration services and grade control and water boring capabilities.

Its services include (but are not limited to) remote exploration projects via self-contained exploration camps, to on-mine resource drilling programs capable of exceeding depths of more than 600m.

With a fleet of modern and well-equipped high capacity rigs and support vehicles on 8X8 trucks, Profile Drilling is able to quickly and effectively meet the needs of its clients Australia-wide.

Operations manager Grant Ingram said the company prided itself on the ability to provide innovative solutions to any problem that clients may have experienced.

Mr Ingram said that Profile Drillings' experienced crews ensured minimal downtime while operating to maximum efficiency without compromising the quality of the client's needs and requirements.

"We have a commitment to continuous improvement in safety and drilling



Profile Drilling's experienced crews ensure minimal down time and maximum efficiency on site.

solutions without compromising production standards with our objective to provide a comprehensive drilling service second to none," he said.

"With the combination Profile offers to only provide the most experienced drillers, support staff and crews along with providing modern, well-maintained

equipment, we are able to provide our clients with a safe, cost-effective service."

More information can be found at: www.profiledrilling.com.au.

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Equipment concierge service

NATIONAL

EQUIPMENT Hub was established as a one-stop-shop for customers looking to buy, sell or rent equipment and machinery for use in drilling, mining, civil, agricultural and other industries.

The company has experience in equipment brokerage, sales, rental for any and all equipment, mining, drilling, transport and agricultural equipment, including dry or wet hire, and the buying and selling of earthmoving and mining equipment, including drill rigs, mud pumps, tracked carriers, jack up skids, mud systems, compressors, boosters, light towers, generators and any other equipment requirements.

Equipment Hub managing director Terry Horsburgh said the company was always on the lookout for equipment to list for clients on its multiple web sites and social media platforms.

“In turn this will assist you in selling any equipment you have no further requirements for, and turn your unused and idle equipment into cash,” he said.

“Even if we don’t have the item you are looking for, we offer a service where we investigate, find, and source or locate and provide options for our clients.

“Equipment Hub are like an equipment concierge service – and we also manage the entire process of valuation, procurement, and relocation of your equipment.”



Equipment Hub has all buying, selling, and renting needs covered.

Whether you are looking to buy or sell surplus equipment, Mr Horsburgh said that Equipment Hub can assist.

“Whatever you need, whether you

need to hire, buy or sell, we can help you out,” he said.

“Equipment Hub is a one-stop shop for all of your drilling, mining,

earthmoving equipment sales and rental requirements.”

For more information visit: www.equipmenthub.net.

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EquipmentHub.net is where you can buy, sell or rent equipment and machinery for use in drilling, civil, agricultural and other industries. We manage the entire process of valuation, procurement, and relocation of your equipment. Whether you need a single item or a complete site fit out.

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www.equipmenthub.net



Raisebore Australia provides raiseboring services nationally and internationally with its fleet of 15 raiseborers and ancillary equipment.

Leaders in raiseboring technology

NATIONAL

RAISEBORE Australia is a premier raiseboring company providing raiseboring services both nationally and internationally with its fleet of 15 raiseborers and ancillary equipment.

Since incorporation in 1995, the company has continued to update its fleet by introducing cutting edge raiseboring processes to ream shafts from 0.6m to 6m in diameter and up to

1000m in depth.

Raisebore Australia has always been at the forefront of raiseboring technology, having introduced directional drilling for pilot holes using both diamond drills and by using the Micon RDVS Directional Drilling System with a raiseboring machine.

The ability to drill perfectly straight holes has been the single greatest safety improvement in raiseboring technology over the past 30 years, as it has eliminated deviation within the

pilot hole and allows the raiseborer to apply its thrust vertically, basically eliminating large diameter reamers becoming disengaged due to the deviation of the pilot hole.

Raisebore Australia has a dedicated commitment to safety as its leading priority, which is demonstrated by reaching the milestone of nine years without a lost time injury.

Raisebore Australia was also a finalist in the Australian Mining Prospector awards 2016: Excellence in Mine Safety,

of which it is extremely proud.

For all raiseboring requirements, whether it be a large diameter ventilation shaft, a single slot raise or a campaign of box holes requiring Raisebore Australia to utilise its brand new Rhino 100 machine, please contact Raisebore Australia.

Should you have a particularly challenging or difficult project, call founder and managing director Rod Bertram to discuss potential solutions to provide a successful project outcome.

Tailored drilling programs to suit mine needs

NATIONAL

IN 2015, Raisebore Australia purchased the assets necessary to establish its own drilling company, DRC Drilling.

The assets were purchased from Pinnacle Drilling, and included late model Sandvik multi-purpose surface drill rigs, a fleet of Boart Longyear underground coring rigs – including a new semi-autonomous LM110 – and the associated ancillary plant and equipment that supports the drilling operation.



DRC Drilling was founded in 2015.

Since its founding in 2015, the company has relocated to Dubbo, NSW, to leverage the closer proximity to clients and key

customers, and to maximise its service offerings to central and eastern Australia.

The company provides tailored drilling

programs that include underground diamond core drilling, surface diamond core drilling, reverse circulation drilling, air core drilling, geotechnical drilling and conventional rotary mud and air drilling.

DRC Drilling is committed to both the highest standards of customer service, and to keeping with the rigorous environmental guidelines required by both national and international standards.

The company collaborates with key stakeholders to maintain an open dialogue that ensures environmental impacts are avoided or minimised.

DRC aims to foster a company-wide responsibility and ownership of environmental responsibility culture in order to build a strong, ethical and environmentally aware corporate citizen.



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A privately owned company supplying
raiseboring services to mining, coal
and construction industries

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Our services:

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- Our fleet features 15 machines (one of the largest in Australia) with the flexibility to ream raises as small as 0.66 metre diameter up to 6.0 metre diameter and 1,000 metres in depth
- RBA has raisebored 150,000 metres since inception


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Australia
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Contact: Rod Bertram Managing Director // m. 0419 856 118 // Office (08) 8358 4444 // email rod.bertram@raisebore.com.au



DRC DRILLING OUR PEOPLE MAKE IT HAPPEN

The leading provider of Directional Drilling services for both
surface and underground projects throughout Australia

- Directional drilling services
- Proven safety systems
- Focussed on Efficiency and Integrity

Our services:

- DRC Drilling is a leading provider of surface and underground contract drilling services covering the following disciplines;
- Underground Diamond Core Drilling
 - Surface Diamond Core Drilling
 - Reverse Circulation Drilling (RC)
 - Air Core Drilling
 - Geotechnical Drilling
 - Conventional Rotary Mud & Air Drilling


DRC Drilling
drcdrilling.com.au

Phone: 02 6884 0044 // Location: 62 Fitzroy Street, Dubbo NSW 2830 Australia
Email: admin@drcdrilling.com.au // Post: PO Box 8, Dubbo NSW 2830 Australia



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It's a short word, yet sums up the strike ethos perfectly.

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Ph 08 9353 3552 admin@strikedrilling.com.au

High capacity drills for Strike

NATIONAL

RECENT arrival to the WA exploration drilling market, Strike Drilling has invested heavily in new drilling equipment to showcase its professional expertise and years of management experience in all aspects of the exploration drilling industry.

Now servicing the East coast of Australia with deep RC drilling and high capacity air core, Strike Drilling offers a wide range of services to clients Australia-wide, starting from near mine through to remote exploration drilling.

Strike Drilling’s high capacity air core and reverse circulation machines are mounted on a modern fleet of Mercedes all-wheel drive trucks and Moorooka track carrier capable of handling the most extreme environmental conditions.

The business operates a new fleet of drill rigs, compressed air trucks, support trucks and field supervisory units and camp amenities which it can easily deploy to its customers’ drilling sites.

Strike Drilling has also developed the “Enviro Pod” for sumpleless RC and AC drilling in environmentally sensitive areas.

The company has an ethical approach to its operations that is respectful

to the environment, and is a proud recipient of the Golden Gecko Award for Environmental Excellence awarded by the WA government’s Department of Mines, Industry Regulation and Safety.

It has a strong reputation for teamwork and dependability and has provided employment opportunity to communities in remote areas of Australia.

Strike has a clear focus on providing an ethical, professional and reliable service to its customers and is on the front foot when it comes to attention to safety around drilling activities.

The WA company uses a Quality Management System aligned with international quality standards in ISO 9001-2008 to ensure it delivers a consistent service to clients that meets their expectations.

Safety is a high priority for Strike, and all of its staff have up-to-date training on safety standards to ensure they remain aware of latest industry trends and are able to improve on their capabilities and upgrade their qualifications.

Statistical information and data on Strike’s drilling operations is provided to customers in real-time through electronic means, keeping them up to date with the latest drilling developments and eliminating paper reports.



Strike Drilling's T450 drill rig delivers high capacity air core and reverse circulation services.



- Track Based
- Grade Control
- First Pass Exploration
- RC Drilling Specialists

30 Ton Float
20ft & 40ft Sea Container
Side Lifter

Design
Manufacture
Hands Free Break-Out System

OUR MISSION

At VM Drilling we strive to be an industry leading drilling service provider, committed to building a sustainable company, focusing of the needs of our clients and the care of our employees.

VALUES & VISION

- Safety** – Operate safely or not at all; no task is worth doing if it cannot be done safely.
- Innovation** – Solutions driven; focused on developing technology and systems to meet the needs of our clients.
- Integrity** – We pride our company on high moral, ethical and business values and principles and seek to also uphold our clients’ values, expectations and deadlines.

Excellence – In our pursuit of personal excellence, we ask everyone to focus on their awareness, attitude, actions, abilities, adaptability, accountability and achievements. So together we grow.



TRAINING

VM Drilling is committed to providing a skilled workforce, with a comprehensive internal verification of competency training program. VM has also partnered with AMPT Services so all operational staff are enrolled in Nationally Accredited Drilling Certification traineeships.

This not only helps the company fulfil its employee development program goals, but ultimately offer all clients a superior service.

FLEET

HYDCO 800	RIG 5			
ROC L8	RIG 4	RIG 8	RIG 10	RIG 18
D65 SMART ROC	RIG 15	RIG 19	RIG 20	RIG 21

VM Drilling goes from strength to strength

NATIONAL

VM Drilling began operations in Kalgoorlie in 2004 in a yard at the back of Boulder, WA, and a lot has changed since then.

The company celebrated its 15th year in business towards the end of last year.

VM Drilling specialises in providing grade control and first pass exploration RC drilling services, utilising small footprint, versatile machines to offer clients an exemplary drilling service.

Traditional RC drill rigs are large and bulky, and these machines typically have up to a 15m stand-off from the pit wall - meaning that in the grade control process, holes that are in close proximity to a highwall are either missed from the program or are drilled at angles where the information produced from the hole is inadequate.

VM Drilling general manager Courtney Pacey said the company's grade control fleet consists of six Atlas Copco ROC L8s and one Atlas Copco D65 RC drill rig.

"Our grade control fleet supports many of the mid-tier mining houses as they endeavour to de-risk project development and optimise resource grade and mill through-put," Mr Pacey said.

"With an articulated mast and boom set-up, these rigs can drill on nearly all axis and angles.

"This allows us to set up the drill with the mast at right angles to the machine as a blast hole rig would when drilling pre-splits.

"By doing this with minimum stand-off from the highwall, we can achieve full pit coverage for our clients."

These rigs are also often utilised by clients as a first pass exploration alternative to traditional RAB or air-core drilling methods because of the hands-free rod handling system.

VM Drilling found that custom-attaching a Cyclone to a small Atlas Copco rig had multiple benefits for its operating processes.

"The machines have quite a small footprint so they can get up close in places where big RC machines are unable to," Mr Pacey said.

"Large machines can't get close to the pit wall, so there's a lot of area the mining company actually misses when it comes to grade control drilling.

"We can offer full pit coverage, drilling a series of holes along the mine's pattern to determine the average grade or the ore and how it runs to dictate the blast and digging process."

Mr Pacey said the company has found a niche with its small and adaptable RC machines.

"We made our own kits to suit our needs using components from a few different suppliers," he said.



VM Drilling specialises in providing grade control and first pass exploration RC drilling services.

"Over the years we have trialled a lot of systems, mixing and matching various components.

"Now we purchase a few select pieces from Harlsan and make the rest ourselves through our engineering company, TJM Engineering.

"We believe what we have come up with is more efficient than the standard RC kits you buy off the shelf, and we've had a lot of success with it."

When drill depths required exceed the ROC L8 capability, VM Drilling uses a Hydco 800 track-based RC exploration drill rig to meet client needs, with depth capability of up to 800m.

Productive partnerships

Mr Pacey said the company has been in a range of successful partnerships to provide grade control drilling solutions for mining companies.

"At the moment 30pc of our fleet are on multiyear contracts," he said.

"The remainder of our fleet rotate around on campaign work with the rest

of our key clients.

"They are all kept very busy in this market."

Skilled workforce

"VM Drilling is committed to providing a skilled workforce, with a comprehensive internal verification of competency training program," Mr Pacey said.

"We have also partnered with AMPT Services and our operational staff are enrolled in Nationally Accredited Drilling Certification traineeships, which not only helps the company fulfil its employee development program goals, but ultimately offer our clients a superior service.

"VM Drilling's difference is in our uniquely versatile approach, utilising fit-for-purpose equipment and highly trained individuals to assist our customers to achieve their goals."

Transport options

The company also has a transport

division, VM Transport, that includes a Western Star prime mover, a 30t tri-axle float and a 40ft tri-axle sea container side lifter.

VM Drilling offers the transportation of VM drilling rigs and ancillary equipment to site, saving on mobilisation costs to clients.

The sea container lifter is capable of transporting either a 20ft, a 40ft or two 20ft sea containers at once.

Utilising unique lifting aids, this unit can lift two 20ft sea containers at once with a payload of up to 36t and can stack sea containers two-high.

"We can offer lower mobilisation costs and travel wherever we need to go," Mr Pacey said.

"We've completed a few jobs in South Australia and have a project coming up next year in NSW - we're a contract drilling service so we'll go wherever the work is.

"Plus, we're self-sufficient on site, we bring everything we need on site to complete the work above and beyond our client's expectations."

Specialists get the job done

NATIONAL

QUEENSLAND-BASED S and K Drilling is a specialist in the field of exploration drilling for both greenfield projects and established mines in the mining areas of NSW and Queensland.

The company can meet all of its clients' needs, at every step of the way, in the exploration drilling process while operating in a safe and efficient manner to achieve its clients' technical objectives.

Since its founding in 1985 to service the coal mining industry, this family-owned business has recorded an impressive track record in its drilling work and, has completed projects ahead of time and within budget.

Some of S and K Drilling's recent projects include carrying out coal washability sampling for a client in the Gunnedah coal basin of NSW, and performing high quality geotechnical studies and coal quality sampling and water monitoring for a Bowen Basin coal miner in Queensland.

Another important project for the company recently has been carrying out drilling to check on coal quality for a client in Queensland's Surat Basin coal field.

The company prides itself on striving to achieve its clients' technical requirements in terms of exploration drilling while at the same time maintaining a sharp focus on safety.

S and K Drilling has a stable and



Drilling rigs operated by S and K Drilling.

capable workforce and its drilling operatives have long-standing experience of working in the field at isolated locations and of staying in touch with clients while getting the work done.

In terms of its future direction, S

and K Drilling has recently revamped its services and product offering for customers to stay ahead of the competition and to keep up to date with the latest industry trends and technology.

The company will continue to serve its clients in both greenfield and brownfield exploration drilling.

More information: S and K Drilling, phone number: 0746 931 319, email: Rachal Hamilton, Snk25@bigpond.net.au



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Improving productivity and safety

NATIONAL

LEADING global mining-tech company IMDEX is using its extensive research and development hub and newly acquired technologies to improve productivity and safety for mining operations.

IMDEX's drilling optimisation technology offers the first substantial shift in drilling standards and practices in many years.

The company is committed to improving mining industry outcomes, spending \$15m a year on in-house research and development to find solutions to existing and emerging problems.

Reports by CSIRO and the Australian Drilling Association have identified improved drilling technology and better safety standards as crucial for the mining industry.

IMDEX has responded by developing the IMDEX XTRACTA and the IMDEX COREVIBE, a patent-protected energy pulse assisted drilling technology it owns after acquiring New Zealand-based Flexidrill for \$NZ40m in December.

Both drilling technologies together fulfil the strong demand from drilling contractors and resources companies for improved drilling productivity, core reliability and sample integrity and safety.

IMDEX COREVIBE

The IMDEX COREVIBE is a next-generation drilling technology – a segment identified in a 2017 CSIRO report as crucial for the development of Australia's Mining Equipment, Technology and Services (METS) sector.

The IMDEX COREVIBE has undergone substantial tests at several sites globally over the past 18 months, and is ideal in hard ground conditions where bit life is good relative to the total hole depth.

IMDEX COREVIBE has delivered significant improvement in penetration rates, in addition to productivity gains of more than 30 per cent (validated by SGS, a world leading inspection, verification, testing and certification company).

Better yet, the technology can ensure efficient drilling by drillers of any level as stripping the bit to keep it sharp is no longer an art form.

There's, therefore, no need to rely on the most experienced drillers to do the heavy lifting, meaning this technology is accessible to all team members.

The results achieved at a test site in New Zealand have been validated by an external review conducted by SGS, the world's leading inspection, verification, testing and certification company.

IMDEX XTRACTA

In addition, the IMDEX XTRACTA offers safety improvements by reducing manual handling.

The IMDEX XTRACTA is a retractable core barrel that enables drill bits to be inspected or changed without retrieving the rods, which substantially improves productivity while maintaining the integrity of the drill hole.

According to the Australian Drilling Association, recent research by Ansell found that 93pc of the companies it surveyed had reported hand injuries and that 42pc said hand impact injury was a



The IMDEX COREVIBE can increase productivity by 30 per cent.



The IMDEX XTRACTA minimises safety risks by reducing manual handling of drillrods.

significant risk to the workforce.

The association has also logged several cases where workers have been injured in drill rig accidents.

By using the IMDEX XTRACTA, mining operations can minimise risk of injury as the requirement to pull rods is no longer influenced by bit wear.

There are also many benefits from a time perspective.

The IMDEX XTRACTA will reduce downtime as there is no need to compromise on drill bit selection or risk hole deterioration/collapse reaming through drilled ground after bit changes.

IMDEX MAGHAMMER

The IMDEX MAGHAMMER was another of the key technologies included in the

Flexidrill acquisition.

The technology is a new hybrid drilling technique combining rotary diamond drilling with fluid-driven percussive drilling to achieve higher penetration rates compared to conventional drilling.

It is currently being developed at IMDEX's New Zealand test site, with trials expected by completed by the third quarter of 2020.

An extensive offering

These products also integrate with the rest of the company's offering – whether it is fluids, core orientation, survey tools and the like – providing a complete solution for its clients.

IMDEX's research and development has produced leading IP-protected technologies and a history of "firsts" in innovative technologies driving

efficiencies for the industry.

According to its latest annual report, IMDEX has 120 trademarks registered and 46 pending, 82 patents registered with 88 pending, and 40 IMDEX patent families.

IMDEX managing director Bernie Ridgeway said the new technologies were a step-change for the minerals drilling industry globally.

"IMDEX technologies align with growing industry demand for total ore body knowledge, real-time information, lower costs, greater productivity and safety," Mr Ridgeway said.

"This is becoming even more important as our clients operate in increasingly challenging environments, working in remote areas and assessing resources at greater depths.

"It's about enabling our clients to drill smarter and faster and have access to real-time data for instant decision-making."

IMDEX supports a diverse range of clients at all stages of the mining cycle, from drilling contractors to junior explorers and major producers across a wide range of commodities.

The company offers global coverage from 20 offices based in Asia Pacific, Africa, Middle East, Europe and the Americas.

Industry accolades

Over the years the company has snapped up a number of prestigious industry awards, with its most recent win including the WA Exporter of the Year in the Minerals, Energy and Related Services category at the 57th Australian Export Awards at Parliament House in December.

Mr Ridgeway said the team "were honoured to have joined Australia's top exporters" at the prestigious awards ceremony in Canberra.

"IMDEX was proud to be a part of such an auspicious event," he said.

In September, the company was also named Mining Journal's 2019 METS Company of the Year.

More information on IMDEX can be found at www.imdexlimited.com.



Drill time, not down-time

With drilling costs on the rise, IMDEX's new drilling optimisation technologies will see you increase your productivity by **up to 30%***

**Validated by SGS, a world leading inspection, verification, testing and certification company.*



INCREASE
PRODUCTIVITY



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OF INJURY



REDUCE HOLE
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 Phone: 03 320 4189 (New Zealand)
 mail: grant@helidrill.com

Drilling knowledge runs deep

INTERNATIONAL

IN March 2020, Helidrill founder and director Grant Brotherston will reach a significant career milestone: 34 years working in New Zealand's drilling industry.

So, there's not a lot he doesn't know about precision drilling to meet clients' requirements.

His Invercargill-based company is a trusted specialist in the field of exploratory drilling for mineral substances, including coal and lignite and precious metals like gold and platinum.

Since entering the drilling industry in Ohai in 1986, Mr Brotherston has worked on many NZ projects, including coal, gold and platinum, and the company has also drilled in Australia.

