BARLOWORLD POWER
Electric power from coal mine methane

JUNIORS IN SOUTHERN AFRICA steal the limelight

SOFTWARE SOLUTIONS AND TECHNOLOGY
Virtual reality breakthroughs

PERSONALITY P10
“Mineral ownership has been completely separated from land ownership – meaning minerals belong to all South Africans under the custodianship of the state” DMR minister Ngoako Ramatlhodi

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New Automation Technology BECKHOFF
M y day started like any other – with coffee and the morning’s news headlines. But this day was different and the consequences are showing already.

17 July, a Friday, is the day the platinum price dropped below $1 000/oz. And like many situations in life, I knew it was coming but was still greatly shocked when it did. Precious metal prices have not been this low since February 2009, which is even more concerning. It suggests a long market recovery turnaround.

Tracking the platinum price since that day has now become my daily ritual – has it gone higher, has it gone lower? At least it seems to have stabilised around the $980/oz mark. This morning it is $987.70.

It seems that despite our platinum industry’s dramatic turnaround after last year’s five month strike, an impressive feat you must agree, the world’s demand for the precious metal remains weak, in terms of jewellery consumption as well as the automotive sector which uses platinum for catalytic converters. Even China is unable to soften these blows. The country’s appetite for metals, generally speaking, is soft and is currently sitting at levels not seen since the global financial crisis gripped the world in 2008.

Fortunately, and unfortunately, the industry has been quick to respond. Lonmin is implementing an “orderly closure” of its Hossy and Newman shafts and further to this will place a few of its Generation 1 shafts (W1, E1 and 1B) on care and maintenance. The company declared, in its Q3, 2015 financial results, that even though it is highly geared to PGM prices, its EBITDA is negative at current price levels.

This action forms part of a larger restructuring exercise which Lonmin reveals “will allow for a smaller more sustainable and agile business.” Over the next two fiscal years, the company’s normalised annual production will be reduced by 100 000 platinum ounces. Subsequent to this, about 6 000 employees (including contractors) will likely lose their jobs.

Lonmin isn’t the only company taking drastic action against weak commodity prices, including but not limited to platinum. Anglo American intends to cut 54 000 jobs by selling off numerous assets by the end of 2016. This equates to a third of its global workforce, currently standing at just over 150 000. Anglo recently reported an attributable loss of US$3.02 billion for the six months to the end of June against a $1.46 billion profit in the same period last year.

While platinum is not the company’s only ‘trouble’ metal, it appears to be one of the biggest. To date, the mining giant has already stopped production at three of its platinum shafts and is also seeking buyers for its Rustenburg and Union platinum mines. The problem it seems is that no one wants them. They have been up for sale for quite some time. While the platinum price remains so weak, this will unlikely change. Closures remain the next obvious choice.

And so, I wait with bated breath to hear what action plan Impala Platinum intends to implement to protect itself. More job losses on the cards I presume.

The silver lining
But all is not lost – according to our mining minister Ngoako Ramatlhodi. Speaking at the Northern Cape small-scale mining conference in Kimberley last month, he outlined government’s intentions to help grow and expand South Africa’s small-scale mining sector.

He is of course referring to opportunities for rural communities to start up their own small-scale mining business operations in and around the areas where they live. With low overhead costs and available easy-to-use technologies, overcoming the challenge of gaining access to finance to fund these start-ups remains the biggest hurdle.

More importantly, as you will read from page 10, Ramatlhodi is so confident of this industry’s potential he says: “If we get this right, it will assist us to absorb the blows of the current economic downturn. There have been significant retrenchments in the mining sector but we can use their local skills to set up enterprises and link up with downstream beneficiation opportunities as well. Ultimately, I believe this niche mining sector could offer more employment opportunities than the well-established mining industry.”

Therein lies a potential solution to the thousands of job losses the platinum, and broader mining sector in South Africa, is experiencing. Can it work? The Department of Mineral Resources is determined to see its success. I remain on the fence with regards to this potential “new” mining arena, but I know with certainty it will be a great help to the country and the levels of unemployment if it takes off. I’m holding thumbs that it does.

It’s time to stop relying on the majors since they are in no position, at present, to offer employment security.

Laura Cornish
My one-on-one interview with DMR minister Ngoako Ramatlhodi in Kimberley. Laura Cornish, Editor, Mining Review Africa
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Coal mine methane is a viable feedstock for electric power generation in South Africa, says Barloworld Power, Caterpillar’s southern African dealer for Energy and Transportation.

The gas segment is still relatively untapped in southern Africa, with only 2% of South Africa’s energy demand currently met by gas. Nalen Alwar, Barloworld Power’s business development manager: Gas for southern Africa, says the potential value of harnessing methane from coal beds is significant as South Africa is the sixth largest coal producer in the world with reserves estimated at 30 Bt, half of this mined underground. It is estimated that mining of known reserves will continue for well over 100 years.

The opportunities are not only in South Africa, but also in coal mining operations in Mozambique, Zimbabwe and Botswana. Methane is a naturally occurring gas formed during the mining of coal. It is highly flammable and hazardous to mining operations, which means that coal seams have to be degassed prior to mining.

As a greenhouse gas, methane released into the atmosphere does 20 times more damage than carbon dioxide. This is cause for serious concern as coal mining is still the world’s biggest contributor to feedstock for electrical power generation. Unburnt methane can remain in the atmosphere for up to 15 years.

The technology to harness coal mine methane for the generation of electric power is gaining traction globally. Alwar points out that greenhouse gas emission in the USA decreased by more than 20% between 1994 and 2005 due to increased recovery and utilisation of coal mine methane.

“He can be safely extracted and, following a treatment process, fed into Cat gas generator sets to produce electric and thermal power. Infrastructural and energy efficiency projects can be undertaken by coal mining companies to generate some of their own electricity or provide revenue earning opportunities as independent power producers (IPPs).”

He says new methane gas to power projects have the advantages of short lead times in the supply and commissioning of proven and reliable Cat gas engine solutions; assisting the growth of a gas economy; wide acceptance as technology for cogeneration in parallel with the grid supply; private sector participation in the generation of electric power; reduction of stress on the grid; and the potential for hybrid solutions with other IPP technologies.

Return on investment in the system would include risk mitigation due to power security, energy efficiency using freely available feedstock, and possible revenue through grid sales. Lifecycle costs include maintenance and equipment overhauls which, if properly managed, would keep downtime to a minimum.

Diagram 1: A possible cost curve scenario depending on utility tariff projections, gas cost indexation and escalation.
Types of methane extraction projects
Depending on the coal mining operation, coal methane utilisation projects could include the following:

- Coal bed methane – extracted from the coal seam during pre-mining drainage with typical methane concentration above 90%;
- Coal mine methane – concentrations between 25% and 60% extracted from active mines during the drainage process;
- Abandoned mine methane – extracted from sealed and pressurised abandoned mines with typical methane concentration between 60% and 80%;
- Ventilation air methane – methane and air mixture carried out with shaft or mine ventilation air, yielding a typical methane concentration below 2% (used only as combustion air to the engine provided methane concentration doesn’t exceed 3%).

Requirements for electric power production
A coal mine methane to electric power project requires sufficient gas meeting minimum fuel quality requirements, adequate filtration and flow control for gas treatment and conditioning, engine installation according to OEM recommendations, and use of certified switchgear panels for power control, monitoring and protection.

The methane is removed and pre-treated to filter dust and particles and dry the gas to less than 80% RH; pressure is regulated to between 5 and 35 kpa; and switchgear and controllers are installed for synchronisation and load management.

A successful solution requires close control over fluctuations in gas concentration, pressure and flow rate, as well as contaminants such as particulates and humidity. This is essential as poor fuel management leads to generator instability, low kWh production reliability, reduced system component life and higher emissions.

Coal mine methane has proven to be safe to power mine plant operations, with a similar flame speed and auto-ignition delay to natural gas, as well as similar flame temperature and NOx emissions. The potential for detonation, misfire or backfire is low.

Caterpillar technology
Caterpillar has a population of more than 11 GW of gas generator sets worldwide in various applications involving natural gas, biogas, sewage gas, landfill gas, coke oven gas, propane and coal mine gas.

Alwar cites Caterpillar’s key technology strength in coal mine methane as the ability to utilise gas with varying methane concentrations over the life of a mining operation. This means power production during pre-mine drainage, active mining and abandoned mine operations, supported by Barloworld Power’s project management and maintenance capabilities.

Caterpillar’s common engine platforms for power generation and mining equipment facilitate efficient maintenance and parts utilisation on sites using Cat products.

It is worth knowing that Caterpillar was the first engine manufacturer to provide a complete generator set solution and has been in the power generation business...
Reference sites
According the Alwar, the Jincheng Anthracite Mining Company in China operates the world’s largest coal mine methane power plant. The plant provides 120 MW of continuous electrical power using 60 x 1.8 MW Cat gensets and 4 x 3 MW combined cycle steam turbines.

The mine sells 840 000 MWh per year to the national power utility and recovers 233 600 GJ of heat in winter. Full load system efficiency is 80%. Other reference sites include the following:

**German Creek Australia (Anglo Mining)**
- Simple cycle 32 MW;
- 16 x G3520C power plant;
- NOx limit of 500 mg/Nm³;
- 690 V to 22 kV to 66 kV.

**Abandoned coal mine in south Yorkshire, England**
- Modular solution designed for quick installation and location flexibility;
- 24 MW power plant;
- 12 x G3520C;
- Two units at each of six locations;
- Parallel to the grid;
- Operational since November 2005 and has achieved more than 40 000 hours.

**Shanxi coking coal, China**
- Phase 1: 3 x CG170-20;
- Phase 2: 4 x CG170-20;
- Total output: 12 MW;
- Commissioning 2008-2010.

**BHP Billiton Appin & Tower Coal Mines, Australia**
- 96 MW of electric power;
- 94 Cat G3516 1 030 kW generator sets delivering 94 MW continuous;
- 8 000 hours annual operation;
- 600 000 m³/day of methane consumed;
- VAM feed to power plant;
- 3.4 M T CO₂ equivalent reduction / year;
- World first coal mine methane energy innovation;
- By 2008 most units had completed 80 000 hours.

Extract from a customer feature (2014)*: Ten of the G3516s in use at Appin have operated for more than 100 000 hours without having a major overhaul, says Wal Hammond, EDL’s operations and maintenance manager at the Appin Power Station. “We have had a very good run with these engines – it’s quite incredible to think that they are running on the same bearings that were installed almost 13 years ago,” Hammond says.


for more than 70 years. The company has manufactured 450 000 gensets and has 243 000 MW of generating power installed worldwide.

Of particular significance to the coal mine methane sector is Caterpillar’s G3520C gas generator, which has an output of 1 966 kWe at standard conditions with efficiency of 40%+. Its open combustion chamber allows use of low-pressure supplies and reduces the installation cost of the fuel system. The engine is tolerant to changes in fuel concentration.

Caterpillar has several reference sites for the conversion of coal mine methane to electric power in the UK, China, Australia and Russia, among others. There are nine Cat coal mine methane solution sites in China alone.

**Barloworld Power**
Barloworld Power is Caterpillar’s dealer not only in southern Africa but also Iberia (Spain and Portugal) and Russia. In southern Africa and Russia there is a close synergy between the power business and the strong mining focus of sister company Barloworld Equipment. Comprehensive mining and power generation solutions are provided by the Barloworld group on many mines that are often very remote and need to be completely self-sufficient with strong back-up and support.

Barloworld Power provides on-site parts coverage of 95% and off-the-shelf parts availability of 98% within 48 hours. New and remanufactured parts can quickly be sourced via Barloworld Power and Caterpillar’s Southern African dealer, can provide EPC power plants within short lead times, as well as responsive product support through the life of the plant. The result is a win-win for all involved.

South Africa has the coal mines. Caterpillar has the reliable and efficient engine technology for gas extraction and power production. Barloworld Power, as Caterpillar’s southern African dealer, can provide EPC power plants within short lead times, as well as responsive product support through the life of the plant. The result is a win-win for all involved.

**Implementing methods to use methane instead of emitting it will**
- Improve mine safety and productivity;
- Generate revenues and cost savings;
- Help mitigate global warming;
- Counter the impact of the proposed carbon tax in South Africa.

Cover photograph shows power station fuelled by methane at Shanxi Coking Coal, a large state-owned coal mine in Tai Yuan City, China. The customer ordered seven Cat CG170-20 gensets in two phases. These engines supply the region with 12 MW of electrical power. Because this project passes the audit of the Clean Development Mechanism (CDM), additional revenues can be earned.
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The Department of Mineral Resources’ (DMR) minister Advocate Ngoako Ramatlhodi believes South Africa’s unacknowledged small-scale mining sector could contribute significantly to the country. In fact, the socio economic reasons to support and encourage the development of a competitive small-scale industry “are so compelling” that government is working to introduce a legalised framework embracing what the minister considers to be a vibrant opportunity for significant job creation, he tells LAURA CORNISH.

The minister was addressing in excess of 700 delegates at the Northern Cape small-scale mining conference in Kimberley in July and highlighted his passion and strategic objectives for the sector in his keynote conference opening address, as well as during a private interview later that day.

“The theme of this conference captures the essence of [government’s] intent – optimising small-scale mining for economic growth and development,” Ramatlhodi began.

South Africa’s mining roots
One should not forget that South Africa’s mining industry originates in small-scale mining activities. Firstly, in Kimberley after the discovery of diamonds in 1871 and thereafter in Johannesburg in 1886 when gold was discovered which saw numerous small-scale gold mining claims established on the outcrops of the gold bearing reefs – stretching from the East Rand to the West Rand. (These claims were later consolidated to establish the large gold mining entities).

Today, centuries later, “small-scale mining remains a permanent feature of South Africa’s economic landscape. You just have to look carefully in the rural areas to spot small-scale mining activities, searching for minerals and precious stones including diamonds, clays and sands to name a few,” Ramatlhodi reveals.

According to the minister, opportunities for small-scale mining in South Africa fall into two broad categories.

- Mining and quarrying of industrial minerals and construction materials on a small-scale; and
- Mining of high-value minerals including diamonds and semi-precious minerals such as Tyger’s Eyes.

Small-scale mining benefits and challenges
Most small-scale mining activities in South Africa are located in rural and remote areas where it is difficult to attract investment due to a lack of infrastructure and access. Despite this, Ramatlhodi says “there are compelling socio economic reasons for the DMR to encourage a more ‘formal’ small-scale mining sector.” Particularly because they have low overhead costs, he notes, and furthermore because there are multitudes of smaller deposits which can be successfully and profitably exploited but are not attractive to or economically viable for large-scale mining.

And with relatively lower capital and less complex technological requirements, the barriers to entry for locally disadvantaged entrepreneurs are less challenging. Despite this they are still considered high risk by financial institutions and as a result experience difficulties securing finance.

The minister is in fact so confident of this industry’s potential he says the following: “If we get this right, it will assist us to absorb the blows of the current economic downturn.”

Classification of small-scale mining
*Classification based on: National Small Business Amendment Act, 2003 (Act 26 of 2003)*

<table>
<thead>
<tr>
<th>Category</th>
<th>Micro</th>
<th>Very small</th>
<th>Small</th>
<th>Medium</th>
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<tbody>
<tr>
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<td>&lt;20</td>
<td>&lt;50</td>
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<td>&lt;R10m</td>
<td>&lt;R39m</td>
</tr>
</tbody>
</table>
downturn. There have been significant retrenchments in the mining sector but we can use their local skills to set up enterprises and link up with downstream beneficiation opportunities as well. “Ultimately, I believe this niche mining sector could offer more employment opportunities than the well-established mining industry.”

But the lack of access to financial assistance – one of the many difficulties encountered by small-scale mining operators – coupled with a lack of knowledge of other available financing mechanisms throughout government must be overcome first.

Other constraints faced by the sector include:

- a lack of knowledge about available training programmes which should help meet specific needs of the sector;
- out-dated mining methods and processing techniques;
- a lack of knowledge of mine and health safety standards as well as environmental standards; and
- access to markets.

**The way forward**

Government will be implementing a new framework support mechanism for small-scale mining in this fiscal year to address the many challenges and constraints which are faced by the sector.

**A HEART-WARMING STORY**

Ramatlhodi originates from a very “humble background” in Limpopo. “I was raised by ordinary people who have lifted me up to where I am today – so I want to make a difference in the lives of simple people and use my position to empower those like me or those I see myself in. My father lost his father and became a miner at the age of 14, working underground, and I carry his mining stories with me today still.”
PERSONALITY OF THE MONTH

the many challenges and constraints which are faced by the sector.

