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SEARCHING FOR TALENT

SKILLS AND EMPLOYMENT IN THE GLOBAL MINING INDUSTRY



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This booklet is based mainly on a series of interviews conducted with a cross-section of management and employees at Mopani Copper Mine, FQM Kansanshi Mine, and Barrick Lumwana; as well as AngloAmerican in South Africa and the Guelb Moghreïn mine in Mauritania.



FOREWORD

by Nathan Chishimba

People tend to take mining skills for granted, assuming that there is an unlimited supply of highly qualified, highly experienced men and women to work in the world's mines.

The reality is quite different, as this interesting report shows.

You'll learn that high-level mining skills are increasingly sought-after and increasingly mobile; that international expertise is a common feature of every single mine in the world; and that Zambia's pool of homegrown mining talent – while not as deep and extensive as that of more developed mining countries – is fairly good by international standards.

It is the exponential growth in global mining production in the last 20 years that has drained the global talent pool; the industry has become the victim of its own success.

That's why identifying, nurturing and training tomorrow's mining talent has become the number one priority for the world's mines. In Zambia, for example, this involves scholarships, formal skills-transfer programmes, and the investment of millions of dollars in high-tech training centres to keep up with rapidly evolving mining technology.

For host countries, the parallel challenge is to put in place policies and procedures that alleviate the skill shortage in the short term, while building a wider local talent base in the longer term.

Alleviating the skills shortage in the short term means facilitating the smooth entry of expertise into the industry, and recognising the

crucial role it plays both in skills transfer and in allowing mines to function at global levels of competitiveness.

Building a wider talent base in the longer term means combining increased state funding with innovative partnerships with the private sector to boost the capacity of the country's universities and colleges to train more people in mining-related disciplines. This is particularly relevant in Zambia, where universities depend heavily on stretched state budgets.

Ultimately, the global mining-skills shortage is both a risk and an opportunity – the risk is that it prevents mines from functioning as efficiently as possible, and delays expansion and construction of new ventures; the opportunity is that it provides a strong impetus for countries to boost the numbers of mining graduates coming through the education system.

There is no reason why, with the correct policies and incentives in place, Zambia cannot become a centre of excellence in mining skills and an exporter of talent to the rest of the world.

Nathan Chishimba
President, Zambia Chamber of Mines



A GLOBAL INDUSTRY; A GLOBALISED WORKFORCE

Mining operates increasingly in a borderless world

Mining on six continents

In today's globalised world – characterised by cross-border movement of goods, services, technology and capital – major industries and their employees are spread all over the globe.

Mining is no exception. Exploration and mineral production is happening on six continents. According to the World Bank,¹ mineral resources play a dominant role in 81 countries, which collectively account for a quarter of world GDP and half of the world's population. Mining typically contributes about 1-2% of a country's total employment. However, when indirect and induced employment resulting from the multiplier effect is included, this can jump to 3-15%.²

Mining companies everywhere

The world's major mining companies are omnipresent, with multiple operations in North America, South America, Africa, Asia and Australia – and even the Arctic. These companies include giants such as Glencore, Rio Tinto, AngloAmerican, Vale and BHP Billiton.

Take Rio Tinto³, the Anglo-Australian giant whose major products are aluminium, copper, diamonds, gold, titanium oxide, salt, iron ore, coal and uranium. Rio Tinto operates in 35 countries and employs more than 50 000 people. Its board of directors includes citizens of South Africa, England, Australia, Canada and France.

It is not unusual for a single country to host several international mining companies. Zambia, for example, has copper mines operated by First Quantum Minerals (Canada), Glencore (Switzerland), Vale (Brazil), African Rainbow Minerals (South Africa), Barrick (Canada), Vedanta (India), Metorex (South Africa), China Non-Ferrous Metals Mining Group (China) and Jinchuan Resources Group (China).

It is not unusual for a single country to host several international mining companies.

Technology global too

The technology in mining is also international in nature. Take the monster trucks which roam the open-pit mines of the world, carrying prodigious quantities of ore: the major brands are Caterpillar (USA); Liebherr (Germany) and Komatsu (Japan).

This geographic diversification is even more stark for large, complex pieces of plant or equipment. FQM Kansanshi's \$900-million smelter in North-Western province, which started operating in 2015, contains specialised equipment from 11 different countries –



Canada, Finland, Germany, Australia, South Africa, the United Kingdom, China, Malaysia, Turkey, Indonesia and the Philippines.

The global nature of mining extends to finished metals too. They are sold using an extensive network of international traders and brokers, and are traded on commodity exchanges as varied as the London Metal Exchange, the New York Mercantile Exchange and the Multi Commodity Exchange in Mumbai, India.

Mining increasingly operates in a world without borders.

International expertise is the norm

Mining increasingly operates in a world without borders, shifting manpower, machinery and metals across regional and national boundaries. The workforce reflects this.

Although the world's mines employ mainly locals from each country, there is invariably an international component; this proportion can be as high as 17% for Tanzania and 8% for Peru, or as low as 1-2% for Zambia and Chile⁴. One would be hard-pressed to find a single mine anywhere in the world that doesn't have its complement of international expertise.