The deepest hole he's ever drilled was while working for the Antarctic Drilling Project (ANDRILL), set up to investigate past Antarctic climate patterns from sediment cores in the McMurdo region on the south tip of Ross Island.

"It was a 2200m-deep hole from the drill rig, through an ice sheet and the sea beneath it to the bottom of the hole on the sea floor," Mr Brotherston said.

More typical of the kind of work Helidrill does today is drilling down 200m for coal projects.

Mr Brotherston's considerable experience means he has an expert understanding of ground conditions, as well as the mechanics of drilling and pumping equipment, so unnecessary delays are kept to a minimum.

Helidrill's heli-portable rig capability enables drilling to be undertaken in remote



Helidrill has an expert understanding of ground conditions, as well as the mechanics of drilling and pumping equipment, so delays are kept to a minimum.

locations or places that are inaccessible by road.

Rigs can be easily disassembled and flown in by helicopter, with the team also equipped with camping gear to stay on site if required.

Helidrill has two main diamond drill rigs that are equipped to cover a range of depths from 80m through to 400 metres.

As well as minerals exploration, Helidrill has the capability to undertake other specialist drilling.

For example, Helidrill has drilled on Raoul Island to support the installation of tsunami warning systems. It can also do investigation drilling and drainage drilling.

"Another example is drilling on hills or the tops of mountains for weather stations or small data towers," Mr Brotherston said.

Leaders in the bits business

NATIONAL

CARBIDE Bit Co is a long established, Australian-owned and operated drilling consumable supplier based in Darra, just 20 minutes from Brisbane.

With original director Dan O'Keefe at the helm and the addition of manager Steve Mellish in 2008, alongside their well-qualified team, Carbide Bit Co is renowned for knowledge and understanding of the drilling industry, and quality, availability and competitive pricing.

This is evident in the showcase warehouse and through communications with Dan or Steve.

Over this time, Carbide Bit Co has expanded stocks of new premium oilfield tricone and polycrystalline diamond compact (PDC) drill bits, as well as developing new products, including PDC core bits, carbide tiled integral body stabilisers, redesigned under reamer bodies and PDC blades.

The acceptance and the performance benefits obtained with PDC bits has driven the need for larger and non-standard size PDC bits, hole openers and other PDC tooling.

The use of different well designs/casing sizes, new casing materials and unforeseen issues such as out-of-round casings or over-welded joints, often create the need for other-than-standard oilfield size bits.



There are more than 66 years of drilling industry wealth and knowledge accumulated between Dan O'Keefe and Steve Mellish, with Dan holding 41 years and Steve 25. This photo was taken in the company's very well stocked warehouse, dubbed 'drillers heaven'.

Carbide Bit Co specialises in non-standard sizes and can offer the complete assembly, bits, stabilisers,

collars and sub-assemblies for purchase or rent in certain cases.

"We have also continued the

development of custom-made specialised tungsten carbide insert (TCI) roller cones and PDC directional and vertical hole openers," Mr O'Keefe said.

"Bi-centre PDC motor bits for methane drainage are a recent success story for Carbide Bit Co."

Quality tooling of the right design is the secret to selling in any market, locally or worldwide.

Price is important but productivity is the key to a driller's success.

Carbide Bit Co offers the following equipment and services:

- PDC bits 2 15/16 to 24 inch ex-stock
- Tricone bits 2 15/16 to 28 inch ex-stock
- 4C/8C PDC coal coring bits
- Hole openers TCI up to 48 inch; and beyond/PDC, up to 36 inch
- PDC underreamers and casing cutters – three body sizes up to 20 inch cut
- Modern warehouse with quality packaging including steel cradles for convenience of dispatch and return for rental or refurbishing large tooling
- Specialist in milling tools and refurbishment of all PDC tooling
- The company is also an official Epiroc re-seller

For more information about Carbide Bit Co, visit: www.tricone.com.au.

CARBIDE BIT CO

CONTACT

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carbidebitco@bigpond.com

Steve Mellish
0408 733 965
steve.carbideco@bigpond.com



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Finger on the mining pulse

NATIONAL

DRILLING equipment supplier Industrial Marketing has its finger on the pulse of Australia's mining industry and is one of the first to know from its customers where new exploration activity is happening countrywide.

As a drill rig broker, Industrial Marketing finds buyers for exploration drilling equipment put on sale by its owners, and therefore has a box seat on areas of fresh exploration activity.

The company can supply a range of drilling equipment from complete packages of drilling equipment to single truck-mounted and track-mounted drill rigs.

Exploration and drilling contractors are among the company's core customers for its specialist services in providing drilling equipment.

It also provides valuations for drill rigs and drilling equipment and for drilling companies.

Industrial Marketing regularly updates its company website which lists a wide range of different drilling equipment and rigs offered for sale alongside price information.

Active in the drilling and exploration industries since the 1970s, the business has a long pedigree and successful track record in meeting client expectations.

Industrial Marketing has brokered drill rig sales in Australia and in other sales territories include, Africa, the Middle East



Truck-mounted drilling rigs offered for sale through Industrial Marketing.

and South East Asia.

The firm is also a consultant to a leading business broker covering Victoria

and Western Australia.

Additional information is available on Industrial Marketing's website at

www.industrialmarketing.com.au including contact information for the company.



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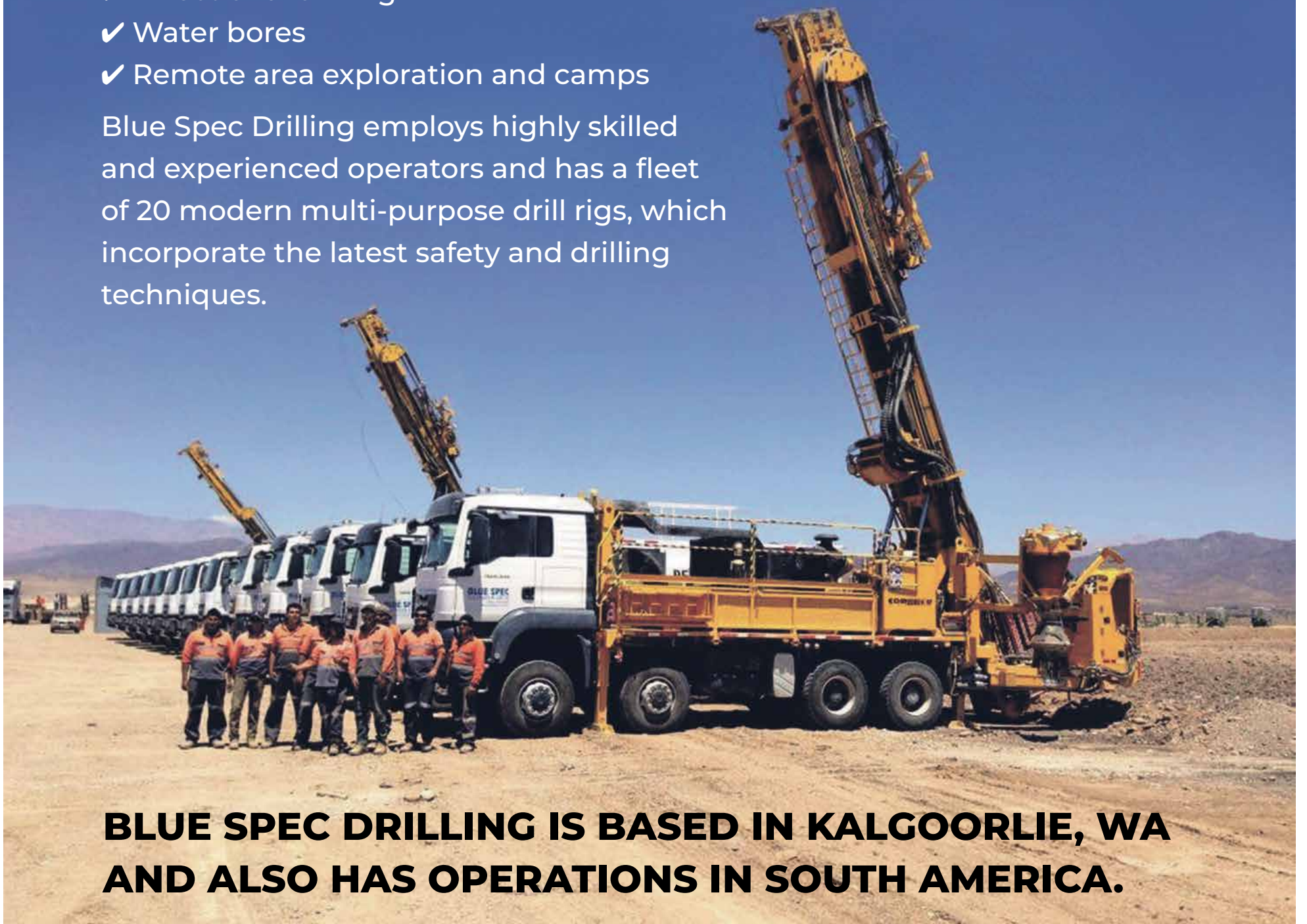
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Blue Spec Drilling Pty Ltd provides a variety of drilling services including:

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Blue Spec Drilling employs highly skilled and experienced operators and has a fleet of 20 modern multi-purpose drill rigs, which incorporate the latest safety and drilling techniques.



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At the heart of the well

NATIONAL

IN 1904, Edward E. Johnson founded Johnson Screens after developing the world's first continuous slot wire wrapped screen to be used in a water well.

Johnson Screens, with its trademark Vee-Wire, is the leading brand for screens in water well, water treatment, mining, food and beverage, and oil and gas applications.

Today, Johnson Screens (a brand of Aqseptence Group) is one of the largest manufacturers of stainless steel water well screens in the world.

With a high open area – allowing for better access to the entire formation around the screen – fines and drilling fluid are removed quickly and completely, resulting in better well development.

Johnson Screens considers its water well screens as the “Heart of the Well”, given a screen has the vital responsibility of determining the success or failure of a well.

A successful screen must allow the gathering of an ample quality of water, while maintaining a minimal head loss so that the pump is supplied with its full capacity of clear water.

A benefit of Johnson Screens is its ability



Johnson Screens improves well development in mining.

to provide a screen with a very high open area, allowing for better access to the entire formation around the screen.

Fines and drilling fluid are removed quickly and completely, resulting in better well development.

The Johnson Screens range of products are proudly Australian-made, designed and developed in its state-of-the-art manufacturing facility in Geebung, Brisbane.

Screens are manufactured from a wide

range of austenitic stainless steels starting from 304/L SS alloys to higher austenitic alloys like 316/L, SAF 2205, 904L, etc that have an exceptionally high corrosion resistance.

A range of Vee-wire screens is also available in PVC material for environmental and monitoring applications.

Johnson Screens are widely deployed for a range of mining operations in coal, iron ore, gold, copper, zinc, bauxite, mineral sand and more.

Johnson Screens is confident that whatever part screening plays in the process, it can improve it with more than 100 years of design experience, vast manufacturing capabilities and around-the-world support.

More information can be found at www.aqseptence.com or by contacting Business Unit Manager, Moyez Poonawala, on (07) 3867 5555 or via email at waterwell.johnsonscreens.au@aqseptence.com.



Johnson Screens

A brand of
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THE HEART OF THE WELL

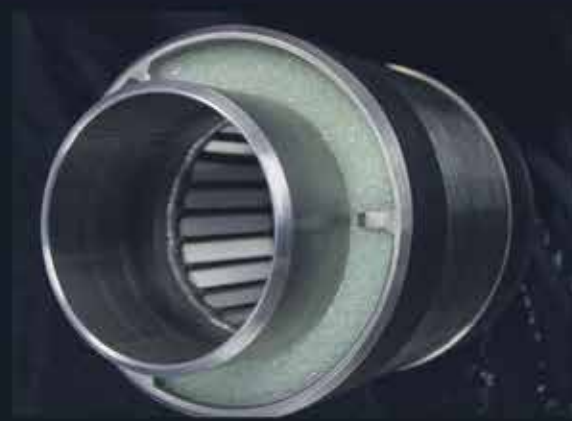
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Ophir unlocks mineral wealth

NATIONAL

NAMED after a mythical golden land filled with riches, Ophir Drilling carries out exploration drilling for top mining companies to help them accurately pinpoint lucrative ore bodies in Australia’s mineral fields.

Since starting up in 2015, the family-owned business has undertaken drilling projects for clients that include Alkane Exploration, Fortescue Metals Group, Newcrest, and Regis Resources.

Despite Ophir Drilling’s young age, its executive team led by directors Bryce Lord and his brother Rhys, with senior operations manager Ben Gavin, has more than 50 years’ experience in the drilling industry.

The Lord brothers are carrying on a family tradition in the drilling industry as their father Phil worked in the sector for 46 years.

The firm operates some of the most modern state-of-the-art drilling equipment in Australia in its Sandvik drill rigs that can drill to significant depths.

This modern drilling technology, combined with Ophir Drilling’s extensive drilling expertise and attention to safety, has given the firm a sharp competitive edge.

The company is receiving good support from equipment supplier Sandvik to further enhance the safety and efficiency of its drilling fleet and to keep up with technological changes to evolve its product offering to clients.



Ophir Drilling operates a modern fleet of drilling rigs.

Ophir Drilling’s flexible approach and ability to tackle any sized project, both large and small with its latest drilling technology, enables it to meet the diverse needs of its clients in various remote and site-based areas.

Explorers through the ages have been unable to find the fabled land of Ophir from which King Solomon reputedly received a shipment of riches every three years.

Ophir Drilling on the other hand has

a successful track record in assisting its clients to unlock the mineral riches of Australia.

Further information on Ophir Drilling is available on the company’s website at www.ophirdrilling.com.au.



Ophir Drilling is an exploration drilling company formed in August 2015.

We are a tight-knit, family owned business with over 50 years’ combined experience in the drilling industry. Leaders in safety, Ophir provides unmatched competitive and efficient drilling solutions to clients with a down-to-earth, highly responsive, country charm service.

Now don’t mistake “country” for “old-fashioned”, Ophir is future-focused and our fleet of state-of-the-art, Sandvik rigs can attest to that. We have the experience, the flexibility, the service and the technology to complete any large, small, remote or site-based drilling project.



Mobile: 0400 035 850
PO Box 1413, Orange NSW 2800
Email: bryce@ophirdrilling.com.au

We mean what we say

Worldwide drilling exporters

INTERNATIONAL

FOR more than 45 years, PRD Rigs has been engaged in the manufacture and export of a comprehensive range of drilling rigs, a legacy that has been built upon since 1972.

The company manufactured its first hydraulic rig in 1992, and started its exports under the name Paranthaman Exporters in 1999.

Since then, PRD has exported more than 1000 rigs to more than 60 countries over five continents.

PRD has grown to employ more than 500 staff, which has given it the capacity to excel in the world-class manufacturing techniques required for any company to adapt to the changing technological landscape in a global export market.

The company has delivered an unmatched range of products to the market for segments including water wells, mining, exploration, construction and other special purpose applications.

PRD believes in a customer focused stratagem which enables the customer to customise their rigs to any extent, right from engineering additional features to choice of colour this delivered with unmatched lead time, convenient functioning, ease of maintenance and aftersales assistances has made PRD Rigs a predominant presence in the industry.



The company has delivered an unmatched range of products to the market.

There is a specialised in-house design and development centre that allows PRD Rigs to continuously improve on its designs, and keeps it at the forefront of drilling rig development in technological innovation and adaptable engineering.

PRD Rigs is the first drilling rig manufacturer to export from the

Indian market with an ISO 9001:2015 certification.

PRD Rigs has branches in Kenya, Tanzania, Cameroon, Nigeria, Ghana, Burkina Faso, Mali, Sierra Leone, Guinea, Sri Lanka, and a dealership network that spans Middle East, South East Africa and Australia (Oceania).

MEMBER OF:

Australian Drilling Industry Association

Engineering Export Promotion Council

Indo American Chamber of Commerce

Indo African Chamber of Commerce

Indo Arab Chamber of Commerce

Indo Australian Chamber of commerce

Indo German Chamber of commerce



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\PRD RIGS



\Paranthaman exporters

Client-focused, competitive, experienced

QLD

WHEN you choose Serra Drilling, you're gaining access to a company with vast experience in the Qld mining industry.

The family-owned business has gone from strength-to-strength since its inception in 1970, led by company directors Joe and Anne Serra, with two sons Dave and Mark now managing the company's operations.

This year, the business celebrates 50 years of business: a huge feat, one which the family attributes to honest, reliable and trusted services over the years and investing in the latest technologies.

"Our company has gained a reputation for taking pride in the quality of our work, offering very client focused, safe and competitive drilling services," Joe Serra said.

"It has been a real privilege to provide specialist drilling services to clients throughout Queensland for the past five decades."

Serra Drilling's core services include drilling large diameter water production bores; dewatering bores; stock and domestic water bores; groundwater monitoring bores; Piezometer installations; exploration drilling; and pump testing.

"At Serra Drilling, we have both highly experienced water well drillers as well as exploration drillers," operations manager Dave Serra said.



The Serra Drilling team.

"Our expertise in water well drilling and state-of-the-art equipment allow us to safely complete some of the most technically challenging drilling programs.

"Having worked with many hydrogeologists through various formations we have a vast understanding of the de-watering process from site selection through to drilling, bore design and pump testing."

The business has aligned itself with

leading brands, which boast some of the most globally advanced technology.

"By taking this approach we have used engineering to eliminate some of the most common and high-risk hazards associated with drilling," Dave Serra said.

With a pro-active approach to maintenance and modern equipment, the team can offer its clients among one of the safest, most productive and reliable services in the sector.

Serra Drilling has an excellent track record, proving that with strong safety systems, well-maintained modern equipment and some of the most highly trained personnel, it can successfully execute difficult drilling programs much more efficiently than would traditionally be expected.

More information on its services can be found at: www.serradrilling.com.au.



CELEBRATING 50 YEARS OF DRILLING

Serra Drilling is a family-owned and operated company based in North QLD.

We've been providing specialist drilling services to the mining sector since 1970, with vast experience in water well drilling and exploration drilling.

OUR SERVICES INCLUDE:

- Large diameter water production bores
- Dewatering bores
- Stock and domestic water bores
- Groundwater monitoring bores
- Piezometer installations
- Exploration drilling
- Pump testing

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Mob: 0418 772 669
Email: admin@serradrilling.com.au
Web: www.serradrilling.com.au



Neumann dredging pioneers

QLD

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Neumann built its first dredge in the late 1950s, and since then it has built up its own fleet of dredges and expert operators.

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Right approach to dredging

NATIONAL

DREDGING expert Simon Burgmans started his independent dredging consultancy, in2Dredging (i2D), in 2016 to provide better services to both Australian and international customers.

The company combines extensive practical field experience with academic knowledge, and has also developed several off-the-shelf tools to provide essential design, engineering and operational support for dredging projects in a mining environment.

i2D has already worked for many large mine operators, including Rio Tinto, FMG and indirectly for Newcrest.

i2D's dredging consultants have been involved in worldwide large-scale projects, such as the Nord Stream 2 and the Wheatstone project.

Mr Burgmans said that over the 20 years he had been in the industry, it continues to surprise him that dredging operations begin without the involvement of an experienced specialist.

"It's like having a cardiologist perform high-risk brain surgery," he said.

"Unfortunately, the scale of cost blow-outs and delays that occur can be massive.

"Of course, hindsight is a wonderful thing, and therefore, I have made it my mission to prove that dredging expertise can proactively make a difference to



Dredging consultancy is critical to the success of any project.

mining projects."

Dredgers and miners both excavate rock or soil, but the two fields are very different.

In mining, the risk of subsurface rock is relatively low, since the rock is first loosened by blasting.

In dredging, cutting and jetting techniques are used since they are more

cost-effective in marine environments.

However, Mr Burgmans said that dredging always involves significant risk because production rates vary depending on the rock or soil strength encountered.

"Besides the risk of possibly encountering adverse soil conditions, dredging always occurs underwater where progress can

only be monitored with specialised survey equipment," he said.

"Therefore, accurate interpretation of survey data is key to monitoring a dredge's performance.

"This inability to visually monitor the excavation process is the other major difference between dredging and mining."



What i2D does:

- Select dredge(s) for mine or closure plans
- Specify and commission new dredges
- Review performance of dredge operations
- Manage port infrastructure dredging works

Why i2D?

- Combine academic knowledge with extensive field experience
- Offer off-the-shelf dredging and mining tools:
 - Pumps 'n Pipeline
 - Equipment Performance Review
- Have Contractor and Client-side experience



Electrical contractors in merger

NATIONAL

SPECIALIST electrical contractors JLE Electrical and EMS Mine Site Electrical (part of EMS Group) have merged to strengthen their product offerings to their network of clients.

The merged business will be rebranded JLE Group.

The business units that operate within the group will be JLE Mining and Tunnelling (formerly EMS Mine Site Electrical) JLE Utility Services, specialising in design construction of utility-based electrical transmission and distribution underground and overhead powerline; and JLE Electrical construction, specialising in medium and large-scale electrical construction projects including long-term maintenance contracts.

Both companies are divisions of leading construction materials, equipment and services provider, Maas Group Holdings (MGH).