“The ideas and insights that we have for small-scale miners suggests that for us to develop it into a dynamic and sustainable small-scale mining sector we should;

- Encourage the use of best practice for mining and processing of minerals for environmental protection and for occupational health and safety through sector specific training programmes and dissemination of information pertaining to the sector;
- Promote the adoption of strategic partnerships to find sustainable solutions to challenges of the small-scale mining sector as government cannot do it alone;
- Support the development of technical experience and capacity building as well as the introduction of fair labour practices in their operations; and
- Inculcate the spirit of entrepreneurship which promotes personal involvement and commitment of small-scale miners to their ventures and promotes adherence to mining regulations.

In theory the task seems simple, but legalising these operations and ensuring regulatory compliance remains an on-going focus. From a government perspective, Ramathodi says it must be punctual and government must process small-scale applications on time.

“We must further implement training mechanisms and tighten our supervision to ensure the environment is cared for and that health and safety is not compromised. This will be achieved through intensified efforts to ensure our small-scale miners report to us on a quarterly basis and register their properties and activities. Our new IT system should take us forward with quick momentum in this regard.”

At the end of the day

“As a department we are determined to make a difference in the country and the government has already gained the support of SMMEs to assist. We therefore actively encourage the sustainable development of small-scale mining to ensure the optimal exploitation of small minerals deposits to enable this sector to make a positive contribution to national, provisional and local economies,” Ramathodi emphasises.

“Let me reiterate that the mining regulatory reforms brought about by the democratic government have ensured that the mineral and petroleum resources become a national heritage for all people of South Africa. In essence, mineral ownership has been completely separated from land ownership which means that minerals belong to all South Africans under the custodianship of the state.” MRA
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Rare earth industry status
Despite the world’s efforts to bring rare earth element (REE) production on-stream from sources outside of China, China remains the largest producer and exporter of REEs in the world. To date it accounts for 97% of the world’s supply, which in turn has seen it dominate pricing. But the global, and African REE sector seems determined to change this.

The drive to find alternative REE sources took hold about five or six years ago, exacerbated by manufacturers’ increasing reluctance to depend entirely on China for REE supply. China is further facing significant reduction in REE exports as government drives in-country beneficiation and production of REE-related products, meaning its export supply volumes could shrink.

“This has resulted in a groundswell of activity amongst various countries to identify alternative sources and the REE sector has subsequently re-emerged with vigour,” says McKenzie.

The Moly Corp Mountain Pass REE refinery has reopened after being mothballed for years while Lynas Corporation has built and opened a new refinery in Malaysia, treating a substantial volume of REEs from Australia.

Africa has also seen a REE awakening with a fair number of junior mining companies tapping into the southern Africa’s REE potential, which according to Mintek – South Africa’s minerals and metallurgy research institution – is vast. “South Africa alone has 1 Mt of contained rare earth oxides, that we know of, which have yet to be exploited,” says McKenzie.

Despite years’ of exploration and REE deposit and project verification, not a single REE player has yet to move their project into development or production. According to McKenzie, inability to raise and secure sufficient funding is the largest problem. Cash constrained markets and a weak global economy is to blame for this, he indicates, but connected with this and more importantly, so is the scale of the projects and their inability to produce a refined REE product/product batch.

No stranger to REEs
South Africa and Mintek are no strangers to the REE sector. The country produced significant quantities of REEs in the 1960s.
and early 1970s, produced largely as a by-product of heavy minerals sands operations in Richards Bay. It was supplied to the Solvay plant in La Rochelle, France for refining which still remains operational today.

“But production dwindled – largely because of the radioactive uranium and thorium found present in our heavy mineral sands and naturally occurring REE deposits. The United States quickly took the production lead in the REE sector. This was however short-lived when China started exploiting its vast rare earth deposits,” which compared to most deposits, are significantly easier to mine thanks to their clay consistency.

Having recognised the upswing in local and African REE interest, Mintek has spent the last half decade reigniting its REE processing and refining technology and believes it can now offer the solution every REE junior is seeking – an affordable refining process which until now has not been available anywhere on the African continent. To date, it has spent R100 million on developing technological innovations which could ensure the rise of a vibrant REE sector in South and southern Africa.

The REE refining solution

“There may be at least 1 Mt of REEs in the ground, spread across a range of deposits, ore types and qualities, but they are all relatively small and cannot sustain lifespans beyond five or six years. Securing funding for projects with such short mine lives is difficult,” McKenzie explains.

It also does not warrant building refineries, which are necessary to produce individual or batch REE products. “Both the Mountain Pass and Lynas refineries have 20 000 tpa capacity ranges – this is the scale necessary to build a refinery. In South Africa this would cost in the region of R5 – R8 billion and is not viably possible for individual juniors.”

This challenge could be solved using Mintek’s patent-developed concept – a South African co-operative rare earth refinery (SACREF) which would allow a central feed from various REE deposits. In order to substantiate and demonstrate this initiative, Mintek has built a REE refining pilot plant, which it officially launched to market in June.

This pilot plant mechanism, which has been in operation since mid-2014, has already successfully produced REE products and batches – such as neodymium/praseodymium, a commercially sold product.

“It proves our REE refining capabilities and will successfully work on a large scale. We believe it will stimulate the development of our African deposits and with a route to a final refined product, encourage investment in the sector. Despite market conditions, we at Mintek believe that the number of high quality deposits, in combination with our technology, will ensure their ultimate development, not in the next two or three years but more likely the next five to 10 years,” McKenzie emphasises.

“Both the Mountain Pass and Lynas refineries have 20 000 tpa capacity ranges – this is the scale necessary to build a refinery. In South Africa this would cost in the region of R5 – R8 billion and is not viably possible for individual juniors.” Alan McKenzie

“We believe that in the medium to long-term this mechanism will work. We started this project in 2011 as an intervention to assist local and regional rare earths sector players see their projects come to fruition.”
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The future

According to Mineral Resources Minister Ngoako Ramatlhodi, “The development of a central REE refinery provides South Africa with significant potential for the development of downstream industries in South Africa, particularly the manufacture of clean technologies and high technology military equipment.” He was speaking at the pilot plant launch. “It undeniably offers the country economic development, job creation, manufacturing stimulation (as opposed to exporting product only),” McKenzie reiterates.

For now, Mintek is encouraging the REE juniors to make use of the pilot plant facility, evaluate its capabilities and partner with it in realising a larger, full-scale commercial REE refinery. “As with any project, the intention would likely be to start small and ramp up to about 15 000 tpa within 15 years.”

China remains the largest producer and exporter of REEs in the world

97% China’s percentage dominance of REE global supply

48% The global percentage of Chinese REE volumes

The future

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Do junior mining companies really enjoy tax deductions?

The mining industry has experienced turbulent times and junior miners have felt this most. Apart from the real economic challenges, South Africa’s tax legislation has not made the operating environment for junior miners any easier.

Muhammad Saloojee, director and head of corporate tax at KPMG, explains that junior mining needs to take heed of lessons learnt from Canada and Australia on incentivising the junior mining sector.

The 2015 Junior Mining Indaba which took place from June 3 to 4 in Johannesburg dealt with some of the issues facing junior miners and exploration companies which include addressing the perceived red tape in the Mineral and Petroleum Resources Development Act (MRPDA) and understanding the fiscal and tax regimes.

“Notwithstanding the fact that the mining industry in South Africa has experienced several ongoing challenges in recent times, opportunities abound for junior mining companies to participate meaningfully in the industry,” Saloojee believes.

Undoubtedly, the challenges facing these companies, including access to finance, a challenging outlook in terms of the current tax legislation and acquiring the relevant licences from the South African government, are significant.

Meanwhile, market entry is also often hampered by a lack of financing. Junior mining companies struggle to secure finance and the persisting decline in commodity prices has stemmed capital flow.

While the South African government has taken some steps toward creating an enabling environment for juniors and prospectors, there are some learnings we can take from Australia and Canada that would further incentivise junior mining companies to enter the sector, says Saloojee.

One key lesson can be taken from the Canadian flow-through model in terms whereof an investor receives 100% tax deduction on all Canadian Exploration Expenses; and when the investor sells shares in a qualifying flow-through vehicle, only 50% of the gain is subject to capital gains tax.

In addition to this, additional provincial tax credits may apply for exploration undertaken in certain Canadian provinces, and because of income tax deduction, federal tax credit and provincial tax credit after tax cost of $1000 investment in a Canadian flow-through company could drop to anywhere between $519 to $319.

Australia recently enacted an Exploration Development Incentive for junior miners, which enables greenfield mineral explorers who incur greenfield mineral expenditure to forgo tax losses on exploration expenditure. Moreover, Australian resident shareholders are entitled to refundable tax offset or franking credits if a corporate entity.

Whilst South Africa has a venture capital company (VCC) tax regime that seeks to include junior miners, the model has not really worked even though the government has recently increased the investee threshold to R500 million.

One reason for this is that the VCC model is framed along the lines of an investment fund model which is highly regulated. Tweaking the VCC model could well be the trick for South Africa to align itself alongside the successful Canadian flow-through model, but will require legislative intervention and a push by industry to convince the government of the benefits.

Undoubtedly, the Canadian and Australian examples taken together with some real positive lessons on the legal/regulatory aspects in other international jurisdictions, can help South Africa unlock its mineral potential at a time when the mining industry is in dire need of bold and visionary steps to get the South African junior mining industry back onto the international map.

“While the South African government has taken some steps to create an enabling environment for juniors and prospectors, there are some learnings we can take from Australia and Canada that would further incentivise junior mining companies to enter the sector” Muhammad Saloojee
Privately owned, Zimbabwe focused gold exploration and mining company **Metallon Corporation** may be a junior in theory, but its intention to grow its annual gold ounce production volumes significantly over the next four years is undoubtedly positioning it to enter the mid-tier leagues, writes **Laura Cornish**.

**Zimbabwe is not considered a mining investment destination of choice, largely thanks to its indigenisation regulations as well as its power shortages.**

With four high grade (average 3.7 g/t based on reserves as at December 2014) operational, underground gold mines in the country, Metallon has not only proven that mining success in the country is easily achieved, but is moving ahead with a four year strategy aimed at significantly increasing its overall gold output while also exploring its mines at depth to grow its total resource base.

**The short and long-term strategy**

CEO Ken Mekani reveals the company’s growth plan in greater detail, outlining a short and long-term strategy: "How Mine is operating at full capacity; however our three other producing mines are not yet at full operational capacity. Part of our immediate and current focus is ensuring our mines reach their full design output capabilities. Not only will this lift our gold output quickly, but will drive our operating costs down, to about $800/oz once completed.”

With initiatives already underway to achieve this, Metallon should see a rise in total gold production quickly. The company anticipates producing between 130 000 and 150 000 oz for 2015, compared with 99 000 oz in 2014. Subsequently, this increased volume will ensure the company maintains its status – as producer of one third of Zimbabwe’s entire gold production.

The long-term strategy, Mekani continues, entails growing the company’s gold ounce profile to the 500 000 oz pa mark by the end of 2019 – a major growth undertaking. And this is more than a ‘pipe dream’. Metallon has already identified growth project prospects at each of its mines, which should see its objective easily achieved. This will also result in an increase in personnel – from about 3 500 at present to 4 000 when all five mines are at full operating capacity – and an additional 3 000 jobs will be created for the expansion plan. The expansion plan should also see a further drop in operating costs to around $600/oz.

After completing the necessary feasibility studies for the identified expansion projects, the CEO and his Zimbabwe-based team will prioritise their start-ups. “As our cash flow improves from each project, we will have the money to facilitate the next expansion project. Between 2015 and 2019, these projects will cost approximately US$297 million but are still subject to detailed feasibility studies.”

More than doubling its current output would be considered a massive undertaking by any mining expert, but this is not the end to Metallon’s future strategy. “We are sitting on a JORC-compliant resource of 9.8 Moz based on December 2014 reserves but all our mines remain open-ended at depth and are underexplored across their strike extensions. We believe there is sufficient exploration potential to increase our resource by between 4 Moz and 6 Moz, which we are also aiming to achieve within the next five years.”

Mekani takes a closer look at each of Metallon’s operations, describing the potential growth prospects at each.

"The quality of our assets is good, our mines are shallow and our grades are high – these give us a strong competitive advantage. We also have quality people, a close relationship with government and very supportive communities” Ken Mekani
**JUNIOR METALLON aims for the big leagues**

**THE OPERATING MINES**

Despite its age, **How mine** is Metallon’s biggest gold producer, responsible for 55% of the company’s total production. “Our plan here is to shift How from a grade orientated operation to a volume orientated operation to accommodate decreasing grades (4 g/t),” Mekani explains. “This requires increasing ore generation (extending 16N7 Shaft from 29 Level to 32/33 Level) and milling capacity by 100% (to 60 000 tpm). The mine is performing well however with an operating cost of about $580/oz – which we believe is the lowest in Africa.”

A new shaft has also been raise-bored to 20 Level so the outstanding work required to start increasing production is not cash or work-heavy.

**Shamva mine**, Metallon’s second largest producer contributing approximately 25% of total production, is operating at between 85% and 90% of its full capacity but this should move up to 100% imminently according to Mekani.

And even though it has produced about 2.45 Moz of gold over more than 100 years, the CEO says it still has a lot of expansion potential, on strike underground. The operation also has surface potential thanks to Shamva Hill – an promising open cast / “super pit” whose 80 000 tpm of ore could be accommodated following a plant expansion to 140 000 tpm.

“We also have an old slimes dam resource and test work carried out to date reveals we can recover upwards of 60% of the value in the dam. In light of the age of the material, grades could be higher than average. We will erect a sands retreatment plant to treat this material and have also already started constructing a new slimes dam disposal facility to accommodate the retreated waste material.”

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**How Mine**

- **History**: Underground producing mine since 1942
- **Resource**: 1.202 Moz (based on December 2014 reserves)
- **Hoisting capacity**: 32 000 tpm
- **Depth**: 1 km
- **Milling capacity**: 30 000 tpm
- **2014 production**: 55 008 oz
- **2015 production**: 60 850 oz (expected)
- **2019 production**: 96 579 oz (expected)
- **Average grade**: 5 g/t
- **Current lifespan**: 12 years

**Shamva Mine**

- **History**: Underground producing mine since 1893
- **Resource**: 2.622 Moz
- **Hoisting capacity**: 45 000 tpm
- **Depth**: 500 m
- **Milling capacity**: 33 000 tpm
- **2014 production**: 24 037 oz
- **2015 production**: 31 716 oz (expected)
- **2019 production**: 96 412 oz (expected)
- **Average grade**: 3 g/t
- **Current lifespan**: 10 years based on current capacity
Work has commenced on a new sands retreatment project at Mazowe mine and South African heavy engineering company Baldwin Engineering is nearing completion of the 60 000 tpm plant. It will deliver a grade of about 1.3 g/t to produce just about 2 000 oz of gold each month for six years. Construction of civil engineering work at Mazowe commenced in March 2015 and plant erection on site will commence in August 2015. Commissioning of the plant is expected in October 2015.

“From a project capital expenditure of just $9.7 million, this new retreatment plant will deliver a major $21 million in profits every year, thereby transforming the face of this operation and potentially leap frogging its position as the Group’s third largest gold contributor to second, ahead of Shamva,” Mekani highlights.

In March 2015, Metallon also appointed Fraser Alexander to construct new tailings dams at Mazowe (and Shamva). Construction of the tailing dams will be in stages, with commissioning of the first stage six weeks after construction has begun.

As with How and Shamva mines, Mazowe also has expansion potential underground.
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Unfortunately, Arcturus is the poorest performer in the Metallon stable, operating at between 40% and 50% of its design capacity. Despite a 15 000 tpm milling plant, it is only processing around 7 000 tpm.

“We have analysed the issues, instituted a new management team and are recapitalising the operation which includes re-equipping the shaft and purchasing new underground locomotives. We have in fact already received our first 6 t loco and will soon take delivery of the 2.5 t loco. We have also bought 14 new jack hammers and are servicing all the compressors to ensure the new jack hammers have an adequate supply of compressed air.”

On surface, Metallon is introducing new crushers to the plant, and is overhauling the mills and slurry pumps. “We have also ‘fixed’ the elution circuit.” The combination of all the activities above should stabilise Arcturus and see it return to its full capabilities, within the next three months.