"Within the industry, there is significant mobility between projects and companies, and expatriate employment is common," says a report⁵ by the International Council of Mining and Metals (ICMM).

Georg Radeck is a mining operations professional and turnaround expert from Australia, currently working at Barrick Lumwana mine in North-Western province. His last assignment was at a gold mine in Papua New Guinea. "Expats are not a big deal in global mining," he says. "It's a small world. We all work in each other's countries. And you'll find virtually every single nationality."

One Barrick Lumwana engineer, 35-year-old Chibomba Mukonde, worked for three years in Australia at an iron-ore mine operated by BHP Billiton before returning to Zambia to re-join Barrick. "I had a couple of Australian graduates under me that I had to train," he recalls. "We had many different nationalities in that department. It was a steep learning curve, but really good work experience."



MINING REQUIRES VERY SPECIFIC SKILLS

The reason is the industry is costly, complex and high-risk

Safety demands high standards

Mining is one of the highest-risk industries in the world. Men and women work in dangerous conditions, both above ground and below, in extremes of temperature, and in close proximity to heavy machinery and equipment – often of gargantuan proportions.

In most other industry sectors, the immediate effect of having an inappropriately qualified or experienced person in a critical role is easily contained or dealt with; in mining, it can be fatal.

“Safety is a big issue in mining, and it is non-negotiable,” says Mopani CEO, Johan Jansen, on the importance of having the right skills and experience.

Cost and complexity make mining skills-intensive

It takes about a billion dollars to start a new mine and a couple of million dollars a day to keep it running. The life-cycle of a mine – from exploration and construction to ramp-up, full production and rehabilitation – is measured in decades, and requires a wide range of high-level skills. Ore bodies are often complex, and it's not always obvious where the rich grades are.

“We only have one chance to mine a deposit,” says a member of AngloAmerican's mining economics section. “If we get it wrong, we can't put it all back in the ground and start again.”¹

The stakes are high; and so are the skills required. A typical mine employs geologists, metallurgists, technicians, mechanics, environmental experts, doctors, nurses, paramedics, financial managers, accountants, managers, superintendents, overseers, and engineers of all stripes – mainly mining, electrical and chemical.

**“If we get it wrong,
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and start again.”**

Only the best make it into the industry. This includes mine artisans – such as riggers, boilermakers and mechanics – who face rigorous selection criteria. For example, Mopani's Training Centre in Mufulira, and the FQM-sponsored Solwezi Trades Training Institute in North-Western province, will only accept applicants with top marks in maths, science and English.

Surprise for new graduates

Important as skills are, they only get you through the door. Graduates who join a mine straight out of university are often shocked to discover that their prized piece of paper doesn't count for much.

For the first few years, new mining graduates undergo a rigorous graduate development programme to learn about the nuts and bolts

of mining – particularly in terms of technology, safety and the latest mining techniques. This often involves additional coursework and learning. Graduate development programmes are run by the mines themselves, and are standard in all mining countries, from Zambia and Chile to Australia and the United States.

Mopani CEO Johan Jansen recalls his first mining job in South Africa: “When I was fresh out of university, I was told by my boss that I didn’t know anything, and that I should put my degree in a drawer for ten years! At that stage I did not like that, but today, I understand the importance of developing young graduates before throwing them in at the deep end.”

Rapidly evolving technology

A hundred years ago, mining was hard, labour-intensive work, and physical stamina and endurance were key job requirements. Today, mines are at the cutting edge of modern technology, and there is much less emphasis on physicality and far more on numeracy, literacy and specialist skills. This is one reason why women are now an integral part of the modern mining workforce.

Modern technology has made mining productive, efficient and relatively safe. Low-grade ore, often located in remote regions, can now be mined profitably, safely and with less damage to the environment. This benefits employees, shareholders, communities and governments.

But high technology also means high skills. This learning curve can be a problem, as the South African mining company Gold Fields has discovered. “We’ve found that even semi-skilled rock-drill operators often struggle to read English, so both numeracy and literacy

are big issues for the mining industry as a whole, particularly as one moves up the mechanisation mining chain,” says Sven Lunsche, vice-president of Corporate Affairs at Gold Fields².

The experience factor

Because mining is high-risk, complex and costly – with payback times measured in decades – companies look for the best people they can find to maximise the value of their investment. Such people invariably come with a good number of years under their belts.

“Who would you rather trust – a doctor with one year of experience or a doctor with ten years of experience?”

“Who would you rather trust – a doctor with one year of experience or a doctor with ten years of experience?” says Lara Vermaak, head of Support Services at FQM Kansanshi. While emerging talent and new ways of thinking will continue to be critical to the productivity of the mining sector, it is no “substitute” for experience, according to a report³ by Ernst & Young.

“Senior, experienced people” from the mining sector are best placed to deliver, the report says, because they have the right skills required to realise productivity and efficiency gains; they have deep knowledge of the mining sector developed over time; and they’ve seen it all before, having worked in the sector before the commodity boom of the 21st century. The report refers to them as “a safe pair of hands”.