A union between the two divisions enables the group to consolidate its operations, increase efficiencies, and streamline services.

EMS Mine Site Electrical (now JLE Mining and Tunnelling) has more than 50 electricians on its team who specialise in manufacturing substations and starter boards for the mining and tunnelling industry.

The business consists of highly skilled project managers to enable the delivery of technical HV and LV installations and also



JLE Electrical and EMS Mine Site Electrical have merged.

provide turn-key solutions for their clients.

Its key services include cable reclaiming, trailing cable exchange and repairs, electrical construction, engineering, switchboard manufacturing, as well as offering wholesale pricing on a range of consumable products such as low and high voltage power, control, and trailing cable, SWA cable, flygt pumps (5kW – 37kW), and ventilation fans.

EMS Mine Site Electrical also offers some of the best repair and hire deals in the market.

Similarly, JLE Electrical is an accredited Level 1 ASP service provider specialising in underground and overhead power line construction and HV and LV cable terminating and jointing for supply authorities and mining companies.

JLE's team comprises highly skilled electricians, linesman, HV cable jointers, switchboard manufacturers and subcontractors.

The company can provide turn-key solutions for infrastructure projects

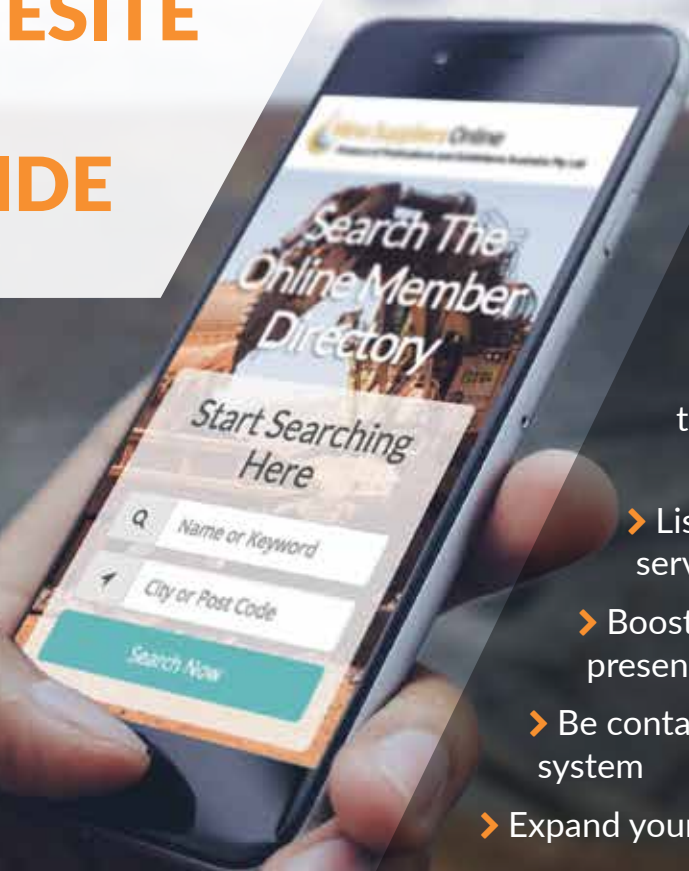
including Level 3 design services, Level 2 works and Level 1 works.

EMS Mine Site Electrical and JLE Electrical will soon be operating under the JLE Group umbrella together as one entity.

Collectively, the group's workmanship and execution are regarded among the highest quality in the industry.

More information can be found at www.jleelectrical.com.au.

BE AT THE FINGERTIPS OF EVERY MINESITE OPERATOR AUSTRALIA WIDE



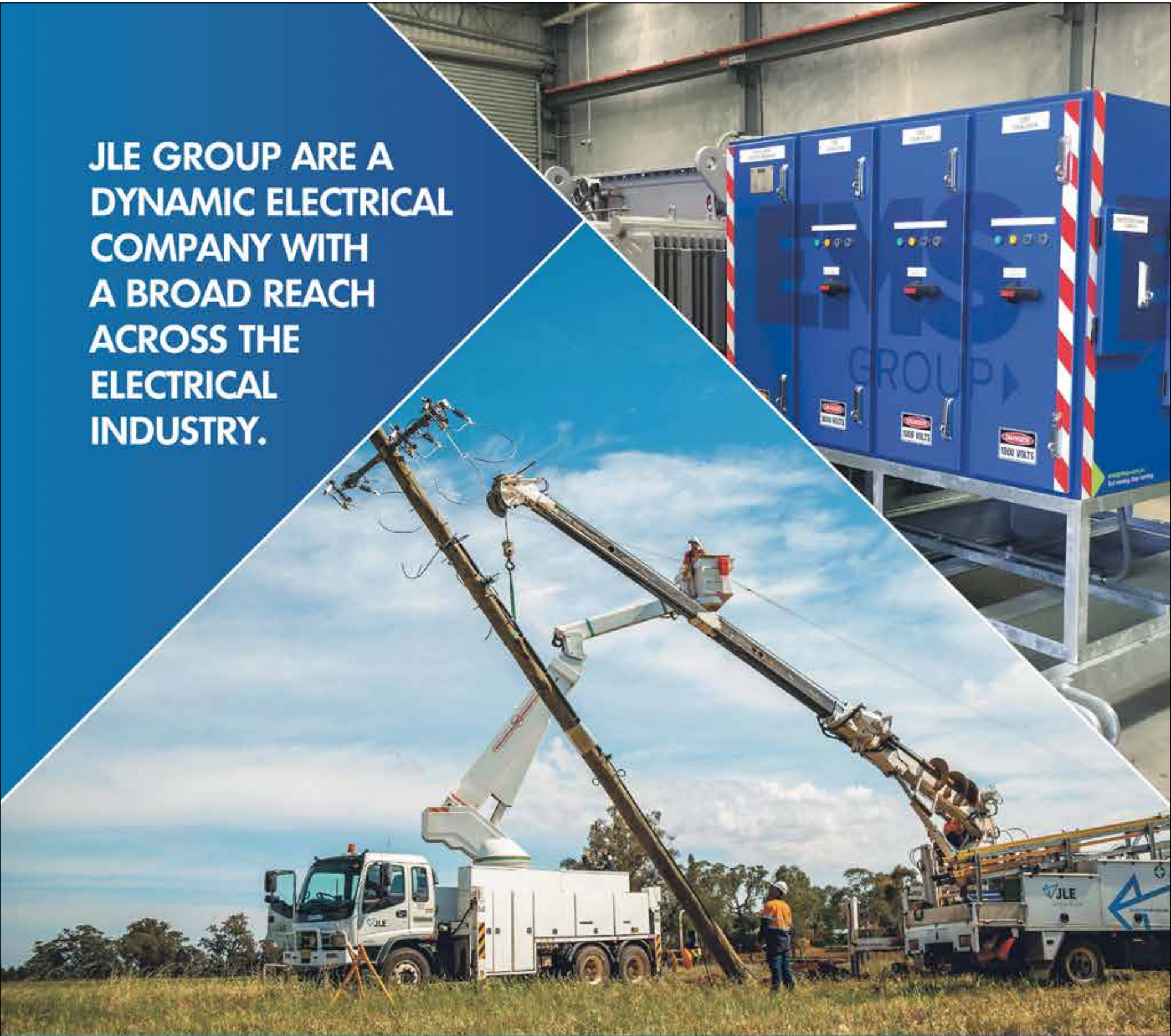
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COMPANY WITH
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ELECTRICAL
INDUSTRY.



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Our mission is to be the service provider of choice for all turn-key solutions in the electrical industry from HV power line construction to connection, commissioning and ongoing maintenance.

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Orange Office: 1 & 2 Stephen Place, Orange, NSW, 280
Perth Office: 19 Excellence Drive Wangara, Perth, WA, 6065



Advanced volume scanner solution

NATIONAL

MINES across the globe are leveraging load volume scanning technology to maximise payloads — with most mines reporting trucking factor increases of about 15pc.

Unlike on-board weighing systems and expensive weigh bridge installations, which require a lot of ongoing servicing and calibration, Loadscan is a touchless system without wear-parts.

The load volume scanner (LVS) is a low maintenance, cost-effective alternative (or complement) to weigh scales.

Hindustan Zinc, the world's second largest zinc producer, currently has four load volume scanners (LVS) in action to monitor material, which is carted by numerous trucks coming and going from its various mines.

At its Rajpura-Dariba mine, Hindustan Zinc's oldest mine, a custom-mounted Loadscan (LVS-3CMX model) is used underground to measure ore, where it's crushed before taken to the surface by lift.

Within this mine there's also a block-mounted portable unit (LVS-3BMP), which is positioned at the portal to measure trucks as they come to the surface.



Loadscan's volume scanner is utilised by the world's second largest zinc producer, Hindustan Zinc.

Another two custom-mounted scanners were purchased for the Zawar mine complex.

Hindustan Zinc vice president and head of corporate communication Pavan Kaushik said Loadscan had been helpful to improve operational performance by managing haul-back to reveal the true shift tally.

"We can now accurately calculate net volumes delivered for processing," he said.

"Time is also saved by minimising

paperwork, there's no manual data entry, driver records or after-shift record sorting.

"Production gains have also been achieved for Hindustan due to increased trucking factors.

"We've achieved lower cost per tonne of material hauled, optimising truck loading and improving productivity."

Special mining specific software reports every detail of every load, and provides 3D

profiles, which can be used immediately to identify sub-optimal loading and train loader operators and truck drivers to safely maximise payload.

Automated data capture and docket printing means Hindustan Zinc's loader operators can focus on the job of loading and keeping trucks moving.

More information on Loadscan's advanced volume scanner technologies can be found at www.loadscan.com.

Real-time actionable intelligence enabling you to optimise loading, production and profits.

Our volume scanning systems provide you with the full picture of what's being extracted.

The original load volume scanner (LVS) system is proven to increase trucking factors.

And the new conveyor volume scanner (CVS) brings a new level of production control.

Freephone 1 800 335 305
Email sales@loadscan.com

LOADSCAN
LOAD VOLUME SCANNERS

LOADSCAN.COM



ELGi impresses with compressors

NATIONAL

COMPRESSED air products supplier ELGi Australia has built a leading reputation in the market for the reliability and quality of its air compressors which are supplied to more than 5000 Australian customers.

ELGi's widely-recognised compressor products include oil-flooded compressors suitable for light and heavy industrial applications and oil-free screw compressors hallmarked by their robustness and high performance features.

Other company products are piston compressors providing a cost-effective, long-lasting solution for compressed air needs, and heat recovery systems that use otherwise wasted heat from air compressors.

The company has manufacturing plants in Italy, India and the US, and its range of 400 products are engineered to deliver maximum uptime and reliability at a low ownership cost.

ELGi products are backed with an industry-leading 10-year warranty and by the company's maintenance support services to ensure a quick resolution of any product issues.

The company supplies a range of parts and accessories for air compressors including, custom-made filters and separators to shield compressors from dust and dirt; lubricants and fluids; and service kits for routine maintenance.



An ELGi Australia oil-free screw air compressor.

Compressed air requires different filtration applications including drying, particle removal and oil vapor removal through a membrane, as it has some inherent impurities that can affect the operation of compressor equipment, said the company.

ELGi has developed systems to remove these impurities to increase the durability of air compressors and to maintain their performance. They are the ELGi Airmate system and the ELGi Conserve solution.

In the mining industry, ELGi's air

compressors are used at minesites in NSW, WA and Queensland, where working conditions can be tough and the climate harsh.

Air compressors supplied by ELGi work reliably in high temperature environments and have a large footprint to allow for maximum cooling of the equipment.

Started in the 1960s, ELGi has a long pedigree in the air compressors industry and has developed a number of bespoke products, such as its oil-free screw air compressor in 2011.

A year later, the company and launched its compact, silent energy efficient encapsulated series of screw air compressors.

The company has a long track record of innovation and has developed a nitrogen inflation system for mining vehicles tyres called NitroPlus.

The gas has the benefit of being corrosion resistant and nitrogen is retained longer in tyres than oxygen, meaning that tyre pressures stay high, keeping vehicles on the road for greater periods of time.

There is also less risk of tyre explosions with nitrogen than oxygen, which can occur in lightning storms, or high temperature conditions, as nitrogen is a non-flammable gas.

The industry standard for nitrogen in mine truck tyres is 98pc purity. At this level, there is no risk of fire or explosion.

6 VITAL TOOLS TO GROW YOUR BUSINESS

Our Mining Business Development Package has helped businesses like yours, across a range of industries, to form relationships with key decision makers on Australian mine sites.

The 12 Month Package includes:

- Access to our Mines Database (Provides details for Key decision makers across 400 mines)
- Social Media Blast to over 7000 followers across all Publications & Exhibitions platforms
- 12 hard copies of The Australian Mining Review (monthly), including The Australian Oil & Gas Review
- Weekly Mining Report (Carefully researched, real business opportunities)
- Weekly Mines Activity Report (Operational Activity specific to Mine Sites)
- Directory listing on Mine Suppliers Online



MC SCAFFOLDS**WE PROVIDE
PEACE OF MIND****MC Scaffolds are Mount
Isa's Scaffold Specialists.**

Our team is highly experienced in the scaffolding industry and consists solely of locally-based Scaffolders and Scaffold labourers.

We hold the largest stock of scaffolding equipment in North West Queensland district, so can cater for any size project.

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temporary fencing****9 Traders Way, Mount Isa****www.mcscaffolds.com.au**

Scaffolding shapes and sizes

NATIONAL

THERE are many types of scaffolds and scaffolding used in Australia.

According to statutory body Safe Work Australia, the following are the most common structures used.

Birdcage scaffold

A birdcage scaffold is an independent scaffold that has more than two rows of standards in both directions that are connected by ledgers and transoms.

It is mainly used for work carried out on a single level, for example ceilings.

Specifications should be referred to when erecting and dismantling birdcage scaffolds made from modular scaffolding.

Trestle scaffold

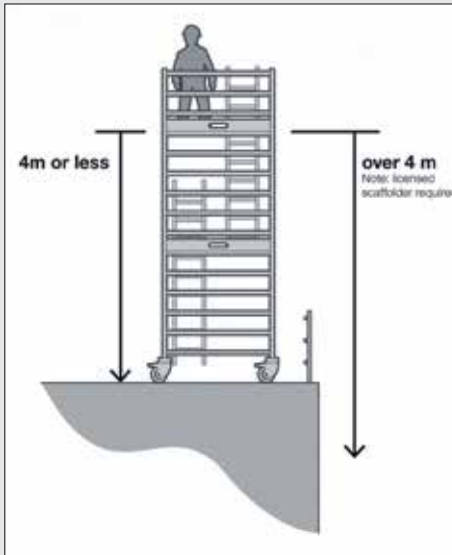
A trestle scaffold is assembled from prefabricated trestles, braces and accessories.

Trestle scaffolds, for example A-frame and H-frame trestle scaffolds, are commonly used by bricklayers, plasterers and painters and for general fit-out and finishing work.

They generally do not require a licensed scaffolder to erect or dismantle.

Hung scaffold

A hung or hanging scaffold is an independent scaffold that hangs from another structure but can't be raised or lowered when in use.

Single pole scaffold

A mobile scaffold. *Image: Safe Work Australia.*

A single pole scaffold consists of a single row of standards connected by ledgers.

Putlogs are fixed to the ledgers and built into the wall of the building or structure.

A single pole scaffold is dependent on the structure against which it is placed for support.

It is important that no components of this type of scaffold are removed until the scaffold is being dismantled.

Suspended (swing stage) scaffold

A suspended scaffold incorporates a suspended platform capable of being raised or lowered when being used.

An example of a suspended scaffold is a swing-stage scaffold.

Tower and mobile scaffolds

A tower scaffold is an independent scaffold that has four vertical standards connected longitudinally and transversely, or two frames in plan connected transversely to create a scaffold of one bay.

A mobile scaffold is a tower scaffold mounted on wheels.

Scaffolds for demolition work

At a minimum, heavy or special duty scaffolds should be used during demolition work to contain dislodged materials or to provide a safe working platform and edge protection for workers.

Special duty scaffolds

Special duty scaffolds have a specified design load for that scaffold only.

A special duty scaffold differs from other scaffold working platforms that are generally rated as light, medium or heavy duty, and have a standardised maximum load rating and minimum dimensions.

Prefabricated scaffolding

This is defined as 'an integrated system of prefabricated components manufactured in such a way that the geometry of assembled scaffolds is pre-determined'.

It can include modular, tower, cantilever, hung and suspended (swing-stage) scaffolds and must be design registered as required under Part 1 of Schedule 5 to the model WHS Regulations.

Association helps maintain scaffolding standards

NATIONAL

ALL members of the Scaffolding Association Queensland (SAQ) share a commitment to professionalism in Queensland's scaffolding industry.

Members of the SAQ help advance more effective safety standards by creating a cohesive industry approach to the development of scaffold-related standards.

The cohesive industry approach of the SAQ also helps ensure that changes to government legislation impacting the scaffolding industry in Queensland are reasonable, and as importantly, consider the opinions of scaffolding companies.

Since forming in 1994, the SAQ has represented its membership in dealings with State and Federal agencies from associated industries.

The SAQ has also developed a successful track record lobbying Government and representing SAQ members in meetings with Government organisations.

Interstate scaffolding companies can also become members of the SAQ.

Interstate members have access to all of the information and resources in the "Members Area" of the SAQ website, as well as receiving the industry-related alerts that the SAQ sends to its members.

They are also welcome to attend the organisation's four General Meetings per year, and have access to the SAQ Executive Management Committee, which



The SAQ creates a cohesive industry approach to the development of scaffold-related standards.

is made up of industry professionals, all with significant experience in operating and directing scaffolding companies.

For more information, contact Erryn O'Brien on 0403 921 319, email committee@saq.org.au or visit the website www.saq.org.au.

**REPRESENTING THE
PROFESSIONAL SCAFFOLDING
INDUSTRY****CONTACT**

Erryn O'Brien (Executive Officer)

✉ committee@saq.org.au

☎ 0403 921 319

🌐 www.saq.org.au



Scaffolding rigs operated by Base Industries.

Committed to people and relationships

NATIONAL

AS one of Australia's leading specialised access solutions companies, Base Industries has developed an excellent reputation over the past 50 years and successfully grown its business by being 'a partner that is big enough to trust, but small enough to care'.

For decades Base Industries has provided the market with the highest quality services and products under the guidance of the company's Integrated Management System, which gives customers peace of mind in knowing that their Base Industries products will always perform in high risk situations.

This approach is underpinned by the group's commitment to continued certification against AS/NZS ISO 9001: 2015; AS/NZS ISO 14001: 2016; AS/NZS ISO 45001: 2018; helping to drive continuous improvement processes and further development of industry leading practices.

As a single source supplier, Base Industries provides large-scale project management, construction and maintenance services for the mining and resource industries, specialising in the provision of scaffold equipment and labour services, rope access maintenance services, non-destructive testing, design and engineering.

Safety is non-negotiable for Base Industries, and its awareness of potential hazards associated with the Access industry is second to none, as highlighted by its leading safety performance in the industry.

The company's vision for injury-free working areas is reflected in its decision to benchmark its safety performance against that of the aviation industry in 2020.

Base Industries has embedded a Critical Risk Management program, building on its decades' long safety experience, helping to improve its understanding and management of critical risks in a tiered approach to planning, implementation and change.

Base Industries general manager, Ed Payne, said CRM prevents fatalities, ensuring every employee is actively engaged in the process – every task, every job and every shift.

A fourth-generation family business, Base Industries shows its care for clients such as through its partnership with Gold Fields



Australia in the operational and shutdown maintenance of Australia's highest producing gold mine, Gruyere JV.

Base Industries utilises its end-to-end integrated management system, TUBES, to pre-empt potential pain points, and work in collaboration with management to eliminate or mitigate risks. Further integration with its Scaffold Management System provides increased transparency to its clients by allowing them to monitor project specifics in real-time.

This level of transparency provides key stakeholders with critical information to make informed decisions on resource allocation, job programming and work schedules, as well as information on contract

terms, resource management and invoicing to support improved efficiencies and cost reductions.

As a client of Base Industries, partners can avoid potential problems on a project which according to the company usually occur in three areas: transparency, visibility and flexibility.

Mr Payne said that while many companies talked about these three attributes, Base Industries has lived them for many decades as an agile family business.

"Quite simply, as a company we've been focusing on these key areas for a very long time – they have become part of our DNA," he said.

Among the core Access products, Base Industries provides the Ringlock scaffold system to deliver further benefits to clients.

Boasting a large national database, the company's construction and maintenance workforce consists of specialised key management personnel, HSE professionals, rope access and NDT technicians, scaffolders, riggers and various tradespersons including boilermakers, welders and fitters.

These include a 50pc saving in time to erect; a 40pc weight reduction than similar competitive options for easier handling and assembly; and 21pc fewer components meaning fewer resources are required for installation.

This all results in a 56pc reduction in labour costs, a 52pc reduction in transport costs and a 42pc reduction in maintenance costs.

All products are manufactured to Australian Standards and Base Industries' proven quality management system ensures every single item undergoes regular inspection and testing to make sure that the highest levels of product safety are reached.