THE DEVELOPMENT PROJECT

Redwing mine was placed on care and maintenance in 2008 but after successfully dewatering the mine above 6 Level (180 m below surface), the mine has returned to operation. There is a 1.5 Mt resource above 6 Level which is significant and warrants mining. For now, Metallon is stockpiling material until it has finished the refurbishment of the plant which

Mekani says is about 60% complete. “The plant refurbishment should be completed in September after which we will start processing about 15 000 tpm, ramping up to 22 000 tpm. Expansion beyond this is also on the table, but towards the end of the four year programme. The mine extends to 18 Level, which from 6 Level to shaft bottom remains flooded.”
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THE WITBANK COAL FIELDS ASSETS
Keaton CEO Mandi Glad says that bringing its Moabsvelden asset into production remains the company’s short-term growth priority.

Moabsvelden became a part of Keaton’s asset portfolio when the company acquired ASX-listed Xceed Resources Limited (Xceed) in February 2014. The rationale behind the acquisition of Xceed was the ultimate integration of Moabsvelden into the greater Vanggatfontein complex, as a result of the close proximity to one another, explains Glad.

As a result, Keaton plans to develop Moabsvelden as a remote pit of the Vanggatfontein operation.

Although a mining right had already been granted to Moabsvelden (included in the acquisition), Keaton has amended the already-granted regulatory approvals as their development strategy and operating model differs somewhat to that of Xceed’s.

Subsequently, the initiation of construction at Moabsvelden and its integration into Vanggatfontein awaits the granting of a water-use licence and the conclusion of a coal supply agreement (CSA) with state-owned power utility Eskom, to which the majority of its coal will be supplied.

“We have been driving the granting of the water-use licence and expect it to be awarded as soon as the third quarter this year. We are communicating with the Department of Water Affairs on a regular basis and several site visits have already taken place,” says Glad, adding that the CSA negotiations with Eskom are also progressing well.

Keaton is actively investigating the most strategic road to achieving Eskom’s 50+1 B-BBEE ownership requirements.

“We have put in place a two-phase plan, which will hopefully enable us to qualify as a supplier under Eskom’s new terms within the next 18 to 24 months. Phase 1 of our plan will be implemented within the next six months.”

IN SHORT
The development of Moabsvelden will bring Keaton one step closer to realising its medium-term goal of becoming a 5 Mtpa saleable coal producer.
Moabsvelden development strategy
The 54.7 Mt Moabsvelden resource has a ROM in situ reserve of 39.8 Mt and will be developed as an opencast operation over a 16 year life of mine. As the project is only 3.5 km west of Vanggatfontein, operating costs will be minimised as all of the ROM coal will be trucked to Vanggatfontein via a 5 km purpose-built haul road for processing.

Apart from the two existing processing plants at Vanggatfontein, which wash an average 600 tph of coal using a conventional dense medium separation process, an additional plant may be constructed at Vanggatfontein to process the coal from Moabsvelden.

Once in full production, it will produce about 200 000 tpm or 2.4 Mtpa of ROM coal, which will generate approximately 1.7 Mtpa of Eskom-quality thermal coal.

The prime economic seams at Moabsvelden are the No. 2, 4 and 5 seams which are all to be mined using opencast methods.

An initial boxcut will be opened to a depth of 60 m and will entail the removal of approximately 5 Mt of material in order to access the coal.

Moabsvelden will primarily produce product suitable for domestic power generation. The final product quality will, however, only be determined once Eskom has specified their requirements.

Moabsvelden also has various areas of high grade 5-seam metallurgical coal which will be supplied to the domestic metallurgical coal market for use in furnaces.

Moabsvelden, once in production, will generate good cash, similar to what has been achieved at Vanggatfontein” Jacques Rossouw

Vanggatfontein overview
Operations at Vanggatfontein colliery have matured well after a challenging ramp-up phase, averaging saleable production of 2.5 Mtpa.

The operation comprises a contractor-operated opencast operation which delivers 5-seam low contaminant, vitrinite dominant, bituminous coal for supply to the domestic metallurgical industry and 4 and 2-seam washed thermal coal supplied to Eskom.

Existing infrastructure on site includes a 100 tph 5-seam coal washing plant producing duff, peas and nuts and a 500 tph 2 and 4-seam plant producing domestic thermal coal.

The operation footprint also hosts twin-lined slimes facilities and a coarse discard facility with related water dams and drainage system, related water and power reticulation, filter presses, stockpile areas and access roads as well as tailings facilities.

Annual sales performance
Keaton Energy CFO Jacques Rossouw says that Vanggatfontein achieved its targets for the year ended 31 March 2015.

The colliery delivered about 2.3 Mt of washed 2 and 4-seam thermal coal to Eskom, up 4% on the previous year’s 2.2 Mt. Vanggatfontein’s 5-seam metallurgical coal sales increased 29% to 126 107 t from 97 635 t. B-grade coal sales of 46 554 t was also achieved, compared to 10 328 t in 2014, as the product gained market acceptance.

In terms of production for the quarter ended 30 June 2015, Rossouw says production was in line with the comparable quarter in the 2015 financial
underground mining conditions in the South African coal industry, says Glad, who has paid, what she calls significant ‘school fees’ towards its development.

“Despite this, we will continue to drive the turnaround at Vaalkrantz and push towards profitable operations.”

Vaalkrantz’s local anthracite sales were 69% down to 16 306 t for the quarter ended 30 June 2015 compared with 52 578 t during the first quarter.

Export sales were also down 73% to 11 000 t from 41 000 t in the first quarter. Glad is confident that Keaton has implemented the necessary changes to overcome the operational setbacks at the colliery and is optimistic that the new management team and systems will improve performance.

Despite this, she says that Keaton will continue to critically evaluate the ongoing viability of this geologically challenging mine.

THE KWA-ZULU NATAL ASSETS

Vaalkrantz update

Keaton’s other operational colliery, the Vaalkrantz anthracite mine near Vryheid in KwaZulu Natal, has presented the company with its fair share of difficulties owing to it being a narrow seam underground anthracite mine.

“The synergies and sharing of infrastructure and management between the two projects are likely to equate to savings.”

Braakfontein

Meanwhile, the possible future development of Keaton’s Braakfontein thermal coal asset, near the town of Newcastle in KwaZulu-Natal, will seal the deal, enabling Keaton Energy to earn its mid-tier coal producer status.

Braakfontein, which already has a mining right, has the potential to contribute 1.6 Mtpa of coal to Keaton Energy’s ROM production, largely from underground operations, which can produce a primary export thermal product with a secondary middlings product suitable for domestic Eskom consumption.

Glad says that Braakfontein will however remain on the backburner for Keaton until South Africa’s benchmarked API 4 export coal prices – currently at around $60/t – improve.

GOING FORWARD

Despite the tough times being experienced in the coal sector, Keaton is determined to overcome this and grow into a 5 Mtpa saleable coal producer in the medium term.

“We believe this goal is possible as we have, in the past eight years, displayed consistent growth in transitioning from an explorer to a successful junior coal producer,” Glad enthuses.

While focused on weathering the coal storm till the market turns, Keaton is already considering other markets for its thermal coal. Glad said that Keaton would look into supplying coal to the independent power producer sector in future should it prove to be a viable market.
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Junior manganese miner Tshipi é Ntle Manganese Mining has grown by leaps and bounds since producing first manganese in 2012 and doubling its first-year production volumes from its flagship Tshipi Borwa mine in the Northern Cape to over 2 Mt of manganese ore in 2014. Tshipi, which ranks among the world’s largest manganese producers, owes its success to the implementation of a clear exploration-to-mining strategy and the building of a strong management team, which brought unique skills to the operation, CEO BRENDAN ROBINSON tells CHANTELL KOTZE.

Over the course of the last seven years, Tshipi é Ntle has taken its flagship Borwa project from an exploration property to an operational mine, exporting in excess of 2 Mt, or 20%, of South Africa’s manganese in its second year of production.

Tshipi’s primary and secondary crushing circuit has a design capacity of 3.6 Mtpa

Tshipi é Ntle Manganese Mining is an HDSA majority-owned and controlled joint venture between black economic empowerment company Ntsimbintle and Australia-listed mining company OM Holdings, which own 50.1% of the venture, and Australia-based Jupiter Mines, which owns the remaining 49.9%.

The mining rights to Tshipi’s Borwa mine, formerly owned by BHP Billiton, was secured under the ‘use it or lose it’ principle in the Mineral and Petroleum Resources Development Act (MPRDA) of 2002, which stated that unused old order mining rights had to be reapplied for or sold.

What makes Tshipi unique, says Robinson, is that it is one of very few success stories of the MPRDA’s ‘use it or lose it’ principal in that Tshipi gained the rights to Borwa through a BEE vehicle, which then progressively gave up value in the rights as the asset was proved up. This resulted in the BEE shareholders owning an unencumbered stake in Tshipi.

The life of mine of the Tshipi Borwa project, located in the Kalahari Manganese Basin near the town of Kathu and adjacent to Samancor’s Mamatwan manganese mine, is likely to exceed 60 years owing to the size of the deposit, which is in excess of 160 Mt. Its manganese is a medium-grade, semi-carbonate product grading at an average 36.5%. Borwa supplies both lumpy and fines products and has the ability to screen out special products, should that be required.
While China remains the dominant market for the Borwa mine’s medium-grade manganese, a diversification strategy implemented last year will see Tshipi limiting its exposure to the Chinese market to less than half of its production in 2015.

Apart from China, Tshipi also focuses on supplying manganese to emerging markets including Russia, Ukraine and India and is increasingly supporting its specialist markets of Japan, South Korea, US and Europe.

The initial scope of work to develop the Tshipi Borwa site, which cost just over R2 billion to establish, entailed the development of an initial R500 million, 20 million bank cubic meter box cut; construction of an 8 km private rail siding and rapid load-out station; construction of a 10 MW diesel power generation plant; and the construction of a primary and secondary crushing circuit with a design capacity of 3.6 Mtpa.

Further work entailed the construction of peripheral infrastructure such as administration buildings, a change house, a comprehensive road network and 55 middle and senior management houses in Kathu.

To date, Tshipi has completed all capital works at the Borwa mine and has run the mine at levels above what was contemplated at feasibility stage.

Robinson highlights that Tshipi does however still have sufficient capacity to scale up the Borwa operation by at least 50% should it believe that it is the responsible thing to do in the context of where the global manganese market finds itself.

Unlike conventional manganese processing, Tshipi has optimised the way it processes its ore to reduce materials handling as much as possible, resulting in Tshipi reducing its fines generation below industry standard. The way in which Tshipi treats its ore has also helped the company reduce its processing losses drastically; the approach which Tshipi takes reduces processing losses to less than 1%.

“Our production target for this year is 3.6 Mtpa The installed processing capacity at the Borwa mine allows Tshipi to scale up the Borwa operation by at least 50% from its current 2 Mtpa.

“I don’t believe that hard constraints exist and neither myself, nor my team, will accept any constraint that stand in the way of us realising our future goals”

Brendan Robinson
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very much in line with last year, which means that we will produce in excess of 2 Mtpa of manganese – once again placing us among the largest manganese producers in the world.”

**Geared for growth**
Tshipi will capitalise on its relationship with Transnet going forward as the Borwa mine – able to produce well in excess of 2 Mtpa – remains constrained by the logistics of transporting its ore to port.

If solutions can be found to resolve the transportation constraints, Tshipi Borwa will be able to quickly increase its capacity to over 3 Mtpa, in line with its 3.6 Mtpa processing capacity, says Robinson.

Tshipi’s state of the art rapid load out station, which was commissioned during 2014, has enabled the loading of bulk trains in a third of the time that it takes the company’s closest competitors to do so.

This rapid loading ability positions Tshipi Borwa well to be supplied with additional trains when there is spare capacity on the network.

Tshipi’s 8 km rail siding, which joins the existing transport rail line a few kilometres from the project site, is also the largest in the Kalahari Manganese Basin, capable of accommodating over 200 wagons.

**Manganese market outlook**
Manganese – an irreplaceable ingredient in the manufacture of steel – is currently in oversupply owing to several new mining operations coming on stream. This trend is however coinciding with a contraction in global steel demand.

“I don’t expect a quick recovery of the manganese market, as the repositioning of the Chinese market may take longer than expected. We also expect a protracted period of low commodity prices in both manganese and iron ore,” notes Robinson.

What will be critical going forward is the reassessing of cost base, says Robinson, who has been privileged to have built its operation during tough market conditions.

“The benefit of this has been that we are well positioned to operate in tough market conditions because we have known no other market condition, specifically high commodity prices,” he says.

FAST FACT
Tshipi’s state of the art rapid load out station has enabled the loading of bulk trains in a third of the time that it takes the company’s closest competitors to do so.

South Africa is currently facing the challenge of cost containment, as a result of the pressure from the depreciation in the rand and the demands by organised labour as well as the escalation of service costs of suppliers and parastatals.

“We will need to build strong partnerships with labour and government in order to ensure that the African mining sector remains globally competitive.

“The future of mining is reaching economies of scale; South African producers will have to look closely at how they can achieve economies of scale with the objective of competing with other large manganese producers globally, most notably Australia and Gabon,” says Robinson.

Going forward, Tshipi aims to become the largest consistent exporter of manganese from South Africa. Robinson and his team believe that there is no such thing as a hard constraint and will not accept any constraint that stands in their way of realising their future goals.

**Dust solutions:**
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It could be said that the undeveloped Manica gold project’s journey has come full circle. It was recently ‘re-acquired’ by gold and copper focused junior Xtract Resources’ CEO JAN NELSON and chairman COLIN BIRD, who first introduced it to the market in 2006 when the project was acquired by their former company Pan African Resources. Nelson’s intimate knowledge of Manica’s progression since then will undoubtedly ensure a successful production future, writes LAURA CORNISH.

**IN SHORT**

Manica has changed hands twice since it was first acquired by Pan African Resources and is now in the hands of the CEO who truly believes in its potential and whose company has the cash to bring it into production.

The Mozambique-based Manica project has walked a slow development road. It is nearly 10 years since Nelson brought it into the Pan African Resources portfolio, and it is yet to produce an ounce of gold. But its potential remains attractive to the CEO, who had been “pursuing the asset for some time” and is now determined to complete its bankable feasibility study (BFS) and see it transform into an operating gold mine.

“Jan and I first started exploration at Fair Bride [part of the Manica property] as part of Pan African’s development programme, a company that is now worth more than £200 million in market capitalisation. It fits into Xtract’s strategy in all ways and we rate the asset highly. This is one of the few high-grade, low-cost, low-risk, open ‘pitable’ gold opportunities in Africa and the acquisition will progress Xtract towards becoming a mid-tier gold producer with all the benefits that will bring to the company and ultimately growth for shareholders,” says Xtract chairman Colin Bird.

**Time well spent**

Previous owner ASX-listed Auroch Minerals, which acquired Manica from Pan African in November 2013, spent its time verifying the project’s economic prospects and undertaking numerous optimisation studies to ensure optimal mined tonnages, throughputs and recoveries would be achieved.

“Manica’s potential has always been clear to me. Unfortunately this has never been fully conveyed nor its refractory ore body fully understood by the Australian market. As a result, attracting investment has been its greatest challenge,” Nelson continues. But now, with sufficient cash in hand and the retention of key Auroch team members, the pathway to production is clear.

**Manica’s pathway to production**

“The Auroch team’s input over the years has been invaluable to Manica’s imminent development. Their most recent optimisation work has confirmed that sulphide recoveries are in the 91% – 94%
According to Nelson, the project is just 18 months from producing first gold and will be Mozambique’s first commercial gold operation when it does. A bankable feasibility study (BFS) is about four months from completion, as are the environmental and social impact studies. The project has been granted a mining licence.

“Our aim is to build a 50 000 ozpa gold operation, which will include an ultra-fine grinding plant, at a cash cost of US$650/oz.” The ore body will be mined from surface as an open pit for five years and then from underground for a further three years. The ore body remains open at depth and there is scope to extend its lifespan by another six years from underground.

Importantly, gold grades are robust for an open pit operation with life of mine (LoM) head grades of 3.5 g/t and a low stripping ratio of 8:1. At an assumed gold price of $1 250/oz, the mine is capable of generating annual earnings of approximately $15 million before tax. Based on the above assumptions, the project has a NPV of $50.3 million with an IRR of 58%.

Start-up capital costs are estimated at
$28.4 million and Xtract is currently in discussions with several banks to finance this, which it anticipates will be mostly from debt. Underground development costs are estimated to be $14.8 million. The underground capital development does not commence until year four of the operation, after the initial project capital has been repaid, and will be funded from cash flows.

Greater potential
A JORC-compliant resource of 900 000 oz (9.5 Mt in situ) is just the tip of the iceberg for Manica. Referred to as the Fair Bride deposit, it represents only 10% of the entire licence.