Base Industries' commitment to safety and quality is brought to life by its strong culture and processes, which empowers every employee to own the responsibility for identification, isolation and reporting of any item or behaviour that appears less than perfect.

The company's strong client list currently boasts an impressive array of tier one and two resource producers and projects nationally, including Gold Fields Australia, Citic Pacific, Rio Tinto, Alcoa, MobilExxon and BHP Nickel West to name a few.

All Base Industries' internal processes remain integral to its vision of leading the Access industry as a dedicated and people-focussed business.

Driven by an unrelenting commitment and passion for visible and 'felt' field leadership at all levels, the resulting culture is something not often found in the service industry, and one on which the company prides itself.

At every opportunity Base Industries prioritises feedback and learnings from its clients, employees and third parties to improve, build and strengthen its business into the future.

Every time, and on time

NATIONAL

ACCESS Engineering Group has been providing access solutions to mining, oil and gas, defense and commercial construction for 25 years.

The company has evolved from a specialised scaffolding contractor to now supply powered access (Mastclimbers), rope access, temporary works design and scaffolding services.

During the past 25 years, AEG has supported projects throughout Australia and undertaken contracts in Newfoundland, British Columbia, Brazil and the UK.

The company's management team has long-term experience in the mining, oil and gas, infrastructure, defense, commercial construction and television industries.

AEG site crews are trade qualified access personnel with industrial



AEG's culture is firmly focused on providing access systems that enable clients to provide their deliverable services and products safely and expediently.

glazing and cladding, welding, insulation, electrical and painting trade certificates.

At AEG, the company's culture is firmly focused on providing access

systems that enable clients to provide their deliverable services and products safely and expediently.

If you are considering any project of any size that requires any access, AEG

will provide your organisation with a one-stop access shop.

AEG caters from design to delivery every time, and on time





Access Engineering Group

FROM DESIGN TO DELIVERY EVERY TIME ON TIME

Leinster Nickel Mine Access Scaffold (2019)

Access Engineering Group was requested to design and construct a complex access system for the main winch guide rails to be replaced.

The project was to be undertaken 1.1km below ground into the main shaft by installing a 34m deep suspended scaffold that was required by the client to support a live load of 5t.

The access system needed an initial concept to include overhead protection (pentice) to be in place prior to any works being undertaken in the shaft.

AEG designed a running rail track on Plat 226 and installed the head frame and pentice back from the main shaft, and rolled this counterweighted structure into the shaft with no personnel exposed to any falling objects or working at

height issues.

The cantilever was then used to install rock anchors to the far side of the shaft to support the outboard beam work.

Once the beamwork was supported on both sides of the shaft, the suspended scaffolding main frame was installed with AEG's own ERT on station at Plat 226 at all times.

AEG completed all contracted works safely with the only delays due to mine operational requirements.

The AEG ERT and Scaffold team were deployed further to the main contract to remove conveyor covers and rig the main stiffening beams for the rail works and help with the day-to-day requirements of our client and the stakeholder.

☎ (08) 9358 5811 ✉ dbeausang@aeganz.com
🌐 www.aeganz.com



Safer Together



S.T.E.E.R.
STRIVE TO ELIMINATE EVERY RISK

Taking services to new heights

NATIONAL

ALTRAD Services is an international leader in the provision of critical industrial services principally to the energy and natural resources sectors.

The company's multi-disciplinary service offering includes access management (scaffolding, ropes access), insulation, specialist coatings, passive fire protection, asbestos management, asset integrity services and training.

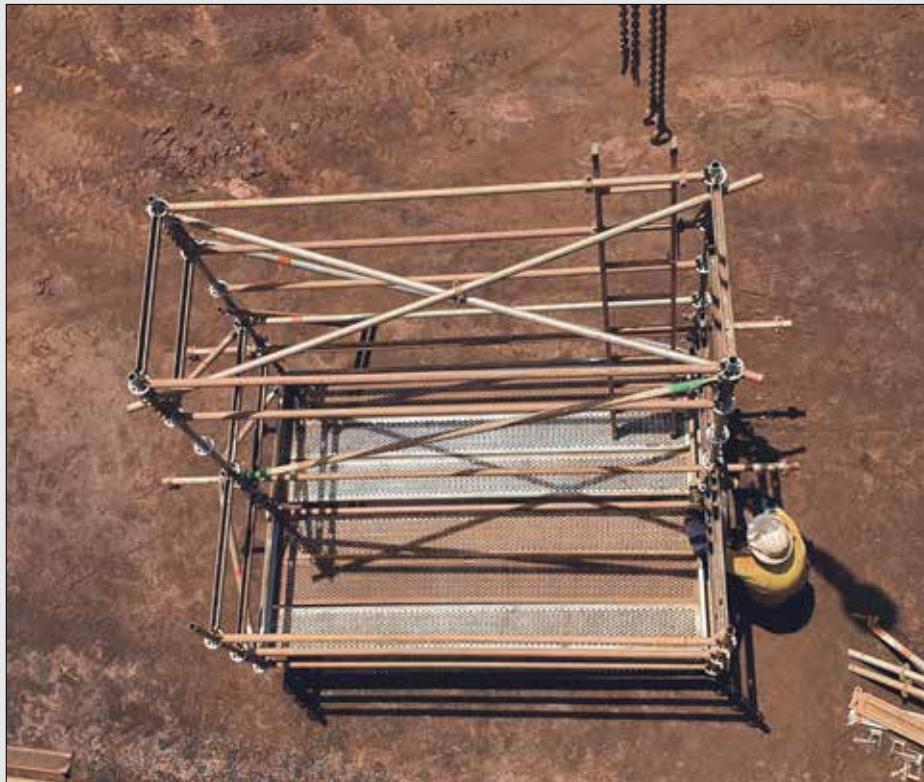
Being able to access elevated areas safely, on time and efficiently is one of Altrad Services' core business.

As a specialised scaffolding supplier with a global reach, the company uses its extensive knowledge to pick the right scaffolding system for its clients, providing cost-effective and efficient access solutions.

Altrad Services is committed to the Pilbara region where it currently employs more than 500 personnel in the North West across eight sites, supported by three permanent offices at Newman, Port Hedland and Karratha.

"Across 2019, we had 3024 jobs mobilised with a supply compliance of 97.42pc," the company stated.

To demonstrate ongoing commitment to the area, Altrad Services has recently executed a Joint Venture (AYJV) with Yurra Pty Ltd to combine its mature systems and processes with Yurra's Pilbara indigenous business and



The company uses its own access equipment, all manufactured to internationally recognised standards for safety and reliability.

experience in the Pilbara.

The company uses its own access equipment, all manufactured to internationally recognised standards for safety and reliability.

"We offer a holistic review of your access requirements rather than a typical commoditised approach through scaffold access," Altrad Services stated.

"The Altrad Services' Access-Decision Tree philosophy ensures that the most appropriate access method is chosen from the range of options we provide."

The team focuses on increasing alternative access, including rope access to access and execute discipline works and identifying scope to be removed from schedules to decrease tool time required

and number of personnel required to be engaged.

Altrad Services also uses Avontus — a web-based application that allows operators to generate 3D scaffolding designs in the field with smart devices that can assist in efficiency gains, and offers a full in-house design service.

Health, Safety and Environment is an integral part of everything Altrad Services do.

Its Australian operations recently achieved 20m man-hours LTI free over an 1800-day period, beginning January 2015.

"Altrad Services' TRIFR of 0.85 is proof of the success of our RESET Program and the culture of care within the Altrad Services Australian business," the company stated.

The company is also committed to being a socially and environmentally responsible corporate citizen.

"We are committed to improve social, economic, education and employment outcomes for 'local' indigenous people and diverse groups," the company stated.

"Through our Reconciliation Action Plan (RAP) 2019-22 Altrad Services is committed to fostering recognition for indigenous people."

In addition, Altrad Services is a Registered Training Organisation (RTO), specialising in the development and delivery of nationally recognised accredited and customised training programs.



SCAFFOLDING EXPERT IN NEW ENERGISED PARTNERSHIP IN PILBARA

Altrad Services has an established presence in Pilbara with 3 permanent offices at Newman, Port Hedland and Karratha.

As a trusted provider, we employ over 500 personnel in the North West Operations across 8 sites.

We have now embarked upon an exciting new Joint Venture with Yurra, creating a strong partnership solution to deliver all services under one entity.



Offering cost effective, safe and efficient solutions

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altradservices-apac.com

Australia's largest shotcrete contractor

NATIONAL

JETCRETE Oz is the underground and surface mining shotcrete contractor of choice for Australian miners.

With more than 35 years in the industry, the company works with a large number of mid-tier and major players across the country, including Rio Tinto, Goldfields Australia, Northern Star Resources, MMG, OZ Minerals, Newcrest, and Byrnecut Australia.

"We specialise in all aspects of concrete spraying and specialist ground support services and can provide remote site concrete supply, underground/surface shotcreting, underground/surface civil construction, shaft lining, cable bolting, and strata consolidation," Jetcrete stated.

"We're also a construction partner for heavy duty workshops, mine site offices, machine foundations and slabs, drainage and culverts, earthworks and high wall stabilisation, and have a ground support division, which delivers alternative ground support systems to



Jetcrete is the largest specialised shotcrete contractor in Australia.

underground projects, including strata consolidation via resin injection and cable bolting."

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 and recently, hydro-scaling.

New technologies such as these have increased development rates for miners through faster excavation cycles, improved early strength support,

and increased bonding between the fibrecrete and substrate surface.

In addition, the ISO accredited company has developed a state-of-the-art remote control lining applicator and can conduct pre and post shotcrete application camera surveys.

Its shaft lining technology can provide shaft lining solutions of up to 400m depths and up to 5.5m diameter shafts, including vent shafts, escape ways, ore passes and more.

The technology has eliminated the

need for personnel to enter the shaft during the entire process, saving time and reducing safety risks.

Its rig comprises multiple cameras and lights for viewing and recording the shaft, a hydraulic motor to drive the rotation of the nozzle, and an integral water dosing housing.

"The rig is fitted with Mines Department Approved enclosures and lighting so it can be utilised in coal mine applications," Jetcrete stated.

"Outside the shaft there is a control room that houses the water, hydraulic, electrical and monitoring controls.

"A dry mix concrete pump is located near the shaft where an agitator discharges its load. Jetcrete currently has two units in operation."

Once the module and umbilical have been assembled on the ground, the crane or winch can lower the module into the shaft to the section that needs to be sprayed.

To ensure exceptional results every time, Jetcrete has invested in training its staff to the highest standards.

"All of our shotcrete operators have a minimum of eight to 12 months intensive training, including concrete batching and delivery driving prior to their appointment as a sprayer," the company said.

"Jetcrete also regularly partakes in new technology research and the development of industry guidelines."

Jetcrete has operations across Australia.

More information can be found at: www.jetcrete.com.au.

AUSTRALIA'S TRUSTED SHOTCRETE PROVIDER

Jetcrete has been delivering Shotcreting Solutions to the Australian mining industry for more than 35 years.

Shotcrete Technologies Innovator
Leading Provider of Shotcrete Solutions
Remote Area Concrete Supplier
Mobile Plant and Equipment for Simple, Rapid Mobilisation
We're Committed to a first-class standard in Quality, Safety, and Efficiency

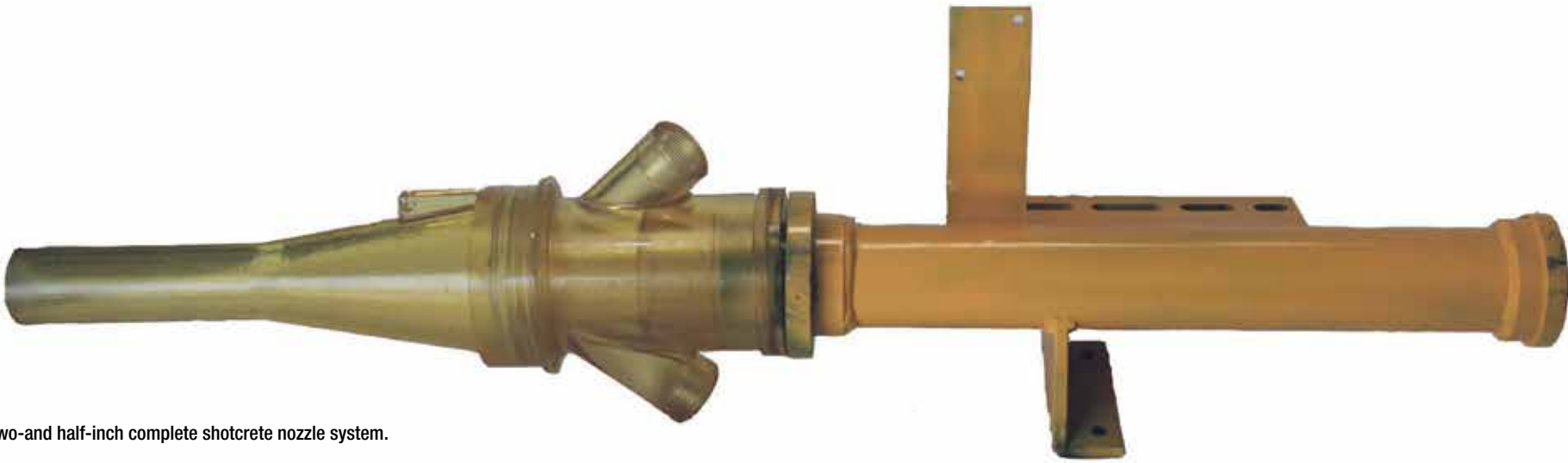
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EASTERN AUSTRALIA OPERATION
20 Enterprise Road
Mount Isa QLD 4825
Ph | 07 4744 7400



tendering@jetcrete.com.au
jetcrete.com.au



A two-and half-inch complete shotcrete nozzle system.

Safety, performance with GSC

NATIONAL

GROUND Support Contractors (GSC) is dedicated to designing and building the best shotcrete nozzles for the mining industry and is constantly looking for ways to improve the user experience of its products.

Its innovative polyurethane three-part shotcrete nozzle system smooths out problems that occur with most nozzles, providing ground crew with a time-efficient, cost-effective, safety-designed shotcrete nozzles system.

This long-established Australian company has been involved in shotcrete

for more than 50 years and consequently has a deep understanding and knowledge regarding user requirements.

GSC's polyurethane three-part shotcrete nozzle system is easy to install, thanks to a careful analysis of existing equipment, resulting in a design which fully incorporates safety, performance and quality.

Individually hand cast, the GSC three-part nozzle system available in two sizes – 2in (50mm) and 2 ½in (63mm) – consists of a nozzle, inner and outer body, which is clamped onto the GSC universal mounting pipe, which can take up to 3in inch delivery hose.

The GSC universal mounting pipe

simply bolts directly to both Normet and Jacon machines.

GSC's polyurethane three-part nozzle system comes with an exceptional wear factor of 2000m3 for the inner body, 5000m3 for the outer body and 150m3 for the nozzle, and also available in two sizes: 2in (50mm) and 2 ½in (63mm).

The use of hand cast clear polyurethane creates a very light weight system which reduces strain on boom movements and has the further advantage of allowing blockages to be viewed very easily.

The cleaning process is simple, with incredible easy disassembly involving the removal of only one clamp and a quick flush.

This novel approach has created a system that will drastically reduce costs, lower air demand and an exceptional performance per area.

Safety is a strong feature in the GSC nozzle system.

All sharp edges have been removed from the design: nozzles will securely blow off if a blockage occurs, then can be effortlessly retrieved thanks to a safety chain attached from the nozzle to the universal mounting pipe that keeps it within easy reach.

The three-part nozzle system is just one of a range of dedicated products offered by GSC for mining operations and will improve and simplify shotcrete operations across the industry.

SAFETY, PERFORMANCE AND QUALITY



Ground Support Contractors – GSC have been involved in Shotcrete since 1970. GSC is a proudly Australian owned and run family business. Specializing in the GSC hand cast Polyurethane three-part Nozzle system, which clamps onto the GSC Universal Mounting Pipe which simply bolt's to both Normet and Jacon machines.

Available in sizes 2" & 2 1/2"

GSC Mounting Pipe takes up to 3" delivery hose

- Lightweight clear polyurethane compound for ease of viewing blockages.
- Safe to use, if a blockage occurs and the nozzle tip is blown off (as designed) retrieve with the safety chain.
- Easy to clean, disassembled with the removal of one clamp. A light tap and flush with water/air and reuse.
- Cost effective, has less air demand and out performs all others with meterage per cost.

Polyurethane 3-Part Shotcrete Nozzle System



Unit 8 / 20 Mayfair Close, Morisset, NSW, 2264 | 0411 348 283
info@groundsupportcontractors.com.au | www.groundsupportcontractors.com.au



Leader in underground services

NATIONAL

REDPATH has been providing full service mining solutions and innovation around the world since 1962.

With a foundation built on global experience, adaptability and exceptional workmanship, Redpath leads the industry with cutting edge innovations in safety and mining practices.

Services including underground construction, shaft sinking, raiseboring, contract mining, mine development, engineering and technical services and a variety of specialty services to the Metalliferous and Coal mining industries.

Global experience has given Redpath expansive regulatory knowledge, regional expertise and cultural sensitivity.

Redpath utilises advanced shotcrete methods including laser scanning, simulator training, AGI sonar devices, and Lean management principles, while maintaining exceptional safety and production standards for clients.

In Australia alone, Redpath maintains and operates five batch plants, and currently applies more than 15,000m³ of shotcrete every month.

Redpath is highly capable of offering a range of shotcrete services, across all divisions including metalliferous, raisebore



Redpath uses advanced shotcrete methods in all its operations.

and coal operations.

The company is ISO 9001 accredited and a leader in innovation, with the experience and expertise to find the most cost effective and productivity driven packages for all our clients.

Redpath provides a modern fleet with a well-established team of specialised technical personnel to all its operations.

This approach has enabled it to provide a consistent and supportive role for their clients, accommodating all their underground requirements.

Its technical capability combined with the philosophy of 'consider it done — safely' ensures that each client receives the personnel and equipment necessary to provide a comprehensive and reliable service

across the life of the project.

Redpath has built a solid reputation for conquering tough challenges, and adapting to a variety of environments.

Redpath's employees are the heart of the company's success and it remains through them that the company continues to expand and flourish.



Providing **FULL SERVICE** mining solutions and innovation around the world **SINCE 1962.**

EXPERIENCE

AFRICA | ASIA | AUSTRALIA | EUROPE | NORTH AMERICA | SOUTH AMERICA

- Project Management
- Underground Roadway Development
- Raiseboring
- Installation of Services
- Conveyor Installation & Removal

- Innovative Equipment Supply
- Underground Construction
- VCD Supply & Installation
- Engineering & Technical Services
- Specialty Services

- Roadway Construction
- Secondary Support
- Conveyor Maintenance



Mining Contractors
and Engineers

Consider it done — safely.



redpathmining.com

EMS and JACON grow together

NATIONAL

LEADING labour and equipment solutions provider, EMS Group, has expanded its underground division through a recent acquisition of JACON Technologies.

With synergies between the companies and complementary product and service offerings, the acquisition has strengthened the ability of the group to deliver quality solutions to its client base and enhanced the groups capabilities in the industries it services.

The acquisition, announced in October, has also seen EMS Group grow its international footprint through various global projects, including a brand-new state-of-the-art factory in Saigon, Vietnam.

Recognised for decades as a leading designer, manufacturer and supplier of purpose-built construction and mining equipment, JACON has developed a respected and versatile fleet of equipment.

Among this fleet is its revolutionary Transmix Shotcrete Combo: the first two-in-one underground shotcrete-concrete mixer in the world.

The Transmix Shotcrete Combo concept was developed knowing there was a need in the market for a machine capable of transporting concrete to the heading, unfolding the boom and applying shotcrete.

This vehicle has enabled the ability to perform ‘one-man operations’ and reduce traffic underground, providing a safe and cost-effective solution to mining operations.



A JACON Transmix Shotcrete Combo in action.

EMS Group and JACON Equipment will be exhibiting at this year’s Underground Operators Conference in Perth from March 25-27.

JACON will have its Utimine Series JSV3 Cabolt Service Vehicle on display at the event.

The JSV3 is purpose-built to service

the Cabolter and has become increasingly popular due to its durability.

When not being used to support the Cabolt Truck, the large flat deck can be utilised as a multi-purpose transportation vehicle.

Senior managers will be attending the event to provide delegates with an insight into how EMS Group and JACON

Equipment now work together to provide a world class product, with world-class service to the mining industry.

The team will be at Stand 12 and looks forward to meeting industry peers.

More information on JACON Equipment can be found by contacting the team at admin@msgroup.com.au.

UNDERGROUND MINING

—

INFRASTRUCTURE

—

CONSTRUCTION

SHOTCRETE EQUIPMENT

CONCRETE TRANSPORTATION EQUIPMENT

CONCRETE PUMPING EQUIPMENT

UTILITY EQUIPMENT

EXPLOSIVES CHARGING EQUIPMENT

TRANSMIX SHOTCRETE COMBO

Come and see us at Underground Operators Conference in Perth, 25 – 27 March. We will be at stand 12.