“We have a 5 km x 20 km prospecting licence with a number of promising targets already identified. Fair Bride is definitely just the start of what could be a much greater project and when we are generating cash, we will actively explore these areas,” Nelson reveals. “Ultimately, we believe Manica has the capacity to deliver up to 100 000 ozpa.”

Further to this, the CEO also indicates consolidation possibilities as well as “quick-cash-generating” alluvial gold potential. The company is looking to build a small alluvial gold processing plant and operation capable of processing between 100 tph and 300 tph. Studies to implement this project are currently underway and results are due shortly. If positive, this small project could produce revenue in the next four months or so.

More than a developer and explorer
Xtract Resources owns a small gold and copper underground mine in Chile – Chépica – which has a three year lifespan remaining. Drilling activity is however Xtract Resources’ history and company goals
The company was transformed from an oil and gas business in 2013 into a mining company, through the acquisition of Minera Polar from TSX-listed Polar Star which included 85% of the already operating Chépica asset and 100% of the Mejillones phosphate project, also located in Chile. The company sold the phosphate asset six months later.

Since then the company has evaluated a uranium project in South Africa which it chose not to pursue following a due diligence.

“To reduce our company risk, we have acquired Manica and are looking into re-processing copper dumps in South Africa, meaning we are no longer a single asset company. Our focus on gold and copper also means we are not a single asset commodity player,” Nelson encapsulates. “Moving forward our vision is to bring Manica into production, ramp up throughput at Chépica and evaluate the economic potential of our Northern Cape tailings.

Mozambique
- Situated in central Mozambique
- Quality infrastructure
  - Power, water, telecommunications and local airport nearby
  - Sealed roads
- Favourable political and legal environment
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- Full Ministerial support
- 6% Royalty

Chépica produces about 1 000 oz of gold each month.
underway to confirm additional resource and increase the LoM to about 15 years. It currently extends to 400 m below ground.

“Chépica was a loss-making asset when we acquired it but immediately enhanced Xtract’s status to miner and producer. We have focused intensely on turning the operation around and officially did in May this year having implemented various plant upgrades, improved safety standards and underground stability which is challenged by tremors and rock falls underground.”

As such, the mine has increased its monthly throughput from about 3 500 tpm to about 8 500 tpm, delivering approximately 1 000 ozpm of gold.

For now, the mine is on track to achieve a profit margin of $1.2 million per quarter from the third quarter, and whilst there will be some seasonal variations going forward, Xtract expects this level of profitability to be maintained on average in each quarter.

Open pit mining has also commenced in March 2015 at two of three pits, six months ahead of schedule. A third open pit area is currently being prepared for mining. As such, Chépica is also on target to achieve throughput of 10 000 tpm by September.

“Having successfully raised $10 million in 2015 we have capitalised this mine and eliminated its debt – placing us in the position to buy Manica,” Nelson highlights.

“Moving forward, we intend to implement the necessary action plans to ramp up the project’s monthly throughput rates to about 25 000 tpm.”

Prospective dumps in South Africa

Nelson’s broader company strategy for Xtract bears a strong resemblance to Pan African Resources’, whose growth over the past years originated from dump re-processing. Nelson is looking to replicate this strategy success.

In March the company signed a deed of assignment (DoA) with Mineral Technologies International, providing the company with an option to acquire the Carolusberg and O’Kiep tailings dam, together containing 33.8 Mt of sulphide copper material in the Northern Cape.

Xtract will have a seven month option period from the date of signing the DoA to conclude drill work and metallurgical test work to evaluate the economic potential of the tailings material. If confirmed and Xtract elects to progress, it will pay $5.7 million in staged payments over a two year period to acquire 100% of the dumps.

In April the company signed a heads of agreement (HOA) with Shirley Hayes IPK (IPK), a local copper explorer in South Africa, to evaluate the Concordia project copper dumps, comprising 182 000 t of surface copper oxide material.

According to IPK, the dumps have an estimated average copper grade of 0.54%, which Xtract will evaluate and verify in its initial due diligence. IPK is the owner of Concordia and, pursuant to the heads of terms, has granted Xtract an exclusive six month period to conduct due diligence on the oxide material. In consideration for the exclusivity period, Xtract has agreed to issue IPK 3 million ordinary shares in Xtract.

Should its due diligence on oxide material confirm that it is commercially viable, Xtract will commence the construction of a heap leach operation to treat the oxide material. Xtract will be entitled to 75% of the gross revenues generated from the heap leach operation with IPK entitled to the remaining 25%. Xtract will assume all and any environmental responsibility for the heap leaching throughout the period of operations.

“Similar heap leach operations in the area yield recoveries of over 75% and the capex required to build such an operation should not exceed $500 000. With expected low running costs, this project could therefore add significantly to the cash generating capacity at the Chépica mine and the management team is actively pursuing opportunities to acquire more material of this nature. The company will undertake a detailed due diligence exercise on the oxide material and will report its findings once completed,” Nelson concludes.

$12.5 million

The value of the Manica acquisition (Auroch originally acquired the asset from Pan African in exchange for 25 million Auroch shares and $2 million)
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Southern African diamond development and exploration company DiamondCorp’s 74%-owned Lace diamond mine in the Free State province of South Africa is steadily ramping up to achieve commercial production during the last quarter of this year – several months ahead of the original production plan, CEO PAUL LOUDON tells CHANTELLE KOTZE.

IN SHORT

DiamondCorp’s Lace diamond mine has an estimated 13.3 million carats of diamonds at a grade of 40 cpht and a history of delivering large gem-quality diamonds, including pink and lilac diamonds.

Having raised the maximum under its open offer and placing at £5.27 million in July, the Southern Africa focused miner has raised enough working capital to bring the first mining block at Lace – the high-grade Upper K4 (UK4) block – into production this year. Development work at the 310 m level and bulk sampling of the UK4 block is currently under way at Lace ahead of full production. DiamondCorp intends to mine the UK4 block by means of long hole open stoping, using a Sandvik 421 long hole drill rig, while the 470 m level block cave is established.

At full production, the UK4 block will be mined at the rate of 30 000 tpm, producing carat grades of between 50 and 60 cpht at a cost of R200/t.

Loudon explains that the reason the kimberlite pipe is initially being mined using a long hole stoping method is to ensure that the project generates early high cashflow ahead of the block cave development.

For the remainder of the year and during 2016, all mining activity will be concentrated on the UK4 block. DiamondCorp will also continue to develop the twin decline shafts, currently at the 310 m level, down to the 470 m level – where it will establish the first block cave during 2017. When the block cave propagates, the company will withdraw from the UK4 block and focus on mining the block cave, notes Loudon, adding that any unmined ore in the UK4 block will ultimately fall into the block cave.

Lace diamonds

Lace has a history of producing large stones including 122, 72, 53 and 47 carat stones. Since acquiring the mine in 2005, DiamondCorp has treated a total of 1.6 Mt of tailings – treating 150 000 t of tailing in 2014 alone, before stopping the retreatment in August last year.

“This has been valuable in terms of providing us with insight into what we can expect to find in the main kimberlite pipe,” says Loudon.

About 80% of the diamonds from Lace are gem or near-gem quality. The Lace
Juniors in Southern Africa

Around an 8% annual increase in basic salary for most categories, along with a progressive lift in the Mineworkers and Construction Union, covering all employees at the Lace mine. The agreement is based on DiamondCorp in February this year signed a four year wage agreement with the Association of

Four year wage agreement secured
DiamondCorp in February this year signed a four year wage agreement with the Association of Mineworkers and Construction Union, covering all employees at the Lace mine. The agreement is based around an 8% annual increase in basic salary for most categories, along with a progressive lift in the lowest categories to R12 500 per month basic salary over the four year period.

Resultantly, the mine has sufficient water in storage to meet all of its kimberlite processing requirements for 2015 despite the third year of below average rainfall in the Free State.

Meanwhile, the diamond recovery plant, built in 2008, is a conventional dense media separation plant with the capacity to treat ore for the +25 year expected mine life. The plant has a 200 tph front-end capacity which will enable DiamondCorp to mine up to 100 000 tpm or 1.2 Mtpa of ore.

The plant will initially only operate at 30% capacity over the next 12 months while it processes the 30 000 tpm of UK4 block, but when productions increases and the mine reaches full capacity from the block cave, the block cave, total diamond output will resultantly increase.

Loudon says there is significant scope to optimise the processing plant in future if necessary, with the addition of a high-volume optical and x-ray waste sorter. The waste sorter will enable DiamondCorp to reduce the volume of internal waste rock from kimberlite ore prior to processing. This will translate into significant water and electricity consumption savings, while also increasing processing rates.

Loudon says that DiamondCorp is able to mine much faster than it can convey the ore to the processing plant. “If we can sort the waste out, we have the potential to increase production rate from the mine to the existing plant, as our conveyor belt capacity from underground is 400 tph.”

Life after Lace
DiamondCorp adopts a very high hurdle rate when selecting a project. Loudon says that he evaluates assets by benchmarking them against the Lace mine.

When considering whether to acquire a new asset, the asset must be sizable and operate at a greater than 50% operating margin, or a greater than 50% internal rate of return.

Because most diamond projects do not meet these criteria, Loudon says he is still on the hunt in the Southern Africa region for a new project should one present itself.

However, in the absence of finding another project that meets the company’s criteria, DiamondCorp will adopt a return of capital model, which means that all the cash generated from the Lace mine will be returned to the shareholders – maximising dividends to shareholders.

Infrastructure and diamond processing
The Lace mine is serviced by a tarred road linking it to Kroonstad and the north, while electricity to the mine is provided through the Eskom grid. There are also offices, workshops and accommodation for senior staff on the mine.

A second 150 000 m³ surface process water storage dam has also been established on site to store process water, rain water and water pumped up from the kimberlite pipe.

Four year wage agreement secured
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Torre’s business is the value added sale and rental of branded capital equipment, the distribution of high quality parts and components, the delivery of critical support services and the provision of financing solutions in support of our customers’ expansion programmes.
Private South Africa-focused mineral exploration and development company, White Rivers Exploration, has signed its second project development joint venture (JV) agreement to develop two onshore gas assets in South Africa, writes CHANTELLE KOTZE.

**White Rivers Exploration** signed a Memorandum of Understanding (MOU) in July with South African gas developer Windfall Energy to facilitate the joint exploration and development of White Rivers’ Heilbronn and Kroonstad natural and coal bed methane gas assets in the Witwatersrand Basin. The formal JV Agreement is expected to be signed this month.

White Rivers’ executive chairman Neil Warburton says the JV aims to fast-track the development of the Heilbronn and Kroonstad gas assets at a time when alternative energy supplies in South Africa are being sought, and at a time when gas is strongly being considered as a promising part of the country’s energy mix.

“As such we thought it good to not only apply for an exploration right application to develop different minerals but also to develop all types of gas on two of our mineral resource tenements,” says Warburton.

White Rivers has thus far successfully been awarded Technical Cooperation Permit’s (TCPs) by the Petroleum Agency of South Africa for both Heilbronn and Kroonstad.

**Development terms**

Under the terms of the JV, Windfall will fund all costs associated with the exploration and development of the two gas resources to the point of the granting of a production right on each asset to earn a 51% participating interest. Windfall also brings a wealth of technical gas expertise with it into the JV.

While developing the gas market through a progressive marketing campaign for its own onshore petroleum production right, Windfall will also develop the market for other gas developers too, says Warburton.

Upon achieving an exploration right for either asset, Windfall will earn a 30% interest in the gas rights of the respective asset.

Upon achieving a production right for either asset, Windfall will earn a 51% interest in the production right and first right of refusal to procure any gas produced on normal commercial terms.

Once a production right has been granted, both companies will contribute pro rata of equity participation to achieve commercial production.

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**IN SHORT**

With a primary focus on gold and coal, White Rivers Exploration is aiming for rapid advancement of priority projects, namely its Beisa, Heilbronn and Kroonstad assets in South Africa’s Witwatersrand Basin.
The JV will enable White Rivers, once in production, to pipe the gas to Windfall’s production plant, near Virginia in the Free State, for processing.

Subsequent to the signing of the MOU, the parties have begun developing a capital works programme and budget for the project.

The parties will then begin to analyse the valuable data collected by White Rivers from over 3 500 drill holes in the Witwatersrand Basin over the past four or five years relating to the gas assets.

The data includes information on the structural formations, faults, rocks and structures intercepted by the drill holes.

“From this information, our exploration team in conjunction with Johannesburg geological consultants Shango Solutions, will create a new structural interpretation for the Heilbronn and Kroonstad gas assets to help us target our first round of drilling, explains Warburton.

Dependent on the success of the drilling and the awarding of the gas production right, the parties expect it to take at least two to three years before it produces its first commercial gas.

Besides producing methane gas from faults within the earth’s structure as well as the coal seams, the Heilbronn and Kroonstad assets are also poised for gold and coal mining.

Possible challenge

The biggest hindrance at the moment in getting a production right are the regulations surrounding methane gas extraction in South Africa, specifically new environmental impact assessment requirements, which relate particularly to fracking but also to the capture of methane gas from existing fractures within the earth’s structure.

Being one-size-fits-all regulations, the requirements may be misunderstood and could create uncertainty or confusion around the difference between high impact fracturing compared with the low impact extraction of methane from existing fractures, says Warburton.
Flagship project progresses

The partnership with Windfall follows White Rivers’ exploration JV, signed in September last year, with South Africa’s third largest gold miner Harmony Gold.

The exploration JV was established to explore and develop gold resources at White Rivers’ flagship Beisa project and abutting exploration areas within Harmony’s adjacent Target mine operations in the Free State.

The JV, in which White Rivers owns 65% of the JV and Harmony Gold a 35% stake, is anticipated to cost R50 million to bring the Beisa gold resource up to prefeasibility stage.

Harmony will be entitled to earn an additional 16% equity stake in the JV once a positive bankable feasibility study based on the use of Harmony’s abutting Target mine underground and surface infrastructure has been concluded.

To date, the exploration JV has now consolidated all historical data gained over the past 12 months on the exploration JV project and expects to release an initial JORC-compliant gold resource in September, with the scoping study, being undertaken by Johannesburg-based mining engineering consulting firm BARA Consulting, expected in December.

“We expect the Beisa JV to be host to a multi-million ounce gold resource,” says Warburton.

As the largest tenement holder in the gold-rich Witwatersrand Basin, White Rivers has 31 prospecting licences covering a total area of 3 198 km² at varying stages of approvals with 20 executed, one in process of execution, three granted and seven accepted.

White Rivers’ exploration projects are considered highly prospective for gas, diamonds and manganese, coal and uranium as well as gold – with the potential to develop multiple gold-bearing reefs.

Near-term listing goal

Founded in 2007 in Johannesburg as a private company by Australian explorer and shareholder Mark Creasy, White Rivers aims to transition from a private company solely funded by Creasy into a significant public multi commodity company.

“We will continue to fund the company as we grow,” Warburton says that White Rivers will over the next 12 months transition into a publically-listed company. It is considering listings on the JSE, AIM, and the SGX.

Bara Consulting is an engineering consultancy established in 2013 by experienced industry professionals to offer high quality consulting services to the global mining industry.

The company has a wide range of engineering skills available to meet clients requirements both locally and internationally, which include:

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The HD series is the perfect choice for demanding industrial applications. The advanced design technologies are setting new standards for industrial gearboxes. High precision ground gears, closely spaced reduction ratios and a wide range of mounting options, guarantee excellent configurability for every application.
North River Resources, the AIM-listed mine developer, has increased the confidence in its planned ore processing solution for its Namib lead zinc project in Namibia following the completion of supplementary metallurgical test work. This is good news for the company considering its challenging ore body mineralisation.

**IN SHORT**

Returning the Namib project is North River Resources’ primary focus at present. According to the company’s mine development plan, its operational plant will process 250 000 tpa.

**Based on** 250 000 tpa, the project demonstrates a payback of just one year and four months, established on a 425 000 t indicated resource and 234 000 t inferred resource mineral inventory.

The project has a current JORC resource of 250 000 tpa, with resulting underground in situ metal inventory of:

- 30 709 t of lead;
- 80 640 t of zinc;
- 1.76 Moz of silver.

“The optimisation work was carried out with a definitive and robust processing solution for our stand-out Namib Lead Zinc mine in Namibia. The improvement in operational control that this process flow sheet provides will add significant value to our preparations for front end engineering and design ahead of a construction decision,” says North River CEO James Beams.

**The challenge**

In January 2015, North River appointed ALS Laboratories to conduct a detailed supplementary test work programme aimed at addressing the inconsistent grade recoveries experienced via processing routes proposed as part of the definitive feasibility study (DFS) which referred to a ‘lack of agreement’ on the performance of different samples.