EMSGROUP.COM.AU

JACON.COM.AU

Layflat hose for pumping efficiency

NATIONAL

MINE sites are always looking to improve productivity.

In the constant race to improve efficiency and reduce outgoing costs, the labour of handling 350mm diameter poly pipe in 6m lengths was proving very challenging for a large iron ore mine.

So the miner approached Crusader Hose, an Australian manufacturer of layflat hose, for a solution to the removal of iron bacteria.

Crusader Hose managing director Francois Steverlynck flew over to Perth to discuss the issues.

From his extensive experience in the pumping industry, Mr Steverlynck was aware of iron bacteria build-up in fibreglass bore pipe.

"Iron bacteria inside rigid pipe builds up like cholesterol, thus reducing flow rate and putting strain on the pump," he said.

"Iron bacteria build-up was building up to such an extent that in some cases flows were reduced to a trickle."

Once Mr Steverlynck saw a sample of the build-up, he understood the challenges facing the company and offered a solution using his high pressure layflat Waterlord hose.

"The Waterlord hoses dilate and pulse during pumping," he said.



Relocating pipelines around an iron ore mine presents very specific challenges that Crusader Hose were able to solve with the layflat Waterlord hose.

"This is why no solids can build up inside the hose, as is the case with poly pipe."

Apart from this pumping efficiency benefit, Crusader Hose was able to demonstrate the ease in which layflat hose can be transported and deployed.

"We filled a single truck with 4000m of 8in Waterlord in a 20 x 200m length configuration plus flanged couplings," Mr Steverlynck said.

"The equivalent volume of poly pipe in 6m flanged lengths would have filled eight truckloads"

The client was delighted with the results, as the pumping operators at the mine were able to deploy the Waterlord in a couple of days.

What's more, this was carried out with minimal labour.

LAYFLAT HOSE



WHY CHOOSE LAYFLAT?

- ✓ Deploy and retrieve quickly
- ✓ Compact storage and transport
- ✓ Less joining, welding, machinery and manpower needed
- ✓ Easier to handle
- ✓ High-pressure rating (25 bar)
- ✓ Reeling systems to suit

All our hoses are made with woven reinforcement using high-tenacity polyester. This woven reinforcement interlocks and achieves a very high burst pressure and tensile strength.

phone: (03) 9720 1100 | email: sales@crusaderhose.com.au

Crusader Hoses are a trusted supplier to major mining companies.





Bulk power

Scania's new R650-Series trucks were developed in Australia for bulk haulage mining applications and can move 200t nett payloads shift after shift.

NATIONAL

SCANIA'S new 650hp and 730hp prime movers add a new dimension to off-road bulk haulage.

The New Generation fleet is the product of more than 10m km of testing and development with an increased focus on customer profitability.

The R 650 is, in the words of general manager, Robert Taylor, "a pretty cool bit of kit".

Being able to haul a gross combination of up to 360t requires some heavy-duty hardware.

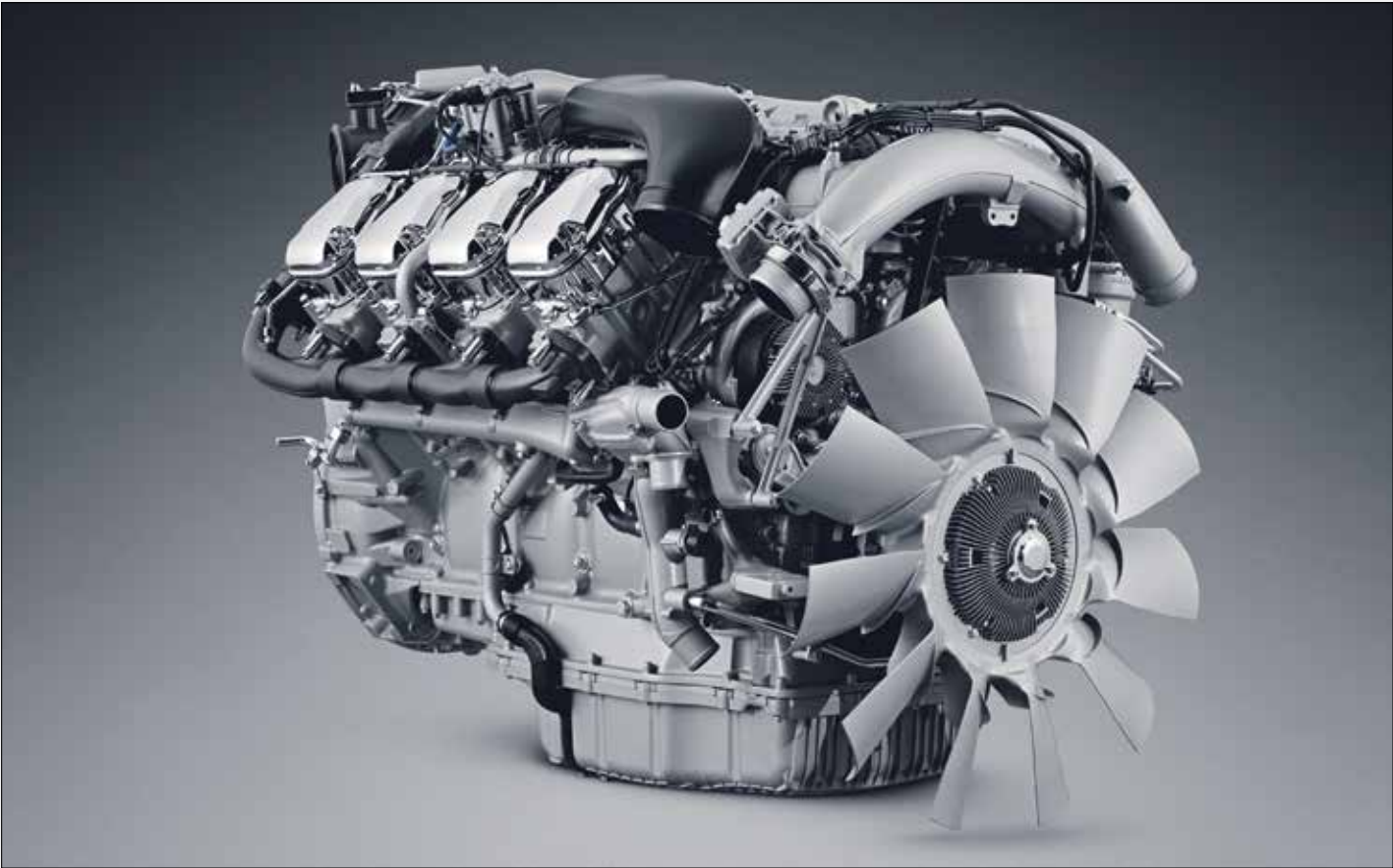
Scania began the R 650's development process by trialling the truck with different loads including gold, coal and iron ore, and assessing the capabilities of the truck at various tonnages, with different driveline combinations.

After a two-year trial, the optimal combination of gear ratios, axles, hubs and engine specs was selected for the base cab/chassis model.

Clean power

Those two years of real-world trials on mine sites situated in Australia's harshest locations has led to the development of a cab/chassis combination that ticks all the boxes when it comes to a built-for-purpose haul truck wish list.

First up is that incredible powerplant, the heartbeat and literal driving force that delivers such enormous pulling power.



The mighty DC16 Turbo V8 develops 3300Nm of torque with 650hp and 3500Nm with 730hp variants, while still meeting Euro 6 emissions requirements.

With 16l of turbocharged diesel displacement, the Scania DC16 V8 develops up to 3500Nm of stump-pulling torque and is available in 650hp (485kW) or 730hp (544kW) configurations.

So far, the 650hp variant is taking care of 200t nett loads on mine sites with aplomb.

Despite the fact that this superbly developed engine produces huge power, it is also fully Euro 6 compliant and actually uses 3pc less fuel as a result of this refined state of tune.

The Euro 6 standard is the most stringent ever imposed and reduces the acceptable limit for Oxides of Nitrogen (NOx) from .18g/km to only .08g/km.

"Scania has been using the Euro 6 standard in its retail fleet for some time in response to

customer needs," Mr Taylor said.

"The lower emissions are important for customers when bidding for tenders, as environmental considerations are always relevant.

"Many companies, including Coles and Woolworths, specify these requirements for all their contractors."



A unique safety feature in all Scania's trucks is their side curtain rollover airbags.

Heavy duty driveline

To cope with the increased engine power and the resultant load pulling power, Scania utilised its new GRS0935R gearbox design, which is 40pc stronger than the gearbox used in previous models.

The gearbox features an optional overdrive to maximise the huge torque on hand and therefore further enhance fuel economy.

Larger hubs have also been introduced, with higher load-rated axles and a 6.43:1 final drive ratio.

Once again, the aim was to provide a complete driveline capable of withstanding constant driving under enormous load and in extremely hot and dusty conditions.

Australian mining truly is the acid test for hard working transport equipment.

These new RBP900 drive hubs give each rear axle a load rating of 21,000kg for a total rear bogie weight of 42,000kg.

Up front, the axle has a 12,000kg load rating.

Designed primarily as an off-road vehicle, the R 650 and 730 vehicles have already been put to work in mining operations around the country, including hauling bauxite 140km north of Weipa, in Qld — a location which is only accessible by boat, plane or helicopter, which makes reliability a highly critical factor.

Despite 200t payloads, the prime mover operates comfortably at up to 80kmh on the haul road, though speed restrictions see it sitting at 60kmh during normal service.

Pre-sales and after-sales client service

The R 650-Series trucks are highly developed prime movers, designed specifically for mine haulage but there are many options and variables that can be incorporated to deliver a truck that is absolutely tailor-made for a particular client and working environment.

It begins with a visit to site by qualified Scania technical personnel, who assess the job at an holistic level.

Factors such as road gradients, corner radii, road surface conditions and load requirements are all part of the data collected before a document is signed or a spanner turned.

From there, Scania's engineers will fine tune

the R 650 cab/chassis to produce a truck that suits that client's exact requirements to provide years of reliable service: a built-for-purpose solution.

Scania Mining and Resources Division has recently established new vehicle preparation shops in Perth and Brisbane and has offices in every state capital in Australia, except Tasmania.

Local suppliers will work with Scania to modify the truck to the customer's specifications.

Each client receives individual attention at each step of the process, with their own assigned agent liaising with them and keeping them abreast of progress on a weekly basis.

The client is kept constantly in the loop, providing them with peace of mind that the build process is being conducted in a timely manner.

Thanks to the wonders of modern telemetry and data transmission, every truck Scania build can be monitored at any time,

anywhere in the country.

This allows Scania's technical staff to work in conjunction with the truck's operators to spot any issues and correct them in the least amount of time possible.

Preventative maintenance

Scheduled servicing is one facet of the after-sales service, highlighting the need for oil, brake, hydraulic and other system maintenance that is required for a particular vehicle under its particular operating conditions.

Scania takes this a step further by also incorporating a preventative maintenance schedule into its ongoing relationship with each client.

This allows the truck's operator to schedule downtime for the replacement of known wear parts prior to failure.

Consequently, parts and labour can be on hand before the truck is pulled from service

and other trucks can be re-scheduled to cover the shifts of the truck being maintained.

Ultimately, this leads to the best possible uptime for the truck and greater profitability for the truck owner or mine operator.

Driver training is another feature of Scania's after-sales service.

This often overlooked aspect of bulk haulage is a very worthwhile investment as properly trained drivers are able to maximise the performance of the vehicle without placing undue loads on the engine, driveline or brakes.

Again, this translates directly into lower operating costs and greater productivity over the life of the truck.

"We also have an after-sales representative that works with me and will touch base with the clients on a regular basis," Mr Taylor said.

"It doesn't matter where you are, if you need us, we will come to site and assist.

"Keeping the customers on the road and making sure the truck is performing at its optimal level will always be the prime objective."

Driver safety

Scania developed the new R 650-Series of trucks with drivers at the core of the design.

Innovative features include an ergonomically designed cab that ensures driver comfort.

The seat position ensures that the driver can sit straight at all times, putting less strain on musculature.

This is known as the optimal driver position.

The interior also introduced a larger display screen with better graphics and easy to access controls to allow full attention on the road and high visibility.

The steering wheel incorporates push button controls and touch screen media.

There are also advanced safety features including a steering wheel-mounted airbag and a first in truck manufacture - side window curtain air bags.

Keeping the driver comfortable helps productivity, reduces down time for haulage and helps meet health and safety requirements.

SCANIA R 650-SERIES MINESPEC CAB/CHASSIS SPECIFICATIONS:

CAB/CHASSIS	
Chassis	R650A6x4HZ
GVW	54,000kg
GTW	250,000kg
Drive Axles	21,000kg load rating (each)
Front Axle	12,000kg load rating
Chassis Width	2550mm
Axle Distance	4350mm
ENGINE	
Power	650hp (or 730hp)
Torque	3300Nm (or 3500Nm)
Displacement	16-litre
Configuration	V8
Emissions Level	Euro 6
DRIVELINE	
Gearbox	GRS0935R (40pc stronger than standard)
Drive Hubs	RBP900 (Heavy Duty)
Final Drive Ratio	6.43:1
Tyres – Front Axle	385/65 R22.5
Tyres – Rear Axles	315/80 R22.5



A POWERFUL PARTNER

While some have the need for the flexibility to carry anything, others demand a vehicle specified for a certain load and environment. That is why we tailor solutions specifically for your needs, combining the strength of technical specifications with the smartness of optimised services. You should be the one setting industry standards, never settling for them.

Visit www.scania.com.au or contact Scania Mining on (08) 9360 8536 to find out more about the new XT range from Scania.

SCANIA



Keeping transport covered

Performance and durability are the hallmark of Esperance Trim and Canvas.

NATIONAL

THE beautiful beachside location of Esperance is home to more than just strangely coloured lakes.

Esperance Trim and Canvas established itself in 1996 and has been providing customised tarp design and manufacturing for its satisfied customers ever since.

Over 24 years it has built a reputation for performance and durability that is the hallmark of their business.

Esperance Trim and Canvas owner director Thomas Blakely said the company's vision was to grow and develop a successful business that is committed to the highest standards of quality and dedicated customer service.

It has close working relationships with its clients who can rely on the company to meet their needs and exceed their expectations.

The fact that its client list is continually expanding is an indication of its commitment to service.

Mr Blakely leads his team in putting customer satisfaction first.

The first step in the manufacturing process is consultation with the customer to understand their needs and it is the most important step in the process.

Throughout the consultation process, Esperance Trim and Canvas uncovers the purpose, the vehicle/equipment, industry/environment, and the type of load.

With that information in hand, it can then determine the type of material and design that best meets the customer's need.



Many colours are available in the 900gsm PVC.

By understanding the type of load, it can then establish the best material to use for the purpose.

Tarp types include roll tarps that roll across the top of the tipper and are operated from the ground, eliminating the need for drivers to climb onto the rig.

There are many different types of tarp, ranging from a roll tarp, side curtain, hoop tarp

to name a few.

The type of goods being transported also requires the correct selection of tarp fabric to ensure the product is contained during transit.

For example, dust retardation material is important for fine materials like cement and lime, while waterproofing material is required

for fertiliser and grains haulage and other loads that need to stay dry.

The company also manufactures hot asphalt spec tarps which retain the heat of asphalt loads without incurring damage.

Once measurements and specifications are taken, all the customer needs to do next is choose their favourite colour.

Esperance Trim and Canvas carries a wide range of material and colours to suit the customer's preference.

The company's trained and experienced team then begin the process of manufacturing the customised tarp.

The tarps are manufactured using heavy duty and high quality European made 900gsm PVCs that ensures strength and durability.

The PVC material is also chemically resistant to acids, salts, bases, fats, and alcohols, which makes it eminently suitable for most loads.

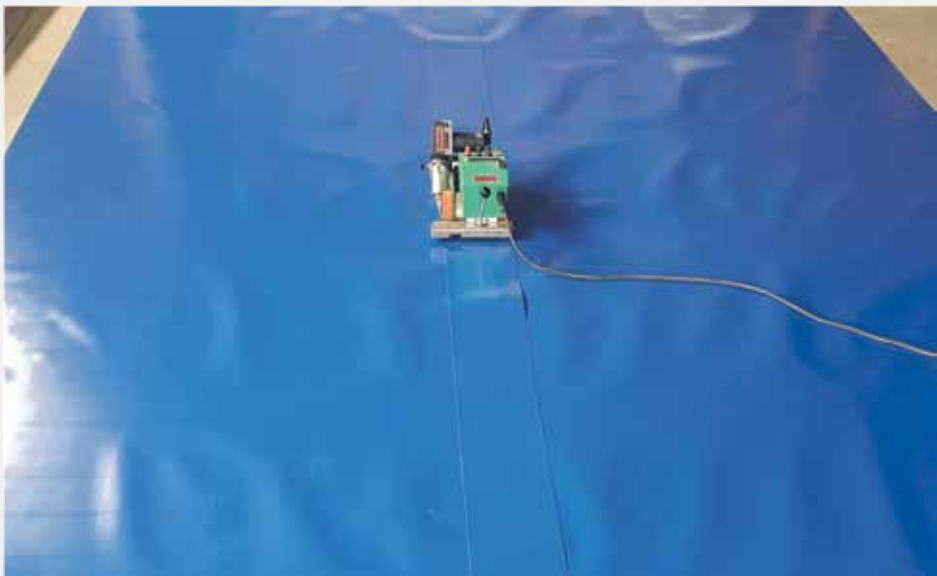
The material is then measured out in pieces and cut with advanced precision cutting tools and are welded together.

Some of the tools and technology used during the manufacturing process are fabric welders to weld overlapped material joins.

Grip rollers provide the correct pressure and the welder is motor driven along the edge of the material for precision.

Once the tarp has been joined and is of the correct size and shape, accessories are then added.

These include galvanised tarp handles that will prevent rust and corrosion and other hardware that varies depending on the tarp system.



Fabric welders seal the tarp joins.

Esperance Trim and Canvas also manufactures blast hole liners to line the drilled holes that are used for explosives in open pit mines.

The liner keeps moisture both out and in, protecting the explosive material in the period between drilling and blasting.

Esperance Trim and Canvas always strives for a quick turnaround from ordering to completion to enable the customer to continue their business with minimum interruption.

Once the tarp is ready for installation, the customer has several options for having the cover fitted to their truck.

Esperance Trim and Canvas can fit the tarp on site, which is accessible to all vehicles including road trains.

The truck/vehicle can be driven directly into the

installation bay and the tarp can be fitted there and then, ready to take its first load.

Alternatively, the company can make freight arrangements to transport the products to the customer.

The business provides custom made tarps for all transit as well as tarps for mining projects and for a range of commercial and private uses.

Esperance Trim and Canvas offers more than just manufacturing with a full repair and maintenance service for roll tarps, side curtains, canvas tarps and other tarp systems.

Though it specialises in tarps, Esperance Trim and Canvas also produces other canvas and PVC products for both commercial and private use.

Its product range include mining spec liners and covers for mining, oil and transport industries.



Blast hole liners protect explosive material in mine drill holes.

Esperance Trim and Canvas services and products include:

- High quality UV resistant shade sails and shade structures
- Outdoor blinds
- Motor and marine trimming
- Commercial upholstery
- Camping equipment
- Canvas bags
- Ute canopies
- Motorbike seat covers
- Engine and equipment covers
- Bund liners
- Waterproof PVC tank covers and liners for pit and trenches

All tarps and canvas products are manufactured on site, at the large, modern workshop, conveniently located near many transport hubs including the Esperance port.

All the company's items are made directly to customer specifications across the Esperance region.

Its customer base also includes the Esperance Goldfields region including Ravensthorpe, Norseman, and Kalgoorlie.

Esperance Trim and Canvas also has an extensive client list of varying industries which include transport companies, trailer and tipper manufacturers, subcontractors, truck owners, fleet owners and logistic companies.

Esperance Trim and Canvas has no restriction on order size and has the capacity to fill large and small volume requests.

MORE INFORMATION: Esperance Trim and Canvas | 08 9071 7733 | info@esprimcanvas.com.au | www.esprimcanvas.com.au



Esperance Trim and Canvas

Mobile: 0429 935 199 | Office: 08 9071 7733

www.esprimcanvas.com.au

85A Norseman Road, Esperance WA 6450

info@esprimcanvas.com.au

A solution to all your coverage, protection and safety needs

Esperance Trim and Canvas is all about manufacturing and fabricating products using industrial textiles to provide coverage, protection and safety to our customers. We use premium textiles and materials combined with cutting edge fabric welding technology to produce high quality product that will meet and exceed our clients' needs and expectations.

Range of Products are:

- Tarpaulins
- Mudguards
- Blast hole liners
- Tool Bags
- Motor trimming seat repairs
- Underground inflatable systems
- General equipment covers

MRD 2257





A loaded road train carrying truck and excavator.

The ultimate tyre pressure management system

NATIONAL

THE correct air pressure for truck tyres depends upon the load that the tyre is supporting, and the road surface it must travel on.

According to AIR CTI chief executive officer Chet Cline, heavy loads need high tyre pressure and light loads need much less.

Gravel and dirt roads need 60pc of the correct highway pressure.

If these pressures are incorrect, tyre life drops, uneven tyre wear becomes normal, punctures and staking increase, suspension damage increases substantially, and drive train life reduces.