The lack of a definitive processing solution in the DFS derives from the fact that the mineralisation at Namib contains the iron sulphide mineral, pyrrhotite, which responds to flotation in a similar manner to sphalerite and marmatite, which are the primary zinc ore minerals at Namib.

This response can lead to a build-up of pyrrhotite, and consequently iron, in the zinc cleaner circuit. While iron is common in lead-zinc deposits, it is normally present as pyrite, which can be more easily depressed during flotation than pyrrhotite.

The implications of the presence of pyrrhotite were experienced first-hand...
in the previous operation and, as a result, intermediate products had to be dumped to tailings in order to maintain saleable concentrate quality, but at the sacrifice of zinc recovery during processing.

At the time of publication of the DFS, the locked cycle tests which were underway had not yet been completed. The DFS postulated the use of magnetic separation as a means of removing some of the pyrrhotite from the circuit, but the subsequent results did not support this proposal as zinc recovery was compromised. Therefore the focus of the latest work was to produce a robust operating environment, taking into account the main variables in mineralogy and flotation chemistry.

Optimisation work
To properly liberate the generally finer zinc minerals, a separate zinc regrind circuit is required to optimise the overall zinc recovery and concentrate grade. Extensive mineralogy was conducted as a precursor to flotation test work to determine the most effective grind size. A primary grind of around 80% passing 100 micron level has been selected and this is also a practically achievable level within the proposed processing system.

Following this, the fundamental issue in improving the differential flotation performance was the selection of an optimal reagent regime. The use of zinc sulphate as a reagent, commonly used in other lead/zinc operations, was identified as a major contributor to slowing down the sphalerite recovery rate, making effective separation from the pyrrhotite more difficult.

Consequently, test work was necessary to eliminate zinc sulphate from the flowsheet and identify a more selective lead collector. These newer collectors, replacing the more traditional xanthates and zinc sulphate, have proved successful in the test work.

Using the optimised grind and new reagent regime, the company has developed a robust processing methodology which can operate with consistent results with a wide range of mineral composition and particularly with the variable pyrite and pyrrhotite content. These results are a significant development, removing any residual concern over operational variability in the processing plant and demonstrating robust controls of the final saleable products. This greatly assists in overall project bankability as the Company moves forward with its financing plans and, in particular, its discussions with debt financiers.

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ELB Engineering Services’ supplies crucial stacking & train loading systems

ELB Engineering Services’ materials handling system for Assmang’s Black Rock mine operations project specifically includes the full design, engineering, supply, delivery, installation and commission of a train loading system, which has been sized to accommodate the filling of a 104 wagon export rake in two hours as well as the supply of two stackers that will feed the stock yards for the train loading system.

Schenk Process Africa innovates train loading

Process and weighing technology specialist Schenck Process Africa, together with ELB Engineering Services, has developed the complete train loading system for Assmang’s Black Rock mine operations expansion. Schenck Process Africa guarantees that railway wagons are loaded to exact specification to prevent wastage and possible derailment thanks to its state-of-the-art gravimetric train loader technology.

Chute upgrade project success

Weba Chutes successfully undertakes chute upgrade at Amplats’ Mogalakwena North mine

Record-breaking belt reeler

Sasol’s Impumelelo mine in Secunda takes receipt of world’s largest vertical belt reeler

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Split roller bearing specialist OE Bearings guarantees less maintenance downtime with its bespoke split bearing design

Cranes worth their weight in gold

Johnson Crane Hire provides heavy lifting solutions flexibility
The contract to design and fabricate a new 5 500 tph bucket wheel reclaimer for Assmang’s Black Rock Mine Operations project has resulted in a highly successful partnership between materials handling expert Sandvik Mining and fabrication specialist Efficient Engineering. Black Rock Mine Operations is operated by Assmang Proprietary Limited, which is jointly owned by Assore Limited and African Rainbow Minerals Limited. Once complete, this project will represent improved delivery timeframes and significant innovations in reclaiming technology – both significant achievements considering its undertaking is 100% local, writes LAURA CORNISH.

The number of major projects in South Africa’s mining sector is few and far between at present – largely the result of weak commodity prices and a general mining down cycle period.

The Northern Cape’s Kalahari region however is home to one of the few major billion rand projects currently underway – which will see Assmang’s Black Rock mining complex increase its saleable manganese production output capability.

Initiated a year and a half ago in February 2014, the project aims to modernise the operation and ensure the mine’s sustainable longevity. It is further expected to curtail cost increases. The introduction of new surface infrastructure is key to the overall project’s success – which will streamline materials handling efficiencies in future.

Further enhancing a solid relationship
Integral to the materials handling component of the overall expansion project is the inclusion of a new bucket wheel reclaimer, designed to feed a new 5 500 tph reclaim conveyor which will transfer pre-selected manganese product onto a new rail load-out station and finally into a train destined for global markets.

Responsible for the design and delivery of the new bucket wheel reclaimer is Sandvik Mining (Sandvik), whose relationship, equipment and service track record with Assmang extends back many years.

The company’s flagship Khumani iron ore mine, also in the Northern Cape, operates 14 Sandvik machines – specifically eight stackers and six reclaimers – supplied between 2009 and 2012 out of China.
Local partnership showcases reclaiming success
Sandvik submitted its tender for the new reclaimer in February 2014, was awarded the contract in July and immediately ‘kicked into gear’. And while erection on site has yet to begin, the project already demonstrates a milestone materials handling achievement for the company – in terms of design and fabrication.

A frank ‘lessons learnt’ session sparked a detailed engineering review and a joint effort approach was initiated to solve common problems and engineer better solutions to operational challenges based on past experiences.

The client’s operational team was instrumental in defining the challenges faced to produce solid design solutions that will benefit the project and operational requirements well into the future.

“This joint effort approach to solving problems demonstrated a true passion we all have for the ‘art’ of mining and the unique challenges it presents. Working together will always produce better results than trying to work in isolation,” says Jackson. The result is the birth of multiple novel innovations and industry firsts.

Within months of the contract award, Jackson and his Sandvik team had appointed Efficient Engineering to fabricate all of the machine components – a step away from its traditional Chinese or South Korea fabrication route. “Barno’s upfront desire to provide local work opportunities, promote local industry and increase the overall local content for the project quickly became a shared vision amongst every team player and will represent a true South African success story once complete,” Graham Priest-Jones, Efficient Engineering’s project manager, points out.

“Working with local suppliers not only improves the country’s local skills set but helps keep our industry alive. We are extremely proud of the achievements we have made already in doing so,” Barno Jackson.

“Our vision for the future includes continuing this partnership with Efficient Engineering. Working with local suppliers not only improves the country’s local skills set but helps keep our industry alive. We are extremely proud of the collective achievements we have made so far on this project,” Jackson reiterates.

Sandvik and Efficient Engineering have been working together on the reclaimer since November 2014 and currently are on track to commission the machine in 2016.

Innovations significantly reduce maintenance requirements
One of the most significant improvements Sandvik intends to demonstrate through its new bucket wheel reclaimer is a major decrease in bucket wheel maintenance down time. “Our common goal was to see what we could do differently in our design that would enable us to do a complete bucket wheel change out in 12 hours,” Jackson reveals. “This is a significant time saving considering it can take up to 12 days under normal circumstances.”

“With bucket wheel lifespan lasting between three and six months between refurbishments, the additional operating time achieved by the time saved over multiple change-outs will result in millions of rands of savings,” Priest-Jones adds.

“We have also changed the lubrication intervals, monitoring systems and type of lubrication products used,” Jackson continues. “Mining companies suffer huge financial losses as a result of unexpected breakage downtime due to lubrication issues often stemming from a lack of maintenance and upkeep of equipment. This is a result of inadequate skill levels within the operations environment, so again, this break from ‘traditional thinking’...
learnt from Sandvik’s previous reclaimer builds in South Korea to ensure optimal fabrication processes and procedures,” Priest-Jones adds.

Sandvik is in fact so confident in its new bucket wheel reclaimer innovation designs that it intends to patent certain features jointly developed with Assmang’s project team.

**The additional benefits of going local**

Ensuring the best quality materials, details and service delivery is a natural benefit when working with local fabricators such as Efficient Engineering. Import and transport expenses are also drastically reduced, a cost saving which is passed on to the client as well.

“Thanks to Efficient Engineering’s modern, large-scale facilities, we are also able to pre-erect all the large components before they are sent to site. Pre-assembly guarantees faster erection on site and greater ease of mind that there will be no unforeseen challenges during final assembly, commissioning and operation start-up. In other words, a lot of risk is eliminated,” Jackson and Priest-Jones agree.

“It should take an average of two weeks to transport each of the major reclaimer parts to the Black Rock Mine Operation using abnormal transport – seven large components have been planned for this from Efficient Engineering’s premises. The planned benefit is reduced site time, something that would have been difficult to achieve if the machine was fabricated in China,” Jackson outlines.

47 years and stronger than ever

Efficient Engineering’s journey since it was first established in 1968 is one of phenomenal growth and success which today is seeing it continue to work on large-scale projects for blue chip mining clients such as Assmang. Today it has what Priest-Jones confirms as state-of-the-art, large-scale facilities capable of fabricating and/or heavy engineering the mining and petrochemical sector’s massive equipment requirements. Management also has in excess of 100 years combined experience, excluding its artisans.

The company has developed an “unrivalled” standard of workmanship that has enabled it to be fully equipped to undertake any engineering job, regardless of size or complexity – from dragline buckets and earthmoving truck bodies, to stackers, reclaimers and pressure vessels.

“Our ‘plug and play’ approach mitigates a lot of risk which in turn returns significant cost savings to clients which is a big value add.” Graham Priest-Jones

**Steps moving forward**

The first components of the reclaimer will be ready for transport to site from August onwards. The first 50 m of rail for the machine is in place, and the reclaim conveyor fabrication is progressing.

Once in operation, Jackson says Sandvik will monitor the machine’s performance for the first year to ensure it performs to expectation. The Sandvik aftermarket team will oversee all its maintenance requirements once operational.
The company’s manufacturing comprises four phases in total:
- Phase I – a 7 000 m² area comprising offices, fabrication facilities and a 1 200 m² computer numerically controlled machine shop;
- Phase II – a 4 200 m² fabrication facility;
- Phase III – a 2 000 m² sheet metal fabrication facility; and
- Phase IV – a 8 600 m² fabrication facility, offering 200 t crane capacity.

Efficient Engineering has a multitude of overhead cranes at its disposal, the largest including a 100 t with a 50 t auxiliary hoist as standard.

“Our relationship with Sandvik is longstanding,” says Priest-Jones. “But through this project, we have taken our relationship to a new level – moving from fabricating specific items to an entire machine.” Operating with more than 230 dedicated employees, who are fully qualified and committed to producing work of outstanding quality, Sandvik is ready to further cement its relationship with Efficient Engineering moving forward. Together, the two companies intend to carry the innovation and quality build momentum started at the Black Rock project into the future. “The communication pathways between our two companies have been particularly successful and have contributed significantly to the successes we have already achieved and those we will continue to achieve throughout the duration of the project until its completion,” both project managers agree.
ELB Engineering Services is a global leader in bulk materials handling, providing a world class capability encompassing the supply of turnkey packages from run-of-mine tip to ship loading equipment.

**The technologies offered include the following:**
- Belt conveyors
- Overland conveyors
- Pipe conveyors
- Stockyard machines/Stackers
- Bridge reclaimers
- Portal reclaimers
- Bucket wheel reclaimers
- Ship loaders
- Train loading stations
- Tippler stations and charger cars
- Telescopic portable radial stackers

**These technologies are packaged in any of the following options:**
- Pre-feasibility studies
- Feasibility studies
- Flow sheet assessment
- De-bottlenecking
- Machine refurbishment studies
- Machine refurbishment
- Lump sum execution
- Construction management
- Training
- After Sales support
- Commissioning and Maintenance packages
ELB CEMENTS
its leading position in stacking & train loading systems

ELB Engineering Services’ contribution to the new materials handling systems for Assmang’s Black Rock Mine Operations project has further cemented its position as a leader in train loading systems in manganese and iron ore applications in Africa – thanks largely to its in-house design and intellectual property, writes LAURA CORNISH.

Situated about 80 km north-west of Kuruman town in South Africa’s Northern Cape, Assmang’s Black Rock Mine Operation; a large, underground operation consisting of various shafts. It is operated by Assmang Proprietary Limited, which is jointly owned by Assore Limited and African Rainbow Minerals Limited.

This new project will see it ramp up production to an increased capability of manganese product for local and international markets.

Crucial to the overall success of this project is the incorporation of new materials handling systems designed to cater for increased manganese capacity. In June 2014, ELB Engineering Services (ELB) joined the team responsible for this portion of the overall project having been awarded the rapid train loading system along with a 531 m long feed conveyor. The surface scope of the project is being managed by DRA Projects.

In more detail, ELB’s contract specifically includes the full design, engineering, supply, delivery, installation and commission of the train loading system, which has been sized to accommodate the filling of a 104 wagon export rake in two hours. The feed conveyor (for the train loading station) will accommodate a maximum sustained feed capacity of 5 500 tph with a nominal feed capacity of 4 200 tph. Additionally, ELB will also design, build, erect and commission two new rail mounted stackers.

Global recognition – already

“Although the train loading system is yet to be completed, it has already been rated one of the best in the world from an accuracy and design point of view – based on the inclusion of world-class technology and material flow controls,” says ELB chief executive Stephen Meijers.

The train loading station incorporates clamshell gates, profile chutes and control systems from measuring and process solutions specialist Schenck Process. “This formed the basis of a sound working relationship allowing the two companies to offer a world-class solution to the Black Rock Project,” Meijers notes.

“And although we have designed three such stations to date, I am confident that the train loading station design for the Black Rock project will be superior to that of our more recent Khumani train loading system (which is deemed to be world class) – having
taken into account some additional design features,” he continues.

The rapid train loading system is envisaged to be commissioned in 2016.

**Stacking excellence**

ELB has a sound, well established and long working relationship with Assmang and DRA. It is these relationships, together with ELB’s materials handling capabilities, which saw its contract expand to include the two rail mounted stackers that will feed the stock yards for the train loading system.

In partnership with FAM, Germany, an international materials handling expert, ELB has over the years provided numerous stackers, reclaimers and ship loaders to the South African market. “For the Black Rock Project specifically, the stackers reinforce ELB’s capability as a world leading solutions provider to the mining environment.”

Excluding basic engineering and the supply of the bogies for the stackers, the remainder of the machines will be detailed, designed and fabricated in South Africa along with the conveyors and rapid train loading system. “We are proud to be a leading materials handling solutions provider in South Africa as one of the few remaining, totally owned South African companies,” Meijers concludes.
Zero tolerance to loading mistakes!
Schenck Process train loader – accurate, high-speed loading system

Schenck Process train loaders are designed to operate reliably in the harshest mining environments. High temperatures, dust and water are commonplace in the mining industry. Schenck Process train loaders will operate reliably for extended periods and require only routine maintenance.

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Process and weighing technology specialist Schenck Process Africa will together with engineering expert ELB Engineering Services (ELB) deliver a train loading system for the Black Rock Mine Operations project that celebrates local design and execution as well as state-of-the-art technology and innovation, writes LAURA CORNISH. Black Rock Mine Operations is operated by Assmang Proprietary Limited, which is jointly owned by Assore Limited and African Rainbow Minerals Limited.

**ACHEIVING new levels of innovation in train loading**

Headquartered in Germany, Schenck Process has over the past few decades established numerous branches across the globe, which in addition to South Africa includes Australia, Brazil and China – all significant mining-focused regions. Today the company specialises in vibrating screens as well as all process weighing technologies including belt scales, weigh bridges and train loading systems.

“Over the years we have supplied our equipment and technology to all major mining territories, which have largely originated from project successes in Australia,” says Schenck Process Africa MD Willem Kempen. This largely applies to train loading systems – Schenck Process has numerous operating installations Down Under. “Through these projects, we have also developed a number of specialised components for use in our train loaders which are specific to their applications and are tried, tested and reliable.”

**Train loading success for Assmang originates at Khumani**

“In 2009 Schenck Process Africa was approached by ELB to partner with it in delivering a new train loading system for Assmang’s Northern Cape-based Khumani iron ore mine. And we successfully provided a state-of-the-art gravimetric train loader (measures by weight, not volume) for the South African project,” Kempen points out.