Maintaining the correct level of air pressure in tyres of heavy-duty trucks is a vital safety measure and AIR CTI's Central Tyre Inflation system is specifically designed to do this, saving operators time and money.

The easy-to-use AIR CTI air pressure management system enables truck operators to automatically vary air pressure in their vehicles' tyres to match changing road surfaces and driving conditions and different truck trailer loads.

Just push the button on the different dashboard controller to set and maintain truck and trailer tyre pressures.

It's that easy – high pressure for loaded trucks on the highway, mid-pressure for unloaded trucks on the highway, or loaded trucks on gravel and low pressure for unloaded trucks on unmade roads or on sand, gravel and dirt.

Reduced pressures double traction in off-road conditions.

All reputable tyre manufactures explain it is important that truck tyre pressure is varied for different driving and road conditions, and for different loads of a road train's chassis and trailer.

"With radial [tyres] it's important to match the tyre pressure to the load on the tyre," Mr Cline said.



A truck fitted with AIR CTI tyre system.

He said the trucking industry seems to have totally ignored tyre manufacturer recommendations, to their detriment.

Tyres are an expensive overhead for truck operators and incorrectly inflated tyres will lead to higher tyre replacement costs, increased wear and tear to trucks, and lost operating time from blowouts, punctures and roadside tyre changeovers.

Optimising tyre pressures on a truck will extend the lifespan of tyres by at least 30pc, Mr Cline said.

Fuel savings can occur for operators when trucks are driven with correctly inflated tyres, not to mention providing greater driver comfort and reducing fatigue, and increased reliability and improved operating schedules.

A smoother drive makes for a comfortable ride leaving truck drivers more alert to exercise

control over their vehicle and less stressed on arrival at their destination.

Tyre pressure is also an important factor in terms safety, and incorrectly inflated tyres will have hazardous consequences for operators and drivers.

Stopping distances

Tyre pressures are critical in truck stopping distances and tyre slippage angles – the degree of movement a truck makes when it does an emergency evasion movement – is therefore a key consideration for operators.

AIR CTI has carried out extensive tests to verify tyre manufacturer and tyre association recommended pressures, based upon the load per tyre, to verify the optimum level of pressure for different road conditions, truck

loads, and driving scenarios.

Test results have showed tyre slippage resulting from overinflated tyres was significantly higher for fully loaded trucks than for unloaded trucks.

"Even at a slight over-inflation like 120psi, tyre slip angles increased by 15pc. In other words, at a set load the slip angle increased by 15pc," Mr Cline said.

Stopping distance also increased 15pc with traditional pressures, compared to optimum pressures.

The AIR CTI system puts the driver in full control of his truck, enabling him to correctly predict stopping distances and to steer efficiently whatever the road conditions.

Australian road traffic authorities have identified tyre pressure as a critical factor in wear and tear to roadways.

"Over-inflated tyres hammer our highways," Mr Cline said.

"A report said road damage is directly proportional to tyre pressure.

"Trucks running on the right tyre pressure would reduce road damage considerably."

Innovation

Mr Cline, a trained boilermaker, mechanic and diesel fitter, started to develop his AIR CTI system around 20 years ago.

In addition to his hands-on work experience of different tyre systems, his practical interest in tyre pressure owed much to his hobbies of riding motorcycles and driving 4WD vehicles, which require different tyre pressures for varied types of terrain.

Trucks and vehicles driving over rough ground or steep gradients need to drop the air pressure in their tyres to improve their grip over the road surface, Mr Cline said.



A road train tanker fitted with an AIR CTI system.

“If you drop the pressure down it gives you a much bigger footprint, and tyres can flex to grip better on the road. Tyre pressure is obviously very important,” he said.

Mr Cline became aware of different tyre pressure systems being imported into Australia, and he began to carry out his own extensive research into tyre pressure systems for trucks, something he is still doing this today.

His first prototype tyre pressure management system was tested on a his truck, and feedback from this trial was important in refining and fine-tuning the system.

“What clinched it for me was I went out for a ride in a customer’s truck and he told me I hadn’t fitted the system very well. He suggested what I should do to make it better,” he said.

“He was impressed with my refit!”

Continuous improvement is part of the AIR CTI company ethos, and Mr Cline has been

working on his tyre pressure system right from the early days.

He has travelled across Australia to speak to truck drivers about their practical experience of operating trucks in different road conditions from a point of view of finding out what they require in a tyre pressure management system.

He was inspired to further develop the safety features of his AIR CTI system after seeing some innovations in electronic products used in the aviation sector.

For example, a series of valves like a diode in the AIR CTI system stops air from flowing from high pressure areas to low pressure zones in a tyre system.

“It took me three years to get the product right, and we have improved it a lot since then, including an improvement in the last couple of weeks to unify all of our valving into one unit, the biggest safety improvement in decades,” he said.

Australian-made

The AIR CTI system is designed and made in Australia, and incorporates tailor-made electronic products, including a self-diagnosis system to run checks for potential faults.

“Everything we put into it is sourced locally, and is built by local people,” Mr Cline said.

The Gippsland-based company has an extensive network of dealerships that stock and distribute its AIR CTI system and other products to customers Australia-wide.

One recent safety innovation automatically locks up the tyre pressure on a trailer’s remaining set of tyres in the event of damage in one or more tyres.

The AIR CTI system closely monitors truck tyre pressures from the driver’s dashboard, and the safety feature is triggered if the pressure falls below the set level.

“Our isolator system will isolate every set of tyres on a road train. If one set of tyres is lost for some reason, all the others will lock up and keep whatever pressure they had,” he said.

The AIR CTI system has trademarked ‘Snizentite’ drop pipes which were developed specifically for the Australian market with its hard-wearing, super tough external drop pipe system that goes around the centre of each truck wheel.

The system fits closely to each wheel of a truck and has individual air pipes to deliver air to several tyres simultaneously.

A quick-release fitting stops air flow to individual tyres when a tyre change is carried out.

The AIR CTI system comes with a standard warranty on all components for 500,000km which even covers fair wear and tear.

A money back guarantee is standard practice. Customer satisfaction is vital to this business.

MORE INFORMATION: AIR CTI | 03 5127 6128 | chet@aircti.com | www.aircti.com

THE ULTIMATE TYRE PRESSURE MANAGEMENT SYSTEM



With the push of a button, Air CTI:

- Increases truck life
- Lengthens driver life
- Adds 30-80% more tyre wear
- Doubles the life of diffs and suspensions
- Automatically maintains tyre pressure
- Adds a longer track life, with reductions in track maintenance of 50-90%.

AIR CTI is not just an ‘automatic tyre pressure’ system. It allows the driver to adjust the tyre pressures whilst driving, simply by pushing a button on the dash, to suit the load and the road.

Safer, Smarter, Greener, Better.

AIR CTI
THE ULTIMATE TYRE PRESSURE
MANAGEMENT SYSTEM

Contact Andrew
Mobile: 0437 517 423
Phone: (03) 5127 6128
120 Walhalla Rd, Moe, Victoria





Retractable Tarps have you covered

The wind-up hood tarp.

NATIONAL

BRISBANE-BASED Retractable Tarps is the largest manufacturer and supplier of truck tarping in Australia.

Experts in load coverage for the mining and transport industry, the company is a leader in the electric tarp system space, working in partnership with Roll Rite International to create products tailored to Australian tippers and trailers.

This established family-owned company has been in operation since 1990 and has developed a diverse range of systems to secure loads in all conditions, as well as utilising a variety of tarp materials that enable it to match the right tarp for the right load.

Its catalogue includes a range of materials for dust suppression, water proofing and hot temperature asphalt applications.

The covers combine with its most popular wind-up hood tarp system and its electric and hydraulic rollover arm systems for mining applications, particularly side tipping trailers.

Mechanical engineer Sam Jones outlines the advantages Retractable Tarps provides to its customers.

"As design, development and manufacturing of our products is undertaken at our Brisbane premises, we have complete control over quality, fit and finish of our tarp systems for the Australian market," he said.

Roll-Rite

The Roll-Rite range of motors is used throughout all of the company's electric tarp systems.



Retractable Tarps' long block waterproof system.

"We've been the Australian distributor of Roll Rite gearmotors and drive systems for more than 15 years," Mr Jones said.

"This partnership has helped develop new designs which have been created to better cater for Australia's harshest conditions."

The acclaimed Roll Rite hollow shaft and tarp stretcher gearmotors are used in all of Retractable Tarp's rollover arm and hood tarp systems.

The hollow shaft gearmotor is designed specifically to power dual cable driven tarping systems and is applied exclusively in the company's electric tarping kits.

The Roll-Rite design has proven ideal for converting a manual wind-out system to electric.

It is housed in a virtually corrosion proof casing providing extra protection for the motor and gear train.

Designed specifically to power side to side tarping applications is the tarp stretcher gearmotor.

This high torque gearbox efficiently powers side to side roll over tarping systems.

Both gearmotors are run by a 12V/24V DC motor controller that is resin filled making it waterproof and shockproof with a reliable solid-state relay.

Electric tarp systems

Retractable Tarps is at the forefront of electric tarping systems.

The electric hood tarp system has had a massive impact on increased productivity by eliminating the need to get out of the cab to manually cover a load.

The entire operation can be done by a remote or in cab switch, allowing more loads to be delivered.

An added bonus is the provision of a dust free environment that is safer and healthier for the driver.

Retractable Tarps can upgrade all existing manual wind systems to electric.

Mr Jones said that its most popular product is the wind-out hood tarp range which is custom made to suit all styles of truck, trailer, plus end and side tippers and is ideal for electric operation.

"Other popular products are our electric and hydraulic roll over arm systems used primarily in mining applications on side tipping trailers," Mr Jones said.

The company has successfully adapted tarping systems to the side tipper application, with both a manual wind-out hood tarp, or as a completely automated dual-arm roll over system available.

This system can be adapted in many ways to the trailer depending on the design and can incorporate assisted arms in a variety of configurations including the hydraulic roll over tarp with dual assisted aluminium arms.

The dual arm rollover tarp system is the most effective for the side tipper as it provides a higher lift for loads higher than water level and will assist to hold the tarp square.

The dual arms also apply even spring tension to hold the roll tube and tarp hard against the passenger side when side tipping. Retractable's new arm design improves serviceability and reduces down time.

Made to measure

All tarp kits from the Brisbane-based company are made to suit the trailer load, according to the requirements, whether the load is quarry based (crusher dust, rock, gravel etc), requires a water-proof cover or needs material to suit high temperature loads.

"Comprehensive measurements are provided by a customer upon ordering. Kits are then accurately assembled to varying stages of completion depending on the style of system," Mr Jones said.

"Products are designed for trailers typically used in harshest conditions, and users can expect many years of operation out of our products when maintained and operated correctly."

Dust suppression

For quarry spec loads, Retractable Tarps carry a very fine mesh tarp constructed from mono-filament mesh with a dense weave that fully contains fine dust that could blow off the load during transit.

Direct sun exposure has a limited effect on the quarry spec mesh which is extremely stable in UV lighting.

The quarry mesh tarp features double reinforcement on all bow pockets and uses stainless hardware to anchor the tarp to the support bows.



The side tipper application.

High strength seatbelt material is used for the edging on all tarps and the seams are joined with UV rated, high strength stitching for extra longevity and to last the lifetime of the tarp itself.

Waterproof systems

The PVC waterproof tarp combined with the hood tarp system is recommended for grain and fertiliser loads.

Waterproofing is available in three levels of coverage ranging from 60pc to 100pc water resistance.

A full 100pc waterproof kit overhangs the tarp up to 150 mm over the combing rail.

This works in combination with an additional roll up rear sealing flap and stainless body locking tabs to keep the tarp tight over the body, minimising water penetration.

High temperature asphalt application

Storage and handling asphalt while maintaining it at temperature is one of the biggest issues facing the asphalt industry.

Retractable Tarps offer asphalt specific hood covers that can also be customised to offer extra coverage.

Performance is strengthened by double reinforced pockets, stainless steel eyelets seat-belt material reinforcing and the use of heavy-duty FR material.

Cost-effective systems

Retractable offers cost-effective pull-out, pivot arm and single cable hood tarp kits for the budget-minded.

The pull-out tarp unit is a compact and lightweight tarping system that retracts the cover into a protective aluminium housing via a spring-loaded centre spool.

This is a simple, low-cost system best suited to smaller trucks with drop sides.

The Pivot arm system has the advantage of

high lift, front to back arms for clearing bulky loads and is well suited for asphalt and hotmix cartage.

It operates via a pivoting frame attached to a retractable tarp encased in sturdy aluminium housing and incorporates spiral torsion springs within its design.

This ensures that the pivoting arms have the required amount of tension.

Retractable Tarps is the only manufacturer in Australia to incorporate these springs.

Compact and efficient electric drive options complement the pivot arm system, working with the high tension of the spring when it is fully wound.

The electric version offers a powerful 12- or 24-volt Roll Rite Tarp Master, that direct drives the tarp spool

Rollover tarp system

This is a heavy duty system that operates by spooling the tarp on and off a roll tube down the length of the body (passenger to drivers' side) and is available in manual and automatic, single and dual arm kits.

The aluminium arms are all powered via electric tarp stretcher or hydraulic drive and are supported by a second rear arm for side tipper applications.

Operating out of Brisbane, Retractable Tarps sells its products across the nation as well as in NZ.

It has established distributors in many main centres and has on-sellers across the country.

MORE INFORMATION: Retractable Tarps | 07 3889 9611 | sales@retractabletarps.com.au | www.retractabletarps.com.au



A NEW GENERATION

Retractable Tarps is proud to present the next generation of roll over coverage for side and end tipping trailers. Co-developed with Roll Rite International, the team at Retractable Tarps have built on the industry standard roll over system of the last 20 years. Updating the design and optimising it for the harsh Australian conditions! New generation arms have the following features:

- Revised centre knuckle and arm geometry greatly improves rigidity and durability under even the most extreme loads!

- Powered by the new Roll Rite Black Edition Gearbox line! With improved drivetrain efficiency and reliability.
- New Torque proof adaptors ensure that your tarp stays drum tight and secure!
- Flexible control options ranging from hardwired switches through to standalone power and wireless remote operation.
- Hydraulic drive options available!
- New arm design improves serviceability and reduces down time for the trailer!

Now available nationally through our network of body builders and resellers! Or direct from Retractable Tarps Pty Ltd.

📍 28-30 Terrence Rd, Brendale QLD 4500 PO Box 5623, Brendale QLD 4500
☎ (07) 3889 9611 | 📠 (07) 3889 9622 | ✉ sales@retractabletarps.com.au

retractabletarps.com.au

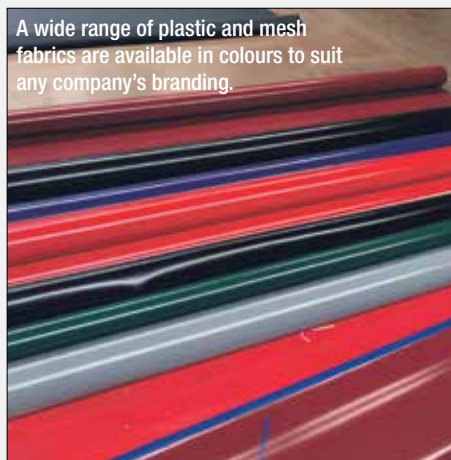


Undercover operations

Auto Tarp Systems designs and fabricates custom automated tarp solutions for any tipper truck or trailer application.



George Stellino founded George's Canvas over 45 years ago.



A wide range of plastic and mesh fabrics are available in colours to suit any company's branding.



All fabric tarps are double-stitched for long life.

NATIONAL

COVERING bulk loads in mining applications is an economic, regulatory and environmental must.

Gone are the days of dust clouds billowing behind road trains, wasting ore and polluting the site with choking particles.

These days, the humble tarpaulin has evolved into a sophisticated, mechanically driven and electronically controlled device that is a money saving asset to truck operators and mining companies alike – improving OH&S standards and providing EPA compliance to boot.

Even amongst the new generation of automated tarps, there are innovations and idiosyncrasies which set some apart from the rest and one such system is the Slide-a-Panel system from Auto Tarp Systems in NSW.

Modular design

Slide-a-Panel is unique because its design is truly modular, allowing repairs and maintenance to be carried out in a fraction of the time at a fraction of the cost.

The fundamental principle is that each section of tarpaulin, spanning a pair of curved bows, can be unzipped and replaced individually if required.

In the event of a tear, that single panel can simply be unzipped and a new piece zipped in its place, which reduces the truck or trailer's downtime to minutes, not hours, and also eliminates the need (and cost) to replace the entire tarp or apply unsightly patch repairs.

It is not just the panels that are modular. Auto Tarp's unique block pad system allows each bow to slide up and down the side rails with reduced friction, prolonging the life of the entire tarp drive

mechanism.

However, dirt, dust and moisture combine to create a highly abrasive paste and over time, these block pads do wear and need to be replaced.

Typically, this involved unfastening the main draw cable on each side and painstakingly withdrawing it through each block to affect a replacement.

With the Slide-a-Panel system, though, each modular block is made in two pieces, allowing any block to be unbolted, removed and the wear surface replaced without undoing or removing any cables.

Once again, truck or trailer downtime is reduced by up to 90pc in some cases with this ingenious design feature.

Proprietary control and drive systems

The Slide-a-Panel system is electronically controlled by Auto Tarp's proprietary system, which was designed and assembled in-house to meet their specific needs.

Push-button operation is guaranteed to be smooth and hassle-free thanks to a variety of electric drive systems that are bullet-proof and reliable to withstand the rigours of harsh remote environments.

Some applications demand a hydraulic drive system in preference to electric operation and Auto Tarp can easily incorporate hydraulic power into their systems if required.

Perfect fit

Because Auto Tarp has the capability to design and build an automated tarp system for any application, the company is able to work with clients to develop



Plastic materials are welded in-house for perfect fit and finish.



Auto Tarps' unique two-piece wear blocks can be replaced individually in minutes, without the need to disassemble the entire cable and slide system.

custom solutions for any application.

Once a design is approved, its fully equipped workshop has the ability to create everything from the tarpaulin to the side rails, bows, cables, automated controls and drive mechanism and ship the complete set-up to anywhere in the country.

While clients in NSW have the option of calling in to have their Auto Tarp installed, others around the country will find that their tarp kit comes with everything they need for a fast and solid installation.

The side rail mounting brackets, for example, are supplied as bolt-on items for aluminium trays and weld-on pieces for tough Bisalloy or Hardox steel trays.

These brackets come drilled and threaded to accept all mounting hardware.

Other applications

The use of quick deploy and retract tarpaulin covers is being adopted in more and more applications across modern mine sites.

Their low infrastructure cost, portability and flexibility make them perfect for concrete bunker covers, construction covers, industrial bins, retractable roofing systems and even large-span covers for outdoor work areas: essentially, any area that needs to be accessible but also quickly covered if necessary.

Automated industrial coverings are a rapidly growing segment in the market and Auto Tarp has embraced this growth by working with clients to develop custom solutions to meet their needs – whatever the application.



Tarp bows are made in-house and can be shaped to fit and span or contour.



A completed mesh tarp awaits fitment.



Auto Tarp's huge workshop can accommodate trucks and trailers simultaneously. Here a new automated tarp is about to be installed.



The initial concept is developed in CAD and then sent to the company's fully-equipped workshop for the fabrication of everything from the tarp material to the frames, slides, mechanical drive system, automated control units and mounting system.

The finished product is then transported to the client anywhere in Australia, for self-installation, which is an excellent option for remote operations such as mine sites.

Another growth area is for load restraint applications for small trucks and utes.

Auto Tarp has the ability to manufacture custom retractable covers, with side wings, for these applications that provide a means to quickly cover a load and then retract without restricting load space.

Naturally, with more than 45 years in the canvas industry, the company also offers general tarpaulins,

canvas products, custom products and a range of specialised, heavy-duty canvas tool bags that will be the envy of everyone on site.

Onwards

From its origins in 1975, with the establishment of George's Canvas, the Auto Tarp brand has emerged as a market leader in sophisticated automated covering systems – entirely designed and manufactured here in Australia and incorporating 45 years of experience in the custom tarpaulin industry.

Guided by Mark Stellino, the son of founder George, the Auto Tarp range continues to move forward by applying new technology and sound experience to an ever-increasing range of applications for automated covering systems.



Rugged and reliable motor drive systems utilize quality gears and electric motors for years of trouble-free operation. Hydraulic systems can also be used if required.

MORE INFORMATION: Auto Tarp Systems | 02 4648 2444 | mark@autotarp.com.au | www.autotarp.com.au



WE HAVE YOU
COVERED

AUTOMATED RETRACTABLE TARPING SYSTEMS:

- Trucks, Trailers, Utes, train carriages, bunkers etc.
- Modular Slide-a-Panel design
- Dust suppression to 100% waterproof designs.
- Spring loaded pull out tarps inc custom designs
- Large span designs to suit work areas.
- Custom designs to suit any application

GENERAL PRODUCTS:

- Truck Tarps
- Custom covers
- Tool Bags, tool rolls etc.
- Custom made products inc Steel works

CONTACT DETAILS
Phone: (02) 4648 2444 // Email: mark@autotarp.com.au
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EXCLUSIVE MODULAR PANEL SYSTEM

QUICK RELEASE FOR REPAIR



Getting immersed in autonomous mining

Immersive Technologies simulator equipment and portable classrooms.

NATIONAL

AUTONOMOUS mining is a hot topic in industry circles as mine operators press ahead with adopting new technologies that allow them to achieve increased productivity and safety combined with reduced overheads and time savings.

A sometimes overlooked benefit of automation is the opportunity it offers mine workers for job enrichment, as all mine-site staff need to be trained up to operate safely in an environment of autonomous vehicles and excavators.

For example, a maintenance operator carrying out scheduled maintenance on autonomous trucks may have to manually drive autonomous vehicles out of the inspection bay and back to the mine.

Though not directly involved in the operation of autonomous equipment, these maintenance operators need to be trained in how to work with autonomous vehicles which involves them acquiring extra skills.

Immersive Technologies product manager Ravitha Sukumaran said a holistic approach is therefore needed to mine-site automation to ensure all workers are safely protected.

"One man's mistake in an autonomous system can have a huge impact, as opposed to in manned operation," she said.

"If one man makes a mistake, it can negatively impact the performance of that entire shift or day."

Immersive Technologies plays a key role in providing training to operators and on-site mining staff to enable them to make the transition to autonomous operations.

The company's exclusive focus in terms of its training is currently on mine-site workers, for example loader-operators and machine operators, and not office-based roles.



IT simulators onsite in the Middle East.

Operators interacting with the autonomous vehicles need to be trained to manage the step-up from working within manned operations.

Misconception about automation

Mrs Sukumaran said there is a common misunderstanding about the automation of mine sites.

"A lot of people have the misconception that autonomous systems eliminate people," she said.

"It does for some roles – say truck operator roles, but for the remaining operating roles they need to be trained to a higher level of proficiency as compared to similar roles in manned operations, otherwise productivity is quickly diminished."

Also, there can be a lack of preparedness on the part of some industry players in terms of anticipating some of the challenges of mine-site automation for their personnel.

"Selecting the right people to do the right roles, effective training and suitable upskilling strategies are key to ensuring a highly proficient workforce," Ms Sukumaran said.

"If personnel in an autonomous environment have a poor understanding of the autonomous system used, or if they incorrectly interact with autonomous trucks, they can easily pose safety issues and reduce operational efficiency."

Range of services

Immersive Technologies has expanded its repertoire of services from providing technology products to clients to offering consultancy and training services for mine-site workers.

"Our services are not just providing the technology, which is core to what we do," Mrs Sukumaran said.

"We are in the business of delivering real results to our customers, so for anything that

challenges the industry, we develop solutions to tackle the challenge."

Technology is applied to client problems in a targeted way to ensure they receive a tailor-made solution to their autonomous operations issues.

Immersive Technologies has virtual reality-based machine inspection products and autonomous equipment simulators used to train mine workers.

The company sells or leases its simulators to mining companies and these are used to train operators on autonomous equipment.

Mining industry professionals are exposed to Immersive Technologies' solutions at its experience centres which are located at five of its offices around the world.

Mining companies can lease additional simulators from the company for periods of high training demand and then return the technology.

The company's simulators are a platform into which different machine modules are plugged to provide training on specific OEM machine make and model for operators.

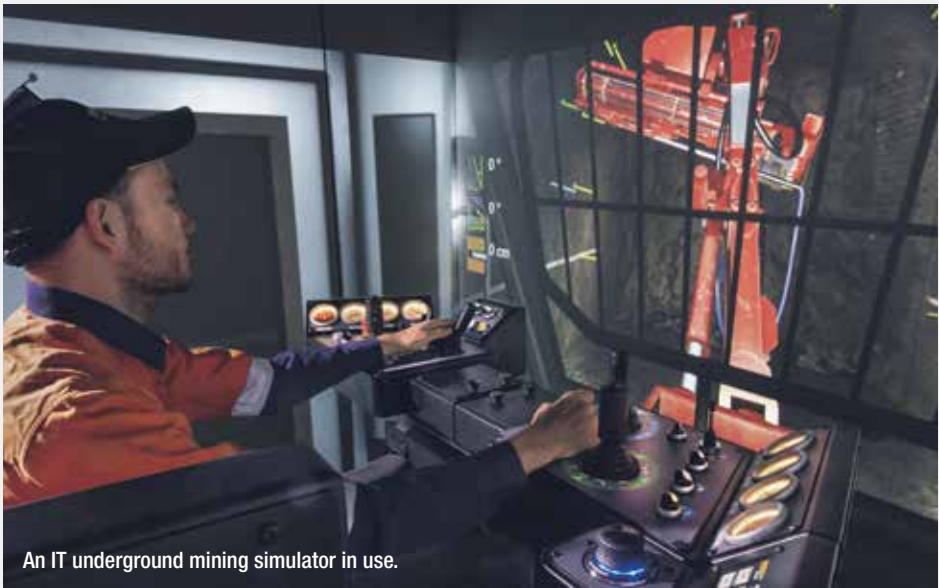
"You can buy or lease a single simulator base platform and you can fit in different machine models, a bulldozer, shovel or grader," Mrs Sukumaran said.

This modular solution enables clients to select the training module that suits them best.

Immersive Technologies regularly updates its training and technology on a world-wide basis, to ensure clients receive the latest tried-and-tested solutions that have been applied in a practical way.

By regularly updating its simulator software, the company ensures the technology on its simulators stays up-to-date and current with industry standards.

This approach is one of the ways in which Immersive Technologies differentiates its product offering to stand out from its competitors, and at the same time its approach saves clients' money.



An IT underground mining simulator in use.



An IT shovel-excavator kit.

"For example, there are 20-plus-year-old Immersive Technologies simulator platforms in North America that are running machine modules with current software to solve current industry problems," Mrs Sukumaran said.

The company currently supports 149 different machine models.

Immersive Technologies has diversified from simply selling products to clients to providing value-adding services that help deliver results in both manned and autonomous operations.

Many of these new products and services originated from customer needs and feedback.

Data analytics

Operator Performance Analytics is the one of the latest services provided to clients, that has been

developed in the past two years.

This involves the company analysing data from clients on the operation of their vehicle and equipment fleets to identify problems down to the level of individual equipment operator.

"We are in the business of looking at data from any fleet management system that the customer can provide, so we can look at problem areas and provide tailored training to address these," Mrs Sukumaran said.

For example, one or two trucks in a client's fleet may be breaking down frequently. Immersive Technologies can diagnose the human causes and suggest a solution.

"The way we present that data is intuitive. We provide a dashboard to the customer so they can identify specifically who requires what training interventions," she said.

The company makes available to its clients best practice experiences sourced from case studies gathered from its network of global offices.

"Miners who are now considering moving to an autonomous haulage system commonly engage with Immersive Technologies early in their purchasing process, because we have worked with a great diversity of autonomous and manned operations around the world," Mrs Sukumaran said.

"They ask 'what are the challenges' and 'how can we prepare ourselves'".

The company can advise clients on suitable approaches to training their workforces for automation.

Ms Sukumaran said there were several benefits of moving over to an autonomous mining system.

They include increased safety productivity and

profitability, reduction of human-related errors in truck operations, and job enrichment for mine workers.

"Productivity is increased because trucks can run 24-7 with no breaks, and less variance introduced by human proficiency levels and behaviours" Ms Sukumaran said.

"An autonomous circuit is generally more predictable because all the human elements that come into play during truck operations are reduced."

Unscheduled maintenance on trucks are reduced under autonomous haulage systems, as equipment is operated in a standardised way compared with the wear and tear from varying driving styles of different human operators.

Meanwhile, human operators can gain from acquiring new skills in automation, leading to potentially greater earnings.

MORE INFORMATION: Immersive Technologies | 08 9347 9000 | www.immersivetechologies.com



Autonomous haulage training solutions for all makes and models

Transitioning to autonomous operations has increased the complexity and criticality of the remaining operator roles left in the field. Our training solutions rapidly and effectively prepare site personnel to work within an autonomous environment in a safe and competent manner.

We are at the forefront of workforce development solutions within autonomous haulage mining operations—and the only provider to successfully implement simulation-based training solutions at multiple mine sites across the world.

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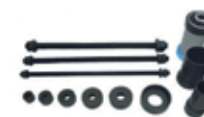
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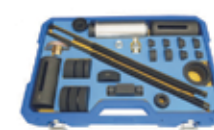
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Haulage trailers at work in Canada's Baffinland.

NATIONAL

OPTIMISING the operation of trucks on mine haulage routes in places as far-flung as the arctic circle is a pressing business need for the global mining industry facing rising cost pressures.

Fuel, maintenance and operational costs for mining haulage trucks can squeeze mining company profit margins and companies are looking for ways to control these unpredictable expenses.

Queensland-based mining consultancy, Smith Global, has developed a software solution aimed at addressing these haulage issues which can be critical at mine sites in remote locations with challenging weather conditions and difficult terrain.

Smith Global managing director, Kerren Smith, said its specialist haulage software, called Optimizer, can unlock savings for miners seeking to trim their haulage costs.

The software has delivered extensive savings in fuel, maintenance and time for its clients that include top tier mining companies.

"What we have as a value proposition, is that we are a design house, particularly focused around transport," Mr Smith said.

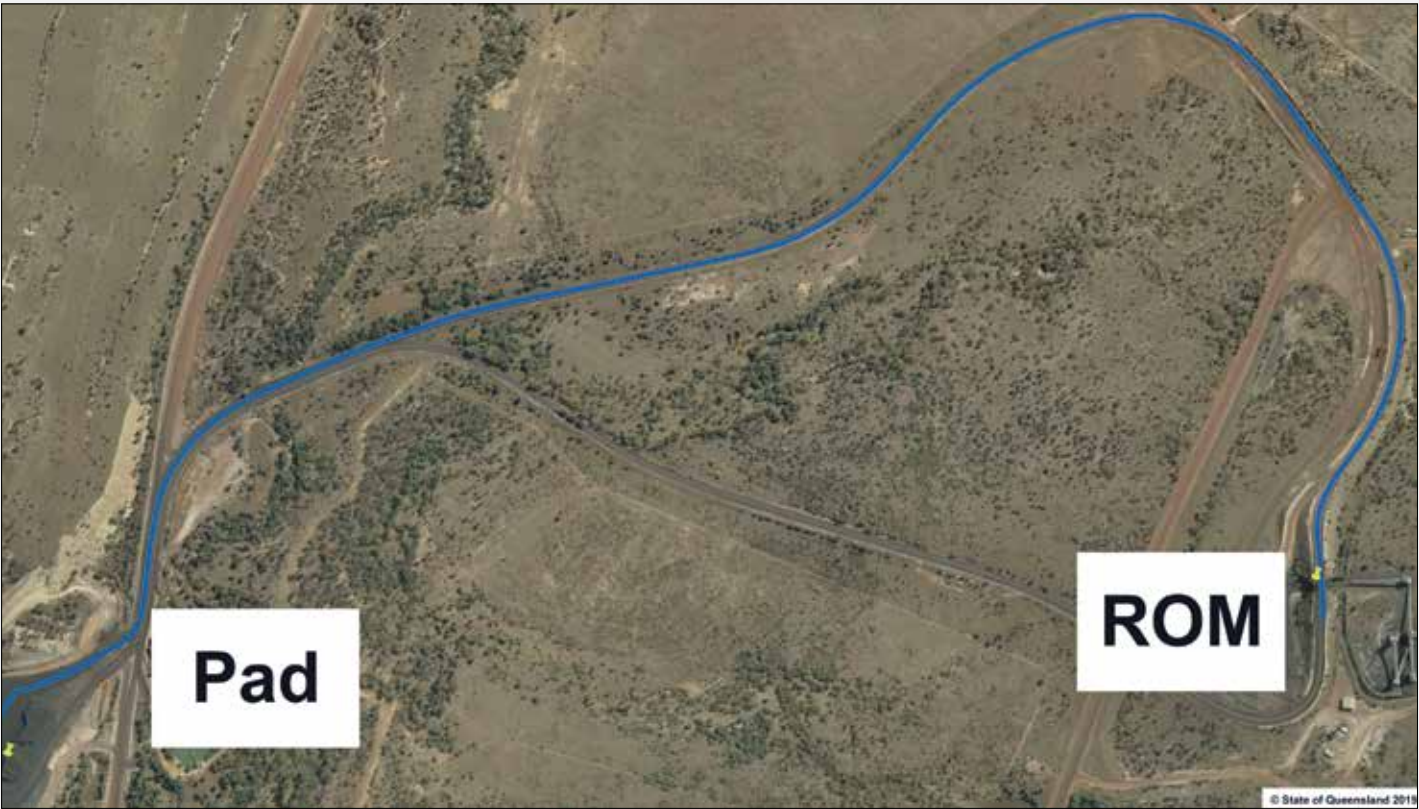
The company's clients are in the mine transport and haulage industries, and Smith Global is seeking to expand its product offering to the large mining company sector.

The Optimizer software is customised for each client and is capable of quickly analysing a miner's haulage operations to highlight areas for efficiency improvements leading to greater productivity.

The package can provide what-if scenarios to allow the modelling of different haulage routes and comparison of different vehicle combinations.

Project implementation

There are three distinct phases to



The REVS software package allows the input of data such as specific GPS coordinates to build up a simulation of haulage routes for individual mine sites.

implementing a project using Optimizer: assess; analyse and outcomes.

The Optimizer process starts with defining project goals and the needs of a client including, auditing a trucking fleet's performance and equipment used in the handling process to establish a baseline, before moving on to a comprehensive analysis of various haulage routes.

The second stage is to carry out a methodical comparison of potentially viable options collaboratively with client staff, from workshop personnel to senior managers.

When initial baseline performance data is gathered into the Optimizer system and client objectives set, an in-depth analysis can begin on evaluating different haulage options.

This next step involves using the software's proprietary specialist tools to process data

and produce findings within the scope of the client's project requirements.

The third stage of the process is the evaluation of these haulage route options and findings to identify areas of cost savings and efficiency improvements such as clearing bottlenecks.

This final stage covers many different aspects, including, gradients, road surface conditions, speed restrictions, corner radii, and obstacles such as bridges.

In addition, the company's self-designed software package, REVS, allows the input of data such as specific GPS coordinates to build up a simulation of haulage routes for individual mine sites.

REVS stands for Route, Environment and Vehicle Simulator and has been developed in-house by Smith Global.

The REVS software can calculate and compare laden and unladen trip times for trucks, and highlight the productivity of different haulage configurations such as powertrain, trailer type and payload.

Data output from the software can include detailed information on comparative fuel burn for different routes, brake usage, payload throughput, and information on stockpiling footprints for material.

All these outputs can be used by clients to increase their competitive advantage through innovative haulage route design that improves productivity and saves on costs.

The Optimizer process is key to the Smith Global Whole-of-Life cost modelling system, which allows clients to accurately assess the relative cost options for replacing or extending the life of mining equipment.



Trailers undergoing testing in Canada.



Smith Global MD Kerren Smith.

Mr Smith, who has 45 years' mining industry experience, said the company take in relevant information, put it into its software package with the various haulage positions to be used, and then provide a full route outcome.

"For any position along a haulage route we can tell you exactly what gear you are in for what period of time and at what speed," he said.

The technology found that the driving styles can vary considerably for different drivers on the same haulage route, revealing a human factor at play in haulage performance.

The software is particularly tailored towards evaluation of long-haul trucks rather than earth moving equipment.

Smith Global has expanded its business in the past 18-months with the intention of targeting the top tier of the global mining industry with its haulage software package and has already had some success in this new strategy.

The company has carried out significant feasibility studies for miners using its optimisation software, including studies into the expected lifespan of mining equipment, and maintenance reviews.

In one whole-of-mine life equipment case study, the consultancy studied data for 40,000 hours of equipment operations at a minesite to analyse costs and audit maintenance plans.

"Australia is a good place for mining companies to test their equipment because we have got arduous conditions with long

distance, high temperatures, but we do have good regulation," Mr Smith said.

For this reason, a lot of mining and transport companies visit Australia to test their equipment, as they can effectively drive long distances to get good baseline data for vehicle testing.

Among the company's other work is holistic design and identifying process improvements, and also forensic type work such as identifying the reasons for equipment failures.

Overworked trucks operating on inefficient routes can result in higher maintenance bills and repair costs, not to mention increased driver fatigue that can become a health and safety issue.

Conversely, miners aware of these issues can occasionally go too far in the opposite direction by over-servicing their trucking fleets and taking trucks out of service for more times than is necessary.

The OPTIMIZER process is about using quality data evaluation to make optimum decisions.

Real world results

Smith Global has deployed its haulage software to remote mining sites such as an iron ore mine on Baffin Island in Canada's Arctic north, located 700km from north pole, involving a 100km haulage route for trucks.

In this project, Smith Global had to deal with difficult road conditions with the route affected by seasonal cold weather and road curvatures, gradients and surface that made it

difficult to deliver consistent productivity.

The project with the Canada-based iron ore miner lasted for two years and covered an in-depth analysis of road conditions, time wastage and shift-work patterns.

"Over a two-year period we virtually doubled their productivity," Mr Smith said.

"We went through a program of getting rid of corners and certain levels of the jump ups and what that did to traction," he said.

The consultancy discovered through its data that trip times on the iron ore haulage route in Canada could vary considerably, which had to be factored into its findings.

By making incremental improvements to the haulage route and equipment the consultancy was able to increase speeds in certain stretches, trim journey times, avoid bottlenecks and increase productivity.

Time-modelling software provided by Smith Global can be used to predict cycle times for complex haulage routes resulting in recommendations to change the grade, layout and surface of roads.

Haulage history

Smith Global's origins lie in building coal haulage equipment for Australian coal mines, and it became the largest supplier of oversize road transport equipment for use on coal mine haul routes.

Six years ago, the company identified an opportunity in the market to expand its

consultancy business overseas in holistic design, and design analysis to overcome equipment failure.

This expertise has given the company a strong foundation on which to base its haulage software consultancy business.

"I think it is because we have a strong manufacturing background in bespoke equipment that means when we do productivity reviews, we can come up with potentially different styles of long-haul combinations that might not have been foreseen," Mr Smith said.

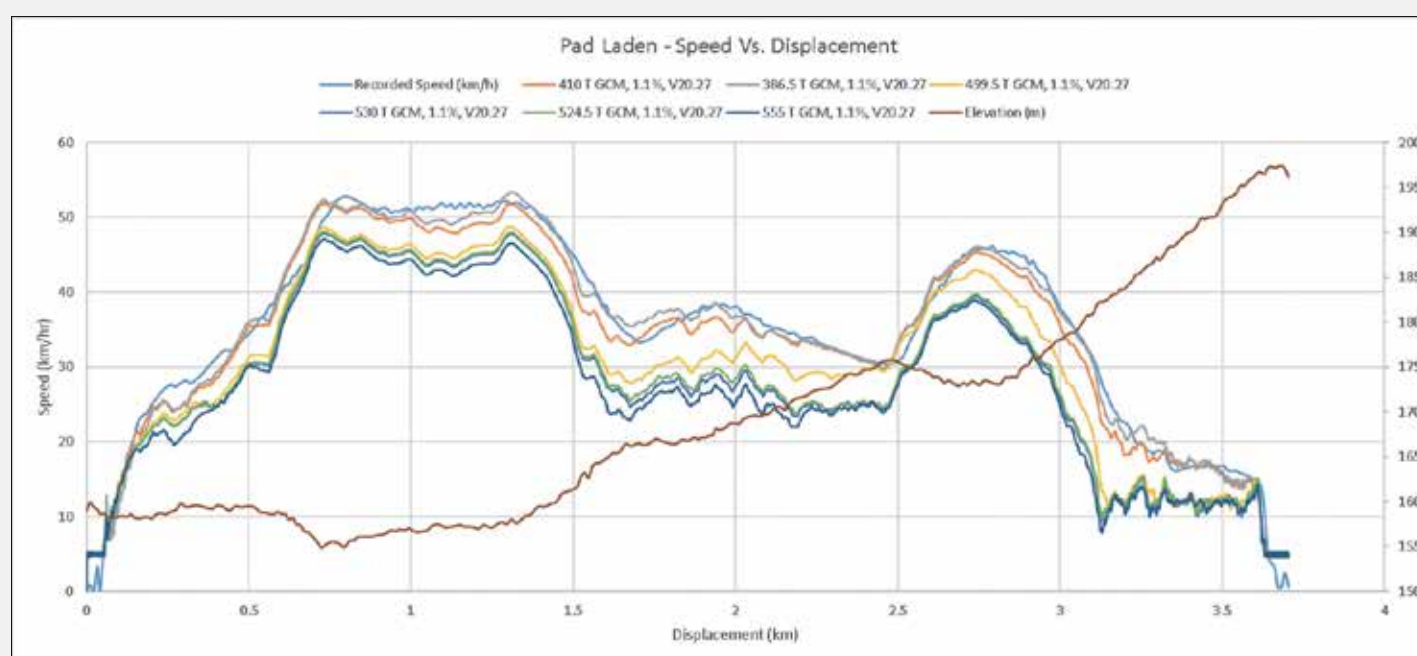
A lot of the company's consultancy review work is linked to its manufacturing expertise as it has specialist knowledge of the capabilities of transport equipment.