Although the company made use of its known and existing Schenck Process technologies, it also developed a number of new technologies/innovations as the project progressed, specifically aimed at the South African mining/train loading market, which are not utilised in the Australian market. “These innovations reduce mine owner and railway operator risk and improve safety as well. In essence they guarantee that the railway wagons are loaded to exact specification to prevent wastage and possible derailment,” Kempen explains.

A closer examination of these innovations reveals an improved interface between railway weighing and bin weighing. Tighter loading tolerances were also introduced, as per the railway operator’s requirement. According to Kempen, not only does the Khumani train loader meet all the expectations associated with the gravimetric train loader, it exceeds them “comfortably”.

“Further to the project’s completion, we also developed a ‘unique’ method of verifying the loading accuracy to the National Regulator for Compulsory Specifications’ requisites and local metrology laws – something which had not been achieved before.”

And according to Kempen, the result of
the system installed at Khumani has seen the mine emerge as “a pioneer in correct train loading. I believe our combined success at this mine played a significant role in seeing ELB and Schenck Process take on the new train loading system project at the Black Rock Project.”

**Black Rock Project – taking train loading to the next level**

Kempen believes the specifications for the new Black Rock Project’s automatic train loading system are largely based on the successes and lessons learnt at Khumani. “The project does however require a higher level of technical weighing innovation, because the train loader needs to cater to different wagon sizes – in terms of physical dimension and payload.”

Schenck Process Africa is working in partnership with ELB again – a partnership which acknowledges and highlights each company’s strengths. For the Black Rock project, Schenck Process’ train loading scope of work includes the supply of all mechanical moving parts including the gates, the complete weighing system for the weigh bin (which allows the quantities going into the wagon to be determined), all ancillary systems including calibration, hydraulic and electronic systems together with instrumentation and also the chute that allows material to be deposited accurately into the wagon. “We will also supply an in-bound and out-bound weigh scale used for checking the final mass of the wagon before and after it is full.”

Having worked together on a similar project at Khumani, Schenck Process Africa and ELB’s working relationship is a close one and both have been working together closely since the project award in June last year – from design stage. It remains on schedule for commissioning in 2016.

“Where our previous train loading project depended more on our international sister company’s input, at the Black Rock Project we are implementing a system which is almost entirely local, thanks to the development of our own in-house knowledge here in South Africa. The company’s Australian office will complete a project overview to ensure best practice is maintained,” Kempen concludes.

**Supplying locally, servicing locally, in the Northern Cape**

“Following completion of the Khumani project we realised a significant aftermarket feature – a train loader is more than just a piece of equipment left to run once commissioned. Like all major equipment it needs constant service and support,” Kempen notes.

Schenck Process Africa subsequently established a full train loading service capability, with a Schenck Process technician situated in the Northern Cape, capable of providing support and maintenance, quickly and efficiently.

Another part of local service, the company is also capable of local design, fabrication and assembly which means replacement components can be supplied with minimum downtime delay. This also delivers significant cost saving advantages.

**FURTHER UPGRADES AND INNOVATIONS AT KHUMANI**

Schenck Process Africa has also been involved in an upgrade of the original train loader at Khumani – bringing the train loader in line with railway operator loading specifications.

“We also supplied the mine with a purpose-built railway scale to weigh the railway wagons for verification purposes. In this specific instance, we can weigh a two wagon set simultaneously – a world-unique concept. In weighing both wagons together, Khumani doesn’t need to uncouple the wagons first.” This project was done in partnership with Schenck Process Africa’s German sister company which specialises in railway weighing applications.

The company has also supplied bin weighing systems for another major iron ore project in the Northern Cape region.
Anglo American Platinum has successfully completed a chute upgrade project at its Mogalakwena North mine thanks to Weba Chute Systems.

The chutes were installed originally in 2006 and subsequently lined with ceramic tiles in 2013 in order to cope with the sticky fines material. “This project showcased the total solutions approach adopted by Weba Chute Systems in being able to respond to specific client problems and challenges,” Ted Cruickshank, Project Manager, says.

“At the beginning of 2014 we installed a temporary bypass leg on one chute in order to bypass the material onto a stockpile,” Cruickshank explains. Following this, Weba Chute Systems, under the auspices of WorleyParsons RSA, was awarded a contract to remove the temporary leg and place a permanent fixture on both chutes.

“Slight modifications had to be carried out to the existing chutes in order to incorporate the new legs, feeding the outgoing conveyors at various angles. Therefore this was quite a complex project that required a lot of time and ingenuity on the part of Weba Chute Systems in coming up with an appropriate solution,” Cruickshank says.

The incoming belt was a 1 050 mm conveyor with a speed of 2 m/s and a material bulk density of 2.6 t/m³. The maximum material size was 10 mm and a required tonnage of 600 t/h. However, a maximum tonnage of 1 000 t/h is possible with the solution provided by Weba Chute Systems.

Cruickshank explains that Weba Chute Systems’ upfront involvement in projects right from the design stage helps to mitigate many of the problems associated with transfer points. “Consulting with us during this vital phase means that we can bring the experience and expertise we have gained during thousands of installations to bear on an individual project,” he says.

It also eliminates the situation where transfer points need to be redesigned after installation because certain critical factors have not been taken into account.

One of the most common problems associated with conventional chute design is where the product drops from any height directly onto the belt. “Such a basic design fault causes the most catastrophic damage and cost, as the impact of product falling directly onto the belt results in excessive wear and, in the worst-case scenario, can even result in tearing of the belt.

In addition to the impact, excessive spillage also results in increased maintenance requirements. This has a direct bearing on both productivity and costs, due to unnecessary downtime and component replacement,” Cruickshank says.

The Weba Chute System is based on a ‘supertube’ or cascade effect that results from those occasions when material runs on material. This highly innovative approach to the dynamics of bulk materials handling results in significant cost savings for clients. It also showcases the considerable expertise and experience that allows Weba Chute Systems to be able to engineer solutions for specific client requirements.
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The world’s largest vertical belt reeler has been manufactured for the Sasol Impumelelo mine in Secunda where it will be used to store and unspool 2 195 m of conveyor belting when the mine’s main decline shaft becomes operational.

Upon delivery the 9 m diameter reel weighing more than 185 t (when full) will be installed on top of the shaft and will enable the 150 t belt to be unspooled in a single operation. Thereafter the reeler will be respooled with spare belting to be used for critical repairs, as well as general maintenance of the conveyor when required.

Designed by conveyor fastening and accessory specialist Flexco, the breakthrough design overcomes previous barriers that had prevented the use of vertical reelers on large-scale projects and has allowed Flexco to manufacture a smaller and simpler mechanical structure. The uncomplicated nature of the design also ensures it has improved reliability over horizontal equivalents and a price tag that is considerably less.

Meeting the challenge

According to Flexco project engineer Simon Curry, the main challenge of the project was the sheer scale of the task to store more than 2000 m of 1800 mm wide conveyor belting, 22 mm thick and weighing in at 70 kg per meter. In addition, with limited space to work in and a tight budget to boot, the reeler had to overcome the pitfalls of vertical storage and possible compression damage caused by the sheer mass of the belt compressing and overstressing the belt at the core of the reel.

“We also needed to ensure the reeler is able to operate at the highest possible availability as the Impumelelo decline shaft is aligned with the mine’s requirement to employ a single arterial conveyor rather than the usual double system that was previously required on its mines. This means that any belt damage or problems need to be addressed quickly and may require the reeler to spool and unspool replacement belt in order to keep production flowing.

‘Although its primary job is initially to spool the new belt onto the conveyor, it then has the very important role of storing replacement belt that can be quickly utilized to replace damaged areas or even the whole belt if required. This means that it has to be always available and ready to perform when needed,’ explains Curry.

Technical requirements

Flexco Engineering manager Neil Cochran says after much deliberation it was decided that the most versatile option would be for a vertical belt reeler with a large enough drum diameter to prevent compression damage. ‘Our calculations showed that
it was possible and feasible to build a vertical reeler and after confirming with belt supplier Veyance that the belt would not be damaged and would still be covered by the full guarantee during storage, we were satisfied to go ahead.

“The operation of the machine is straightforward using a PLC controlled variable speed drive motor to wind the belt on and to rotate the drum from time to time to alleviate compression on any one given part of the belt for prolonged periods. The full weight of the belt is fastened to the base of the drum with a specially designed 1.8 m fastener designed by Flexco to withstand the substantial forces that will be exerted by the pull of the 150 t belt.

“In operation the reeler makes use of a pair of functional brakes that allows the belt to be released down the shaft in a controlled manner even as the full length begins to weigh down the system as it extends down the shaft. The system has an additional pair of fail safe brakes to stop the reel in case of an emergency or failure of the main brakes. The PLC has a system of sensors that controls the torque of the motor in the initial phases to unspool the belt until its weight takes over and gravity pulls the rest of the belt out under braking,” says Cochran.

Team work
The project forms a part of Sasol’s Impumelelo project and required close cooperation between Sasol staff along with ELB Engineering Services (ELB) and Flexco technical teams. In addition, materials and design criteria had to be closely met by the fabricators Bosworth, who built the reeler whereafter they will provide accurate schematics to the final installers, ELBCON, ELB’s in-house construction company.

“Thanks to the combined efforts of our teams, as well as independent engineering experts Deon Niemann (structural engineer) and Roland Friesenecker (mechanical engineer), the winder was constructed and pre-assembled successfully at the Bosworth factory recently.”

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Customised wear solutions increase throughput and decrease downtime

Finding viable solutions to transfer chute wear is based on an intimate knowledge of both the industry in general as well as specific and unique customer needs.

Leveraging decades of experience and a vast and diverse customer base has allowed Multotec Wear Linings to devise customised solutions for wear issues. “Multotec Wear Linings is often perceived as a ceramic solutions company, but this is a limited view of our total capabilities. The company is actually a wear solutions provider, with our services and products offering beginning with a materials flow and wear audit. Wear is a critical element in our business approach; we know how to identify it, how to manage it and how to solve wear issues,” says Mike Dexter, MD of Multotec Wear Linings.

A primary differentiator in the wear solutions sector is that the company employs highly skilled applications specialists who are capable of identifying particular problem areas within an operation by conducting a thorough inspection of the plant. “These could be areas where there are flow problems such as delayed transfer of product in the chute or transfer point, extremely noisy areas or areas where high maintenance costs exist due to excessive wear taking place,” says Dexter.

“The Quick Fit Panel is one of Multotec Wear Linings’ flagship products.”

“Multotec Wear Linings offers a turnkey project solution but we are also happy working with the customer’s preferred rigging team if required, for both cold and hot commissioning.” Mike Dexter

That the feed onto a belt is matched to the belt speed at the point of transfer. Another common issue is material degradation, so we would again concentrate on controlling the material flow through the transfer point. It is, in fact, the speed of transfer which aggravates the situation by creating degradation of particle size, as well as unnecessary wear on the chute or transfer point,” Dexter explains.

All of these challenges will be identified during the assessment process and involves a hands-on approach. “Multotec Wear Linings is one of few companies that can offer the service of conducting materials flow and wear audits. We believe that it is essential to ensure that the customer gets verifiable information from these audits so that an informed decision can be made on the way forward.”

After the audit is completed, the information gathered is used to prepare a comprehensive report that identifies the areas where improvements can be made to rectify problems. “The overriding objective of these audits is to minimise unplanned...”
downtime and improve product throughput, both of which will significantly reduce the overall operating costs of the plant,” says Dexter.

In order to ensure best practice solutions, it is often necessary to prioritise the work which needs to be done, usually in close collaboration with the customer. The ability to successfully implement a project schedule requires a mix of understanding the plant requirements and the application of the available technology and products to find a fit-for-purpose solution.

Multotec Wear Linings handles wear projects from the conceptual design through to the engineering and implementation phase. “Collaboration throughout is key to the success of the solution being employed. Each project has a unique approach in terms of whether it is to be implemented as an entire solution or as part of a solution, with changes and improvements phased in, often over a period of a few years.

“We also take into account that large pieces of hardware can only be replaced during a planned plant shutdown, so this type of information needs to be factored in when we undertake the project scoping process. This requires careful planning, as the new equipment or components that are to be replaced will need to be manufactured in advance. By ensuring these elements are considered and incorporated, we are able to dovetail the installation and commissioning with the plant shutdown,” Dexter points out.

Product solutions depend on the...
The Quick Fit Panel is one of Multotec Wear Linings’ flagship products. This quick-fit panel consists of ceramic tiles embedded in polyurethane and is aimed at simplifying wear lining installation. The panels are attached by means of threaded studs that are simply stud welded to the chute. This allows for rapid change out when future liner replacement is required.

The innovative Green Dot Tile incorporates an integrated wear indicator comprising a two-tone cylindrical insert in the centre of the tile. As the tile wears down so does the insert. Once the tile has worn down to only 25% of the original thickness the indicator will then reflect red indicating that lining is due for replacement.

Another example of Multotec’s innovative approach to the maintenance issues facing minerals processing plants and mines is MultoLag, a direct bond ceramic pulley lagging system for drive and non-drive pulleys. The maintenance free, wear resistant cover system uses standard, smooth high alumina content ceramic tiles for non-drive pulleys and studded tile lagging for drive pulleys. Typical MultoLag life is more than six times that of conventional lagging systems.

The MultoCano Modular Chute is a modular chute system with no single component weighing more than 50 kg, which can be adapted to specific customer requirements. It is easily transportable and can be quickly erected on site by a two to four person team.

“Multotec Wear Linings offers a turnkey project solution but we are also happy working with the customer’s preferred rigging team if required, for both cold and hot commissioning. In this instance Multotec Wear Linings will provide supervision and integrate with the customer’s team to ensure the success of the solution being provided,” says Dexter.

Multotec Wear Linings provides on-going onsite interaction with the customer through the monitoring of the plant to ensure that continuous improvements are made. Proper preventative maintenance can reduce unplanned downtime, so after sales service and maintenance contracts form an important component of any service level agreement.

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**Multotec Wear Linings**

MATERIALS HANDLING
Since its inception in 1997, split roller bearing specialist OE Bearings has grown consistently through innovation and superior service levels to become the market leading supplier of split roller bearings in southern Africa, writes CHANTELLE KOTZE.

OE Bearings MD Warwick Steinhobel says that split roller bearings have increased in popularity owing to the many advantages they offer over conventional bearings. The main benefit is the saving in downtime, which OE Bearings can drastically reduce from three weeks for conventional bearing replacement or maintenance, to as little as four hours, owing to the bespoke split bearing design, which in turn increases productivity and profitability.

OE Bearings manufactures its split roller bearings in partnership with its principal supplier, UK-based bearing manufacturer Revolvo. While the split roller bearings are manufactured by Revolvo, the standard or bespoke cast iron bearing support units are manufactured in South Africa and machined in-house at OE Bearings’ facility in Selby, Johannesburgh.

The company prides itself on the fact that approximately 50% of the entire split roller bearing is manufactured locally. “Our ability to manufacture the cast iron in South Africa has made us flexible in that we can custom-make the bearing support units to suit specific customer requirements,” says Steinhobel.

Other benefits of manufacturing the cast iron bearing support solutions in-country has drastically reduced the manufacturing time. While the delivery of cast iron from overseas suppliers takes between six to eight weeks, if available, OE Bearings can manufacture the cast iron units within two weeks.

Further, because the cast iron components are manufactured locally, the price to manufacture them is not affected by the fluctuation in exchange rates, which are currently at record levels.

Aside from OE Bearings’ off-the-shelf range of cast iron components, its manufacturing capability enables it to make special units to suit customer’s unique requirements.

OE Bearings’ split roller bearings have been used in several critical materials handling applications in the mining industry including on conveyor drives and on the bucket wheels of stacker reclaimers and have been specified for use by several mining companies including Vale, Anglo American Platinum, Glencore, Lonmin, Assmang and Debswana.

Case Studies
State-owned port logistics company Transnet Port Terminals has been a repeat customer of OE Bearings’ split roller bearings, which have been installed on a number of stacker reclaimers at the Port of Saldanha Bay, in the Western Cape. Owing to past successful installations, Transnet has ordered four additional bearings to keep as stock.

The company’s split roller bearings have also been specified for use on submerged scraper chains in ash removal applications at state-owned power utility Eskom’s Majuba, Medupi and Kusile coal-fired power stations, as well as on screw conveyors in cement factories.

Following successful conversions of bearings on conveyor drives at diamond miner Debswana’s Orapa mine, in Botswana, OE Bearings was approached to make a Special Take Up to replace the existing Take Ups running on conventional spherical roller bearings. The new unit was designed and manufactured within a record time of two weeks and delivered to site in June.

Steinhobel says that while OE Bearings supplies to the existing split bearing market, the majority of its business is to customers that are converting from standard solid bearings to split roller bearings.

OE Bearings supplies a range of bearing series, namely the L, M and H, which provides solutions for a wide range of operating conditions.
Product innovation
As the only bearing company in Southern Africa specialising in split roller bearings, OE Bearings has gained a unique and detailed insight into its customer’s problems, thus enabling it to develop bespoke solutions.

Owing to its sales engineers’ extensive bearing troubleshooting capabilities, which include selecting, fitting and commissioning split roller bearings, OE Bearings can easily pinpoint its customers’ problems and develop solutions around them. In some cases OE Bearings has gone as far as to develop solutions to address the problem, such as developing a new range of bearings.

One such product innovation by OE Bearings was the development of a new ‘in between’ range of split roller bearings to complement its existing three load capacities of bearings. This product innovation has ensured that the right capacity of bearing is available for the required application.

The JSM series fills the gap between the light and medium series, while the VSM series fills the gap between the medium and heavy series of split roller bearings. These two new ranges now form part of OE Bearings’ standard stock range.

Meanwhile, owing to the company’s continual investment in R&D with Revolvo, the companies are currently working on a new bearing design that would combine a bearing and hold back.

Value-added service
Another way in which OE Bearings provides a value-added service to its customers is that it is able to carry stock for its customers. “During these tough economic times we have noted that many of our customers have reduced their inventories,” says Steinhobel, adding that it has increased its stock levels to offer 100% availability to its customers.
CRANES WORTH THEIR WEIGHT IN GOLD

Undertaking a heavy lift is not a case of ‘one size fits all’ but rather about selecting the most appropriate lifting solution for a given project or contract, according to Johnson Crane Hire, which boasts a heavy lifting capacity unmatched on the continent.

“Ultimately, a successful heavy lift is determined by the technical expertise of the heavy lift supplier. Johnson Crane Hire has a breadth of resident knowledge that enables it to provide best practice heavy lift solutions in a turnkey project approach that includes rigging and transportation,” says James Robinson, heavy lift manager for the crawler cranes and projects division at Johnson Crane Hire.

“We are able to offer flexibility in terms of heavy lifting solutions because we operate a crawler crane fleet and a hydraulic mobile crane fleet as well as alternative lifting solutions.”

Robinson points out that the three largest cranes in the Johnson Crane Hire fleet are its 750 t and 600 t lattice crawlers and its most recent addition – a 750 t truck mounted lattice mobile unit.

“This level of heavy-lifting capacity provides continuity and shows our level of commitment to the market by providing them with access to an unequalled combination of heavy lifting capacity and technical expertise.”

Robinson cautions that there is a critical need to recognise that a lattice boom crawler crane offers a vastly greater lifting capacity when compared to mobile hydraulic crane lifting capacities. It is not uncommon to find people making the mistake of comparing one with the other as the nomenclature can be very misleading.

As an example, Robinson points out that the 250 t lattice boom crawler competes against a heavy lift 400 t hydraulic mobile crane. These machines have equivalent lifting capacity, but this not obvious to those that do not understand the differences between lattice boom machines and mobile cranes. The nomenclature should not be used as the manner in which to differentiate between capacities and capabilities.

Johnson Crane Hire has a ten year history in the crawler crane market and has amassed a number of impressive lifts, including a recent heavy lift at Zimplats. “We were contracted to remove an old mill weighing 225 t, with a radius of 31 m, and to replace it with a new one weighing 170 t. We then brought in an LR 1600-2 (600 t) crawler crane from Europe to perform this work. The crane is now part of our permanent fleet,” Robinson says.

Johnson Crane Hire also used the LR 1750 (750 t) crawler crane to lift a 280 t tippler in Mozambique for the Nacala port upgrade project. A notable feat achieved by the team was the lifting of the 280 t assembly in one execution. The company is also actively involved in heavy lifts for the major expansion underway at a

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diamond mine in South Africa. A recent lift at this mine required the lifting of a 110 t structure with luff er and full super lift configuration at a 55 m radius. There are additional lifts planned for equipment of 200 t at 35 m in the same configuration.

On all lifts, the company provides a full pre-lift feasibility study that includes computer simulated drawings, generating method statements, full risk assessments and load studies. Operation of the well maintained crawler fleet is supported by an experienced technical team with in-depth knowledge.

Safety in the complex operation of heavy lifts is paramount. “Adherence to safe operation comprises a number of critical elements. Firstly, our machines are current technology and well maintained, and our operators are skilled and comprehensively trained. In addition, we implement carefully documented and implemented safety systems, which comply with all industry safety standards. This is complemented by the risk assessments conducted before each lift. We are justifiably proud of the fact that safety as a culture is ingrained in every Johnson Crane Hire employee,” says Robinson. Safety in fact forms part of the company’s holistic lifting package, referred to as the ‘SMART’ (Safety, Maintenance, Availability, Reliability and Total cost effectiveness) philosophy.

Johnson Crane Hire has an acknowledged track record in delivering fit for purpose heavy lift solutions for the power, petrochemical, refinery, industrial, mining and civil infrastructure industries, throughout Africa.

MRA

Commissioning of a 750 t crawler crane at Liebherr

This Johnson Crane Hire 750 t Liebherr crawler is configured with super lift for a lifting project at Waterval Smelter

Available, Reliability and Total cost effectiveness) philosophy.

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- Belt Tracking Systems
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- Service & Maintenance
This, in summary, is the view of mining consulting and risk specialist company VBKom, whose primary functionality is not designing software and technology solutions, but making use of those available to provide the sector with optimised mining and decision support solutions by means of cash generation opportunities and profit maximisation.

Subsequently, over the years, the company has developed specialist knowledge of available software solutions (such as Whittle, SURPAC and XPAC) and has in fact, on numerous occasions, developed its own in-house bespoke solutions which cater to its clients’ specific operational requirements.

More importantly, VBKom has become a keen early adopter of emerging software trends in the mining sector which are becoming increasingly essential in contributing positively towards the industry’s operational sustainability.

A round table discussion with six of the company’s mining and senior mining engineers: Duan Campbell, Ben Bruwer, Francois Taljaard, George Olivier, Barend Steyn and Werner Heenop, delves into the salient software trends and challenges facing mining companies today.

“Despite mine planning and scheduling software becoming more and more simplified in current day packages, a mining operation will always need a well-seasoned and experienced person overseeing/emanaging the software with the correct technical understanding and practical knowledge”

Taljaard and Bruwer
provide mines with more comprehensive simulations in shorter timeframes."

"Simply put – doing detailed and customised solutions for complicated and ‘unique’ ore bodies is difficult and time consuming with standard, off-the-shelf software packages. Overcoming these deficiencies and delivering an optimal mining solution has become a VBKom strength in the market," Campbell continues.

VBKom and its host of fresh, young and ‘up-to-speed’ engineers observe that mining software companies are combining more and more stand-alone, complex features into a single package which is simpler and easier to use. “This trend might be to compensate for the scarcity in mining technical software skills, but has the downside that one loses that ability to fine tune the solution to the exact individual mine’s needs,” says Olivier.

“Today’s mining software is still very powerful and allows you to perform detailed optimisation work which can significantly influence mining projects’ go-forward development or increase operational performance,” Olivier continues.

“Our customised software is geared to run thousands of detail-level scenarios and determine the best outcome taking into consideration every possible parameter – including commodity cycles, processing efficiencies and various trade-off scenario analyses,” Olivier states. “We like to look at every possibility and every detail – and we can do it quickly. Nothing is left to assumption,” Steyn further highlights.

Virtual reality the new software technology era

On the plus side, the mining industry is embracing a new technology available on the market. “We are seeing traditional scheduling & design technologies merging with imaging and gaming technologies,” Steyn notes. This provides either a virtual or an augmented reality – where the latter is a computer-generated image which is superimposed on a user’s view of the real world, thus providing an interactive, composite view.

Steyn believes that the benefit in providing a client with the opportunity to see their mine and gain a complete understanding and awareness of how their mine will operate and develop will revolutionise the industry, especially when coupled with 3D instructional technology moving forward.

Further to this, “the world is also moving more and more into the cloud – another option enabling clients to run and consider multitudes of scenarios, from anywhere in the world, without being limited to a single, geographical desktop. This is an extremely powerful tool considering the current mining trend where new deposits and mines are becoming more and more remote,” Oliver points out.

Cloud computing also makes software rental more accessible – a solution that reduces software costs. “Instead of paying a fixed price for an expensive licence, we believe there is substantial benefit in buying or renting a licence only when it is needed,” concludes Olivier, Director at VBKom. “Ultimately the client and mine benefit as the cost of computing is trending downwards, but the speed of delivery is picking up.”

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The latest trend in dynamic simulation in the mining industry is its evolution into operational modelling. This takes into account considerations such as decision-making and related business processes such as exploration, planning, services and infrastructure.

Using its in-house operational modelling approach, Hatch is able to assist its clients in unlocking value in their existing operations by ensuring design capability, capital effectiveness and operational efficiency of the integrated production chain.

“Our key differentiator is operational modelling,” Rüdiger von Varendorff, Australia-Asia lead, operational performance analytics at Hatch, comments.

Von Varendorff recently visited South Africa and spoke to Mining Review Africa exclusively about the latest trends and developments in this field. “The South African mining industry is looking to mechanise. However, you first have to adopt best practice in terms of the mining operation itself, as well as putting the necessary systems in place to sustain that.”

A major mining house called in the expertise of Hatch to determine how to up its planned output from 270 Mtpa to 290 Mtpa – without any additional capital cost, simply by unlocking the latent capacity in the supply chain.

25% increase in throughput
Assisting another client in the gold-mining sector, Hatch was able to effect a 25% increase in throughput, also without any additional capital. “The key to these significant achievements is that they were realised in close cooperation with the client itself by tapping into the organisation’s own knowledge,” Von Varendorff stresses.

While dynamic simulation has been used traditionally as a form of scenario planning, Von Varendorff cautions against such a ‘crystal ball’ approach. “A client’s expectation from such a simulation is that it will provide answers to the questions posed. That is our first point of departure, in stating that operational modelling is able to provide valuable insight into the type of answers that are needed. The real value lies in how the engineer or consultant deploys dynamic simulation as a tool in order to generate such insights.”
A typical example is a coal operation using simulation to determine the ideal size of its coal stockpile. “This is the wrong kind of question to ask,” Von Varendorff asserts. “Why do you require a stockpile? What is its purpose and how does it fit into your overall business strategy? Are you going to utilise that stockpile to blend coal, or to mitigate against the impact of seasonal rainfall? These are the sorts of scenarios that operational modelling is best suited to assist with.”

**Lack of new capital projects**

The lack of new capital projects in the mining industry globally has resulted in a general change in the business focus of many mining houses. “These days it is all about sweating existing assets and reducing unit costs and increasing productivity. It all depends on the parameters of the business case.”

Dynamic simulation is not a ‘silver bullet’. Rather, companies need to engage an expert that can apply operational modelling to their supply chain or production process in a holistic fashion in order to generate maximum cost-effectiveness and efficiency,” Rüdiger Von Varendorff

Operational modelling is therefore ideal to assist in the decision-making process in this new business milieu. “Traditionally mining houses would have had a business improvement group to manage their own internal project pipeline, with some external consultants brought on board for change management in terms of looking at any bottlenecks, for example.”

A major issue in terms of data is variability, which has resulted in a trend towards ‘data mining’. “It is always important to bear in mind the context of any data that is generated,” Von Varendorff explains. This means companies need to ensure that they have the correct business information systems in place.

**Driving down costs**

“At the end of the day, the main driver for operational modelling is to drive down costs, as part of a continuous business improvement approach. The key thing to remember is that it is not just about plugging in some costly software program that then produces immediate results. It is all about adjusting and optimising your existing operations by learning the value of doing things differently – where necessary.”

Von Varendorff highlights: “Dynamic simulation is not a ‘silver bullet’. Rather, companies need to engage an expert like Hatch that can apply operational modelling to their supply chain or production process in a holistic fashion in order to generate maximum cost-effectiveness and efficiency.

“From underground operations to open cast mines, if you want to improve productivity without spending large amounts of capital, you have got to do things differently. This inevitably means you have to change the way you make business and operating decisions. The mining industry is steeped in fairly traditional business practices. It cannot just keep on doing things the way it has always done,” he concludes.

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"We are seeing a major paradigm shift in the market toward machine-to-machine communication. Over the next couple of years, machine-to-machine communication will become paramount to mining and manufacturing," says Jaco Moolman, managing executive of Industrial Solutions within the Business Solutions division at Business Connexion.

"Business Connexion is exploring new opportunities and harnessing this shift in a way that enables companies to improve their workspace. It is critical that we work with our clients, onsite at their plants, to address their specific challenges."

He explains that their role in the systems integration (SI) field is to help miners and manufacturers optimise scarce resources – their products, machines and people.

Business Connexion was announced as one of the Top 5 Wonderware Top System Integrator Award winners for the third year in a row.

The X-Change User Conference, hosted by Wonderware and Schneider Electric, has established itself over the past two decades as the longest-running, best-attended and most informative mining and manufacturing conference in southern Africa. The annual event draws industry professionals and system integration providers who are leading the way in the industrial automation and manufacturing IT sectors.

Business Connexion was acknowledged for the third consecutive year as a runner-up for the Wonderware Top System Integrator Award at the 2015 X-Change User Conference.

The conference, themed ‘Game Changer’ this year, was attended by over 300 delegates representing top-tier organisations such as AngloGold Ashanti, Aspen Pharmacare and South African Breweries.

"While the X-Change Awards are given to SI’s that have the highest software sales figures, we are also proud to provide full solutions that include engineering and hardware. It is an honour to be included in the awards, says Moolman.

Business Connexion’s SI service provides total business solutions aimed at delivering information and knowledge as a service to companies by leveraging existing IT assets and infrastructures.

Business Connexion’s SI services enhance business processes by making all the necessary information available where and when it is needed through an automation process facilitated through safe and accurate systems.

It provides critical and authenticated information and knowledge to allow businesses to make informed decisions based on real-time business operations and imperatives. It enhances the user experience by providing composite (merged – matching different information from two systems) with rich new age web/internet experiences whilst hiding the functional and technical complexities.

It streamlines and simplifies information management within a business.

Advantages of SI

Business Connexion’s total business systems integration solutions offer the following advantages:

Enhance business decision-making

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When information systems of organisations with related functions are integrated, the existing business processes will inevitably have to be changed. Current business processes will be critically analysed and radically designed to achieve breakthrough improvements in performance measures. This is greatly achieved through a system that is flexible and helps you to optimise the process in order to make it better.

Business Connexion is exploring new opportunities and harnessing the shift towards machine-to-machine communication in a way that enables companies to improve their workspace.
South Africa is world-renowned for extracting mineral wealth from the earth, often at depths that are unequalled anywhere else in the world. Working at these great depths means physical discomfort and danger – all risks that have to be considered and planned for. Ultimately, it is the combination of innovation and technology that saves lives and ensures that miners return safely to the surface.

Because safety is taken so seriously by mines, millions of rands are spent every year on products and services designed to keep miners safe. Not many people would believe, however, that some of the most important and advanced technological safety solutions have their origins in the world of computer gaming.

“Innovation and technology are game changers in the mining sector. Minimising risks means maintaining production and reducing lost-time incidents,” says Standard Bank head of small enterprise Ethel Nyembe.

“Given that mining companies are operating under many constraints, it is to their credit that they have adopted all the technology they can to protect their people.”

A recent episode of the Standard Bank-supported The Growth Engines series, highlighted how major mining company Anglo American Platinum works with specialised SME The Cyest Corporation to reduce risks and drive bottom line performance through 3D visualisation technology.

Anglo American Platinum is a key player in the global platinum market, and produces about 37% of the world’s platinum in the Bushveld complex that is home to about 70% of the world’s known resources of the mineral.

However, various factors such as a platinum price that has dropped by about 35% in the last five years, and reduced global demand, have placed a strain on the sustainability of platinum mining.

Responding to tough times demands innovative strategies.

“Innovation and technology in the mining sector is exceptionally important, particularly to companies like Anglo American Platinum,” says head of technology and innovation at Anglo American Platinum Jeannette McGill.

“We look at how we can increase our global competitiveness in terms of being able to produce sustainable operations and create maximum value for our shareholders.

Achieving this has meant investing in computer-generated, advanced visualisation techniques and tools that have crossed over from the world of video gaming.”

Anglo American Platinum increases its global competitiveness through innovation and the application of technology in underground and open pit environments.