As a family-owned business with a 120-year history, Smith Global has worked in 21 countries and six continents across the mining and extractive industries, and other sectors such as the sugar industry.

"We have the knowledge and experience and tools we have developed over the years that have provided significant benefits to our clients," Mr Smith said.

The company has extended its expertise to the diagnosis of problems with power equipment in underground mines.

Smith Global's service also covers equipment risk assessment for transport and materials handling systems and for operational processes.



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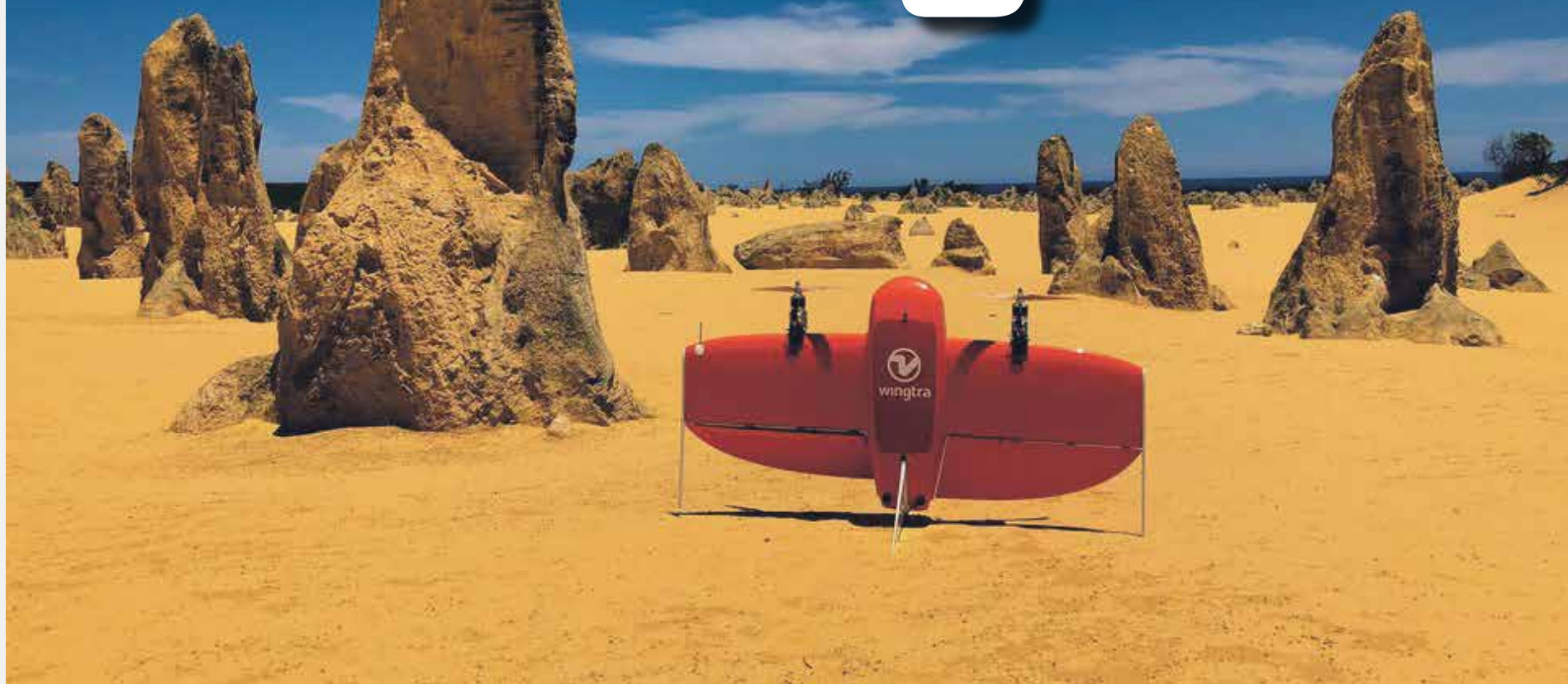
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The game changer



CR Kennedy is the only Australian distributor of the WingtraOne – the only fixed-wing Vertical Take-off and Landing (VTOL) drone on the market, offering the nimbleness and versatility of a multi-rotor drone with the long-distance capability of a fixed-wing surveying drone.

NATIONAL

ONE of the many of the solutions that CR Kennedy offers the mining industry are drone and UAV hardware, software and workflow solutions.

The company caters for clients who're looking for entry-level photogrammetry (the building of auto mosaic images and 3D models from aerial images) right through to the top end users, and everything in between.

Survey-grade is the standard at CR Kennedy, and the company's focus on accuracy and precision means that it is dedicated to finding the right drone for the right payload for the right job.

The company is also the exclusive dealer of the ground-breaking WingtraOne tail-sitting fixed-wing aerial survey drone.

The WingtraOne is the only fixed-wing Vertical Take-off and Landing (VTOL) drone on the market, offering the nimbleness and versatility of a multi-rotor drone with the long-distance capability of a fixed-wing surveying drone.

CR Kennedy WA UAV sales manager, Graeme Carleton, said that the WingtraOne was able to cover up to eight times the ground of a multi-rotor drone of comparable size.

It also opens up areas that were previously inaccessible for fixed-wing drones because of the VTOL capabilities.

"It enables the user to operate from a small footprint," Mr Carleton said.

"For a fixed-wing aircraft, you have to launch and land on large, open, cleared areas, but with the WingtraOne its just not necessary."

Mr Carleton said that to launch a fixed wing aircraft, a pilot would need at least 100m for take-off and landing.

"Even with catapult and hand-launched fixed wings, and a belly land it can be very limiting," he said.

"In some places your options can be very limited because with a traditional fixed-wing drone you have to take off into the wind, and you have to land into the wind as well.

"When you are flying on site, you might not have enough clearance in the right direction to land the drone.

"The terrain on mine sites is very unforgiving.

"You're trying to land precision equipment at speed on rocky ground and typically what happens is the airframes get ruined pretty quickly – that's the hard truth."

The technical stuff

Combining the long range of the fixed-wing drone with the VTOL capabilities of a multi-rotor was no small feat.

The WingtraOne uses elevons – a cross between ailerons and elevators – to control the roll and the pitch of the aircraft.

In combination with the thrust from the rotors and a sophisticated flight control program, the WingtraOne is able to transition

from vertical to horizontal flight without adding any extra moving parts.

This means the WingtraOne is inherently more robust and reliable.

The complex algorithms that govern the flight controller kick into action after the pilot has completed a flight plan and pre-flight check list.

To launch, the drone is placed perpendicular to the wind and takes off on its tail, once it reaches transition height sensors detect and then face the wing into the wind to generate initial lift, and the elevons push the nose down to start horizontal flight.

The flight mission is completely automated from take-off to landing, meaning near-zero chance of human error.

Pilots can, however, assume control of the drone at any stage if there are safety reasons.

While there are two other options available, the payload that CR Kennedy sells with its WingtraOnes is a Sony 42mpxl camera Sony RX1R II.

The payload comes as a modular kit and can be easily swapped out by changing the payload bay, should the customer require a different solution from the drone.

Mr Carleton said that the outstanding resolution provided by the camera means the drone can fly higher and faster than many of its competitors.

"In the photogrammetry world, we talk about ground-sampling distance and that's the distance between pixels, the distance between one pixel

and another in the final image," he said.

"The Sony RX1R II has enabled our clients to quote on bigger jobs, and to do more work than before because they are not limited by distance."

Exclusive distributorship

When Wingtra approached CR Kennedy, Mr Carleton was keen to put the drone through its paces.

He and the sales team from Wingtra took the WingtraOne out to a WA location specially chosen because of its exposure to wind, heat, and another uniquely Australian variable – wedge tailed eagles.

The giant raptors are famous for attacking and destroying drones, especially fixed-wing drones, that can cost many thousands of dollars to repair and replace.

The drone passed the wind and head tests with flying colours, and the eagles showed little to no interest in it.

This has been put down to the bright orange colour.

Mr Carleton was especially impressed with the range that the drone could cover in a single mission – up to 200ha, which is nearly eight times longer than a multi-rotor drone of a similar capacity – this means that about 80 minutes of operator time could be saved on any given 200ha mission.

Shortly after testing the WingtraOne, CR Kennedy signed on to be the exclusive Australian distributor.

Mr Carleton said there were four of the drones in operation in WA.

"I've had three occasions in the goldfields where we've seen some really big, aggressive eagles and had no issues with them attacking the drone, they just left it alone," he said.

"One mine in particular adopted it because of the amount of attacks they were getting from angry eagles.

"They had to change their system because of the sheer amount of drones they were losing, they lost about 12 to eagle attacks.

"But what they reported back was a massive increase in flight capabilities and far superior data accuracy and resolution to the system they were using previously."

The future of drones and UAV

Drone technology is relatively new to the market, and constant innovation is seeing the price and size of high-powered cameras shrink, while the image resolution and quality constantly improves.

This means that the payloads equipped to drones and UAVs is becoming more diverse and advanced with every year.

Mr Carleton said that an area he is particularly excited about is the advances in 3D LiDAR capture capabilities in drones.

Lidar is an airborne laser scanner that builds a point cloud model, rather than collecting photos.

This provides raw data that is simplified and ultra-accurate.



The weight reduction and price drop in lidar tech means that much smaller drone systems will soon be able to carry these payloads, where previously a much larger unit would be required.

The WingtraOne is just one of the many offerings from CR Kennedy, and Mr Carleton said that he and his team would highly advise talking to someone about the nature of the work

before purchasing a drone system.

"We encourage people to contact us and to let us know what their application is, so that we can best guide them to the right solution for the job," he said.

MORE INFORMATION: C.R. Kennedy | 0408 619 740 | gcarleton@crkennedy.com.au | www.crkennedy.com.au

WingtraOne

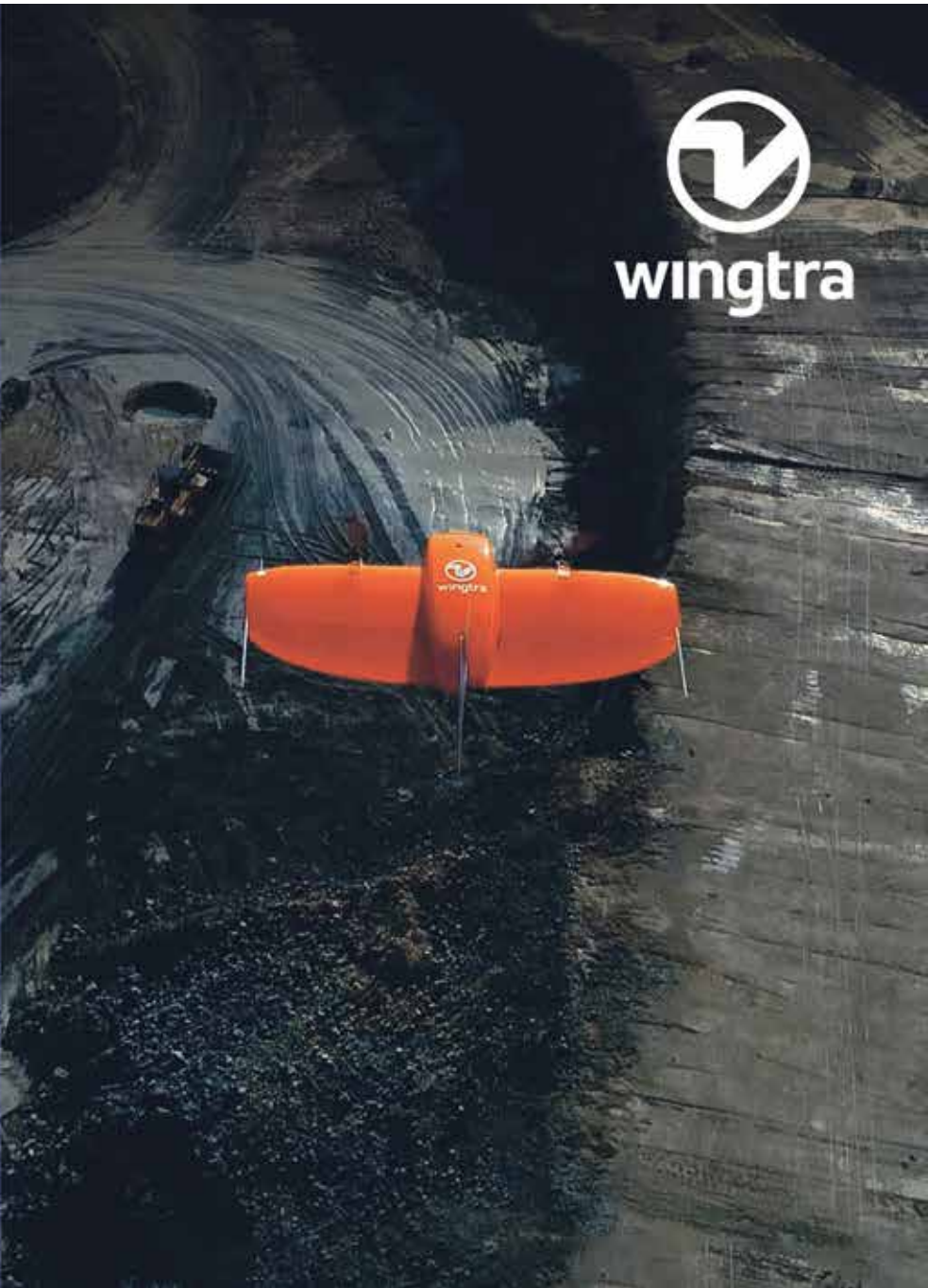
Aerial Data for Professional Mapping and Surveying

The Vertical Take-Off and Landing [VTOL] capability allows the WingtraOne to ascend and move like a helicopter. For the mapping mission it transitions into forward cruise flight and matches the endurance and speed of fixed-wing airplanes. In order to land, the WingtraOne switches back to hover flight and descends vertically.

- **Vertical take-off and landing** allows use in a far greater variety of situations, guarantees safety for the operator and offers much reduced wear and tear on the drone.
- **State of the art PPK system** allows for mapping with down to 1 cm absolute accuracy without using ground control points.
- The WingtraOne PPK system with **42 MP camera** produces brilliant resolution images with down to 0.7 cm/px GSD.



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Lagging reduces noise from pipes and ductwork.

Pyrotek lowers the heat

NATIONAL

CREATING a safe environment for workers in hazardous conditions is one of the biggest challenges in the mining industry.

Apart from obvious hazards like rock falls, explosives and machinery accidents, vibrations, noise and heat can cause ongoing issues for workers.

Pyrotek is committed to providing noise and heat reduction measures through advanced thermal insulation and vibration damping and isolation.

Its range of barrier and composite products work in conjunction with each other to suit the condition, surface and industry and mitigate the effects of noise and heat and are ideally suited to mining applications.

Pyrotek sound barriers work by effectively reducing noise at the source.

Technical R&D manager, Michael Kierzkowski, said that testing a variety of composites against different frequencies has produced the optimal technology in noise abatement and products.

They can substantially reduce machinery noise levels, improve health and safety and provide safe, productive working environments.

Mine spec applications are one of its specialities, with products that can be applied to underground installations and process plants and other high noise or heat installations.

Its noise reduction insulating products can also be applied to village and mine office applications for accommodation and computer housing.

Stansfeld and Matheson's research in the British Medical Research found that noise interferes in complex task performance, modifies social behaviour and causes annoyance.

The study suggested that occupational and environmental noise exposure is associated with hypertension and can be a general environmental



Thermobreak insulation blankets maintain thermal performance when exposed to moisture.

stressor and nuisance.

The World Health Organisation also reports that exposure to prolonged or excessive noise can cause a range of health problems ranging from stress, poor concentration, productivity losses in the workplace, and communication difficulties.

The reports conclude that noise reduction in mining environments and processing plants, as well as recreation areas can therefore be beneficial.

According to the study, removing noise stressors can improve production efficiency, reduce downtime and contribute to reduced retribution in the workplace.

Mr Kierzkowski said that noise can be

mitigated by the installation of Pyrotek's advanced coatings or barriers.

Its various composite and barrier products are optimised to produce maximum noise and thermal minimisation.

"Coating products such as Pyrotek's specialised anti-condensation Decicoat T35 coating, and water-based vibration damping, Decidamp SP80 are the best way to insulate building and construction," Mr Kierzkowski said.

Pyrotek manufactures a damping compound that performs over a broad temperature and frequency range, achieving significant reductions of radiated structure-borne noise in the mine-site or processing plant.

To reduce noise from pipes, valves, fan housings, and ductwork, he recommends

high-performance composite acoustic lagging products such as Soundlag.

Soundlag works by utilising a highly dense and flexible mass vinyl combined with a decoupling layer which breaks the vibration path between substrate and the mass barrier.

This means the vinyl external wrap remains flexible.

External foil facing offers a fire-resistant covering and an excellent surface to join adjacent sheets which reduces noise breakout from waste-water pipes.

HVAC systems can be lined with the company's polyester alternative, Sorberpoly 3DNW, to reduce internal duct noise.

In large open areas such as processing plants, self-standing noise enclosures are required.

Pyrotek also manufactures a range of standard mass-loaded vinyl barriers that perform this function.

Its dense, thin, highly-flexible, tear-resistant and high strength qualities can serve as a barrier and can reduce noise transmitting through panel constructions such as plasterboard.

"Quadzero, for example, having low stiffness, shifts its natural frequency and co-incidence dip phenomenon outside the 'critical bandwidth' maintaining the transmission loss performance of the system," Mr Kierzkowski said.

The dense, mass-barrier attenuates noise from mechanical equipment and engines when transmitted through walls, ceilings and floors.

Tests have revealed that altering the thickness of composite that separates the noise barrier from the structure improves the product's performance in some frequencies without significant increase in overall weight.

The unique structure of Pyrotek's signature Sorberbarrier targets specific frequency ranges and is the most versatile product for controlling noise in the marketplace.

The high performance of Sorberbarrier is achieved by its unique construction.

Placing the mass barrier between two layers of absorbing composite, keeps the barrier separate from the structure to which it is bonded, allowing it to remain flexible at all times.

Being lightweight and flexible, Sorberdamp readily conforms to irregular surfaces and practices absorption and vibration damping in one product.

It works effectively in enclosed spaces such as engine bays, air-conditioning ducts and generators.

An area that is often forgotten in mining is the all-important IT department.

Computer server rooms need to be well insulated in a mining environment from both the heat and other elements and the dust.

Without the option of data base storage in the city, a server room must be installed in the office environment, requiring thermal and noise insulation so office workers are not affected by the high level of noise generated.

Engineered high temperature materials address noise control challenges and can be customised to individual applications.

Pyrotek's unique products include water-based, spray-on coating; high density acoustic and thermal glass wool; lightweight high-performance insulation; acoustic absorbers; vapour barriers; composite multi-layered noise absorber barrier and premium, thermal insulation products.

Heat from engines as well as HVAC systems and other piping can be mitigated



Decidamp and Sorberbarrier insulate noise through vibration damping and isolation.

with removeable covers for high temperature applications.

"Removable insulation means less down time and is more economic over the long term," Mr Kierzkowski said.

"Energy costs can be reduced as the blanket can insulate from heat transfer and against noise.

"Other benefits of the thermal blanket is protection of equipment."

Pyrotek's Thermobreak insulated blanket is manufactured from physically crosslinked, closed-cell polyolefin composite and is designed

to maintain thermal performance when exposed to moisture.

It will combat condensation around air conditioning ducts, walls and ceilings and is also available with a facing to protect it from water, oil and other liquid.

Pyrotek has also looked at improving thermal protection on surfaces which lowers cooling costs in underground sites and processing plants.

Its Decicoat T35 is a water-based spray-on thermal insulation coating specially formulated with anti-condensation and corrosion protection properties.

Sprayable properties mean that a seamless application prevents thermal bridging and bonds flush with substrates around uneven surfaces, making it perfect for mining applications.

It has a low odour and has flame, heat and smoke retardation properties and can regulate surface temperatures caused by condensation.

Kilometres underground, or in the hot dusty condition of the Pilbarra, Pyrotek products are reliable and durable, as well as high performance.

"The light-weight composition of Pyrotek products is ideal for duct and piping insulation and provides substantial weight-savings to energy and fuel efficiency," Mr Kierzkowski said.

Sorberglass is a high-density glass wool board bonded with a thermosetting resin to provide both thermal and acoustic reduction properties and can be used in self-supporting applications.

It has excellent resistance to fire and is heat resistant to 350°C.

Sorberglass is perfect for self-supporting rigid ducting for HVAC, thermal and acoustic applications required underground.

VOC-free, ultralight polyimide composite Sorbermide is currently one of the lightest and most flexible polyimide composites in the market and provides a unique combination of sound-proofing and thermal insulation performance with high fire properties.

Dedicated to creating safe and efficient workspaces, Pyrotek has revolutionised the noise and heat mitigation industry and continue to work with companies to provide unique solutions to insulation in the mining and other sectors.

MORE INFORMATION: Pyrotek (LS) | 02 8868 2000 | contact@pyrotek.com | www.pyroteknc.com | www.pyrotek.com

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