Virtual reality saves lives in SA platinum mines
This requires a certain level of innovation and the application of technology both in underground and open-pit environments. “With shallow resources being depleted, we need to mine deeper. There are significant challenges involved with this, including being able to supply our mines with ventilation and support through a variety of applications. It is about mining safely and meeting our corporate objective of causing zero harm,” says McGill.

Achieving this involves driving discontinuous change. “Our need has been to stop making small continual changes in technology, by bringing about change that leapfrogs us into a different space. This is about being collaborative and comparing ourselves not only with other mining companies, but also about seeing what impacts other sectors as far as technology is concerned,” she adds.

Keeping pace with the demand for change led to The Cyest Corporation bringing different technologies – including advanced visualisation technology – to Anglo American Platinum.

It is in this visual discipline that Anglo American Platinum is making a major impression. The technology is being used in the training arena, where virtual reality software is used to drive home the realities of working underground and making the intrinsically hostile environment as safe as possible for all workers.

Visualisations are used to simulate scenarios that can produce life-saving improvements in the mining industry. The relevance of gaming technology to business technologies is acknowledged by the company – particularly when it comes to promoting safety underground. “There is so much that technology can do in empowering people and making them more effective at their jobs. Whether it is advanced visualisation or beneficiating data to make better decisions, we are only touching the tip of the iceberg. Innovation and technology are the bridge to taking companies forward,” says The Cyest Corporation director Andreas Cambitsis.

“It is important to keep an eye on innovation and the bottom line. You must be clear on how the innovation is going to benefit profitability. It is also something that should be considered as a long-term objective. Great ideas are often stifled because they don’t meet short-term needs.”

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In both surface and underground mining, the training of today’s and tomorrow’s earthmoving operators will increasingly focus on their interaction with onboard and remote technologies, including on-going trends in semi and full machine automation.

Barloworld Equipment’s Operator Training Academy in Isando, Johannesburg, is at the forefront of these developments, spearheaded by the incorporation of Cat simulators that provide a virtual environment that greatly enhances the learning experience. (Barloworld Equipment is the Cat dealer for southern Africa.)

Caterpillar fields a comprehensive simulator training line-up. This includes modules for articulated trucks, hydraulic excavators, medium and large mining trucks, M-Series motor graders, scrapers, track-type tractors, small and large wheel loaders and electric rope shovels.

Further developments are underway to introduce Cat simulator training stations for the underground market. Cat Simulators are compact and easily portable from the classroom environment to customer sites. These units are also available for sale or rental.

“We have found that the use of simulators greatly enhances downstream proficiency and efficiency at a time when the industry is looking for ways to save on operational expenditure and maximise the cost per tonne utilisation of their existing fleets,” comments Willie Haasbroek, head of Barloworld Equipment’s Operator Training Academy.

An accredited training provider in terms of the Construction Education & Training Authority (CETA) and the Mining Qualifications Authority (MQA), Barloworld Equipment’s Operator Academy is currently ranked in the top tier among Cat dealers worldwide. Around 700 operators from industry are trained and certified annually at the Academy.

“In addition to proving machine proficiency, we will only certify operators if they can demonstrate, via theoretical and practical examination, that they have a comprehensive understanding of the correct techniques required to achieve safe and optimum production. This includes an understanding of how these techniques can positively impact on machine health and availability. Cat simulators enable us to set the benchmark at the highest level,” Haasbroek continues, “as there are no shortcuts or training gaps.”

Once on board a Cat simulator, realistic controls ensure that the operator gains familiarisation and muscle memory using the same hardware found in the actual machine. Rich graphics create a virtual world as trainees move through a succession of exercises that test and record their progress.

In addition to correcting bad habits, Cat simulators also prove beneficial when addressing new technologies. An example is the Cat M-Series motor grader simulator that trains operators on a machine class that functions purely on joystick controls, as opposed to the conventional steering wheel and levers found on current K-Series units.

“Even for experienced K-Series operators, this can be a conversion challenge and we’ve found that it generally takes a minimum of six weeks before they grasp the basics of the new joystick technology,” says Haasbroek. “Younger operators accustomed to the virtual world of 3D gaming may pick up the techniques slightly faster, but in the end the playing field is levelled by the nature of the training programme.”

Core metrics are built into the programme for all Cat simulator machine classes. For the Cat M-Series module, these include controls familiarisation, the number of blade-ground contacts; total blade-ground contact time; total time spent in reverse; average speed; highest gear used;
number of collisions; and number of blade-
tyre contacts.

**MineStar**

Once in the field, Caterpillar has a wide range of technologies that build on the competencies of an expert operator. A prime example is the Cat MineStar system, which consists of a number of configurable capability sets: namely Fleet, Terrain, Detect, Health and Command. These can be used individually or in combination to provide the scalability needed to maximise safety, reduce costs and improve profitability.

‘Fleet’ provides comprehensive, real-time machine tracking, assignment and productivity management, enabling a comprehensive overview of all operations.

‘Terrain’ enables high-precision management of drilling, loading, grading and dragline operations through the use of guidance technology. It increases machine productivity and provides real-time feedback for improved efficiency.

‘Detect’ helps keep personnel and assets safe by using satellite, radar and camera technologies to enhance operator awareness of the working environment around their manned or remotely controlled mining equipment in both surface and underground applications.

‘Health’ delivers critical event-based machine condition and operating data for the entire fleet. It includes comprehensive equipment health and asset monitoring capabilities, with a wide range of diagnostic, analytic and reporting tools.

‘Command’ in turn enables remote control, semi-autonomous and autonomous systems for surface and underground mobile mining equipment.

By integrating the capabilities of Fleet, Terrain, Detect and Health, it delivers dramatic improvements in safety, productivity and availability.

“At the Academy, our role is to ensure that we keep abreast of technological developments that maximise the machine and human interface,” adds Haasbroek.

“Now and into the future, this training journey begins on a Cat simulator.”

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Cat 140K motor grader showing conventional steering wheel and controls layout
Nigeria has the potential to reinstate itself as the next mining giant in Africa
Mining firms today are facing a barrage of challenges that only a concerted focus on digitisation can address. Across the broad range of ferrous, non-ferrous and precious metals, commodity prices remain subdued and are unlikely to enter any new growth cycles in the near future. **BY SCOTT MCGOWAN, GLOBAL MINING PRACTICE DIRECTOR, AFRICA, WIPRO**

**H**owever, the growth cycles in commodity prices over the past decade or so has thrust mining stocks into the spotlight. To maintain their attraction to investors, and maintain the strong margins seen in times of higher commodity prices, mining organisations are increasingly considering technology to drive operational efficiency and transformation.

Due to the importance of scale of economies in this sector, waves of consolidation have left many large mining operations with fragmented systems – sprawling reams of outdated legacy systems. Due to this complexity, mines have generally been slower than most other verticals to invest in new enterprise technology.

Now, the rules of the game have changed. Mining houses need to mine at deeper and deeper levels; while dealing with volatile labour dynamics, and a dearth of skilled engineers and technicians in the sector.

Perhaps the most fundamental change has been from a supply-driven market to demand-driven, which essentially means that the industry is moving away from stockpiling material ready for sale to providing visibility of material to the marketing departments. This optimises the value of the material that they have in process. We call this the ability to optimise the ore-body balance sheet.

Having the right technology assets is crucial in meeting the needs of this more challenging, more competitive market. Miners need the most advanced tools to predict the productivity of mines or shafts; and ensure that output achieves the buyers’ desired state of ore. They must create cost-efficiencies wherever possible to offset the increasing cost of production.

Mining technology is essentially divided into two areas: back-office or administrative technology, and operational technology (which actually touches the ore). At the heart of digitisation in mining is the concept of ‘standardisation at the back, differentiation at the front’. The goal should be to create an efficient, centralised back-office environment, combined with cutting-edge technical innovations that differentiate the miner from its peers.

These on-site innovations include the likes of:

- Geo-location technologies like RFID, or location-based sensors within local area networks, keep track of people and equipment. This ensures a more efficient use of resources and better safety procedures. The details of a particular miner can be tracked to show where he entered the mine, where he's currently located, which mine pack he is using, which breathing device, and so on. More advanced systems can track things like operator fatigue in real time – to help prevent accidents before they are likely to occur.
- Cameras, sensors and thermal-imaging systems help maintain the physical security of mine sites. Ideally, data can be fed from multiple disparate sources and will generate automatic alerts for any “out of bounds” activities – any anomalies that may represent a security breach. In this way, mines can reduce the cost of security monitoring, but have complete situational awareness and are able to improve safety and minimise the risks of theft and other issues.
- Mobility solutions that extend powerful analytics to mine managers via mobile devices like smartphones and tablets. Getting real-time, highly-visual data on every aspect of the operations helps to shift their strategies, and improve productivity and efficiency.

For mining firms to continue expanding, to continue consolidating, and to retain the interest of profit-hungry investors, digitisation needs to take place in every area of the mining operation. The new sources of competitive advantages may no longer be things like scale, or location – but will be found in areas like technology investment and speed of integration. Today, a wealth of new mining technology is available for those that are most committed to adopting and capitalising on it.
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It has been ten months since Vacon, one of the largest manufacturers of drives in the world, joined the Danfoss VLT Drives group division. Today the two companies are working together to reach a position of leadership in the global market for low voltage AC drives.

The new company motto “Going for #1” clearly reveals the goal of combining the excellence between Danfoss and Vacon to design, build and distribute the best AC drives on the market.

In 2014 the two companies produced more than two million drives, generating total revenues of around €1.2 billion and an EBIT of 12.8%. The combination of both companies sees 4 800 skilled employees, of which more than 900 people are dedicated to research and development, serve customers in more than 100 countries through sales subsidiaries located in 43 countries and 12 production sites in Denmark, Finland, Germany, Italy, China, India and North America.

During 2015 Vacon and Danfoss remain committed to uniting their activities in a progressive way to continue offering the best possible service to customers and both companies guarantee the availability of all products currently commercialised moving forward.

The current products portfolio will also remain unchanged during the brand unification process. In the short term the range will however be enhanced with innovative products, including a new family of medium voltage drives scheduled for 2016.

Together Danfoss and Vacon will drive growth, inspired by the passion in providing high quality solutions to meet customer needs.
The first edition of Mining Review Africa’s ‘Mining Elites in Africa’ provides you with a spotlight on the elite mining suppliers and service providers on the African continent. This is your personal guide to who is doing business in Africa, how they are doing it and how they plan to increase and expand their service offering further to help improve your mine.

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With the conclusion and huge success of the launch edition, and back by popular demand, be sure to book your space in the 2016 issue. Positions are exclusive so don’t wait and miss your opportunity to position your company at the forefront of your industry sector.

The digital version of this exclusive yearbook has also been distributed to the Mining Review Africa database of 31 000+ international digital users. Additionally, copies have been and will continue to be hand delivered to Ministers and CEO’s of top mining houses at various African-focused mining events as well as all major project and product decision makers on site.

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ENVIRONMENTAL SOLUTIONS AND CONSULTING
SAFETY AND QUALITY
AUTOMATION
The Delco Remy 38MT+ heavy-duty starter – ideal for engine start-ups in heavy duty trucks – is now available with integrated over crank protection (IOCP), a built-in circuit breaker that protects the starter from thermal damage and automatically resets at a safe operating temperature, while eliminating the need for a wiring harness.

The IOCP protects the starter in adverse starting conditions, such as cold weather cranking, lower battery capacity, high-starting circuit resistance or operator misuse.

“Our customers have seen the value of the IOCP on the Delco Remy 39MT and have requested it on the 38MT+ as well,” says Randy Andis, Remy International’s director of aftermarket operations.

The 38MT+ with the IOCP, Andis says, is the best option in the aftermarket for Paccar MX 11 and 13 litre engines.

Benefits of the Delco Remy 38MT+
• New starter: The 38MT+ is a new, coreless starter for the aftermarket;
• Product reliability: The smaller, lighter model is designed to protect against excessive heat and electrical current draw;
• Long life: With a three-year warranty (applies to U.S. and Canadian markets only), customers have the security of longer product life – something not often guaranteed in the aftermarket;
• No additional wiring: The 38MT+ does not require an extra wiring harness, which means customers can upgrade or replace a competitor model without any wiring changes;
• Integral Magnetic Switch (IMS) reduces voltage drop and ensures the solenoid receives the maximum available voltage in any starting condition;
• Electrical soft-start consistently and accurately engages the pinion with the ring gear, providing increased reliability;
• Lighter, more compact design makes it easier to service. Technicians have more room and visibility as they perform maintenance.

Trysome Auto Electrical is a Delco Remy Master warehouse distributor in southern Africa and carries the full range of Delco Remy products.

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SEW-EURODRIVE Johannesburg has improved its operational efficiency by as much as 40% after rolling out its new standardisation of logistics and assembly processes (SLAP) system earlier this year.

SLAP specifically focuses on the goods receipt process, assembly and capacity planning, commissioning assembly, and packing and shipping. It was initially implemented at SEW-EURODRIVE Germany, with South Africa being the sixth country to roll out the new system.

According to SEW-EURODRIVE general manager: finance Gerd Seuffert, it took eight months to implement the new system due to the large-scale factory refitting, re-orientation and training necessary to accommodate the system.

“Now that it is up and running it has become apparent that all the hard work and investment was worth it. Conservatively, it’s safe to say we have seen an operations improvement of between 30 and 40%,” he states.

Since its implementation there has been a marked improvement on the goods receiving side. “One of the major benefits is that SLAP barcodes enable local warehouse staff to identify exactly what parts are in a fully-loaded container from Germany, for instance,” Seuffert adds.

Efficiencies have also been greatly improved on the assembly line. Once the assembly department receives the parts, job sheets are printed and allocated for assembly by SLAP according to a work cell’s availability, capacity and skill set.

“The SLAP system also tracks how long it takes each particular cell or worker to retrieve the necessary parts, assemble and pack a unit. This not only enhances productivity, but also enables the branch to accurately predict when an item will be ready for dispatch,” Seuffert asserts.

The training benefits derived from the new system are particularly noteworthy. Many of the company’s staff working on the assembly line had never worked on a computer until SLAP was introduced. “Now, in addition to a number of other new skills, these staff members are computer literate, a fact which they take great pride in and which will undoubtedly stand them in good stead in the future.”

Today, SEW-EURODRIVE Johannesburg is already receiving better customer feedback. “This is thanks to the fact that the new layout allows the factory to run faster, while reducing paperwork, mess and confusion. Efficiency is up across the board.”

The rollout of SLAP at SEW-EURODRIVE Johannesburg represents the first step in SEW-EURODRIVE South Africa’s nationwide rollout of the system. A further four branches will implement the system in the near future, taking into consideration the lessons learned during the rollout in Johannesburg.

This is in line with SEW-EURODRIVE’s global ‘Standardisation of Services’ plan to mechanise and eventually link all branches, in order to provide uniform, integrated products and services.

Michael Meregi, Nomawazi Kubenze and Gilbert Ndlovu enjoy the benefits of working at SEW-EURODRIVE following the implementation of SLAP.
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Contact Victoria Stephen or Rochelle Riley on +27 11 026 6517

Reach 50 000 key decision makers in Africa’s mining industry today.
If the premiere in 2013 is anything to go by, BAUMA CONEXPO AFRICA 2015 will be bigger and better, providing a highly interactive platform and featuring exhibitors who will introduce new mining and construction technologies, machines and equipment. It takes place from 15 to 18 September at the Johannesburg Expo Centre (NASREC).

The trade fair, which is part of the international bauma brand, brings together key industry players and international visitors to meet, connect and expand business. bauma takes place in the world’s key regions, including India and China, with the biggest event in Munich, Germany.

The 2013 event attracted 754 exhibitors from 38 countries and 14 700 visitors from over 100 countries. Covering more than 65 000 m² in exhibition space, this was the largest event for the sector in Africa. Nine country pavilions were present and the top 10 visiting countries were South Africa, Mozambique, Germany, Botswana, Zimbabwe, Zambia, India, Italy, the United Kingdom and Namibia.

With a footprint of 68 000 m², BAUMA CONEXPO AFRICA 2015 is set to be larger than the 2013 event. This year, the event includes ten country pavilions with new country participants including North America, Turkey, and the Wallonia Region of Belgium. The European contingent includes Germany, Italy, Finland, France, Spain and the United Kingdom.

Its forum features a strong line-up of speakers from Africa who are scheduled to highlight their mining and infrastructure project pipeline and showcase the benefits of investing in their countries. The Chambers of Mines and other associations from countries such as Namibia, Botswana, Mozambique and Kenya, will present projects in the planning and developmental phases. This aim is to facilitate discussions relevant to local and international visitors and encourage greater project participation. MRA
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