A GLOBAL SHORTAGE OF MINING SKILLS

Rapidly expanding global mining production drains talent pool

Sounding the alarm

As far back as 2008 already, with the global commodity boom roaring ahead, mining leaders were expressing concern about a critical shortage of mining skills. The shortage was ranked as the number-one risk facing the industry by professional services company Ernst & Young. It was compromising the operation of existing mines and threatening to delay the start of new mines.

“Just when we need it most, the mining industry is starting to suffer a massive loss of accumulated wisdom, knowledge and experience,” said a 2012 article, *Crisis in Mining*¹.

This rapid growth in new mining production has been particularly strong in emerging economies.

Nick Holland, CEO of South African mining company Gold Fields, echoed this theme at the Reuters Global Mining and Metals Summit that year: “A lot of people ask me what is my biggest concern. What keeps me awake. Having skilled people available to do the job... That is one of the biggest challenges. We are looking to build a whole lot of mines in the future. And getting the right skills to build those mines is a huge challenge...”²

With the global mining crisis of the last few years, and the resulting cutbacks in production, the skills shortage has slipped in the rankings. However, it is still “substantial”, said Ernst & Young, in a 2014 report entitled *It is only a ceasefire – the war for talent will continue*³. A loss of focus on this critical area “is likely to result in a significant skills shortage when the next cyclical upturn inevitably begins”.

That upturn is now well under way, and the warning has proved to be particularly prescient. A 2016 article in Mining.Com notes that with rising commodity prices, mines are now reactivating shelved mining projects, but “there is a new looming risk they don’t seem ready to deal with – their ability to access workers with the skills needed in an upswing”.

Rising demand for mining skills

The main factor driving demand for mining skills over the last 20 years has been the rapidly increasing number of mines being built and expanded around the world to meet the growing global appetite for metals and minerals, particularly from China. This rapid growth in new mining production has been particularly strong in emerging economies in Africa, Asia and South America.

Zambia itself is a good example: since privatisation in 1997, nearly \$15 billion of new mining investment has seen the expansion of existing mines and the creation of new ones. Zambia’s copper production has tripled since then, and the once-backward North-Western province has boomed to become Zambia’s main copper-producing region.



Stories like Zambia's have been reproduced all over the world. The mining world's talent pool has not been able to keep up with this rapid growth in new production.

The greying of the mining industry

An important reason for the decreasing supply of mining skills around the world is that the industry is experiencing its most significant retirement wave for many decades⁴.

According to a 2016 analysis⁵ by Canada's Mining Industry Resources Council, more than 40% of the country's workforce in mining are between the ages of 45 and 64. Some 49 000 workers need to be replaced over the next decade due to retirement. However, each new worker, if found, would not necessarily replace a retired person, because of what the Council refers to as the experience gap.

"[We estimate] that a person in the mining industry will, on average, accumulate about 37 years of participation in the labour force. Upon retirement, an average person therefore removes this many years of labour force 'experience' from the industry...a loss that industry must find a way to offset."

In the United States, about half of all geoscience workers – a key skill category in mining exploration – are just 10 to 15 years away from retirement. Despite an increase in student numbers, the American Geosciences Institute is projecting a shortage of around 135 000 geoscientists by the end of the decade⁶. In Australia, around 15% of the senior technical experts, such as mining engineers and geologists, are fast approaching retirement, posing a threat to the supply of key skill-sets⁷.

Mining working conditions a deterrent

Mining is not as easy and comfortable a career option as say, banking or retail. Mines are usually located in remote regions, far from major towns and cities. The local language and culture may both be unfamiliar. The work can be in extreme conditions of temperature – from blazing heat to freezing cold. Mining operates around the clock and throughout the year, so working hours are long. Time away from family is common; and mining is a dangerous industry.

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So, a mine like Gahcho Kué, for example, would test the commitment of the average job candidate. This \$900-million venture by De Beers is the largest new diamond mine the world has seen in 13 years. It lies 280 km north-east of Yellowknife, in Canada's NorthWest Territories. It is what is known as a Fly in/Fly Out mine site, where both people and supplies have to be flown in. Winter temperatures at Gahcho Kué plunge as low as -40°C⁸. People wanting to work in mining had "better have a passion" for the industry, advises a mining consultant⁹.

"The truth is there are more attractive industries out there for mining graduates, with better work-life balance," says Sam Ash, General Manager at Barrick Lumwana mine in North-Western province. "Global mining is just

not attracting the talent it once did. And it doesn't help that mining is perceived as a dinosaur industry, rather than an industry of the future."

According to South Africa's Mining Qualifications Authority (MQA), 75% of South African mining graduates join the mining industry once they graduate, but just 15% of them remain in the industry in the long term. The number of graduates in fields relating to mining and minerals has grown "substantially" in recent years, the MQA says, but "demand for skills far exceeds supply"¹⁰.

Critical skills most in demand

The skills most in demand across the industry as a result of the talent shortage are those that are critical to the daily operation of the mines.

Such skills are largely technical in nature, and are the domain of people like engineers, geologists, hydrologists, technologists, technicians, mechanics, artisans and managers. It is thanks largely to them that mines are able to operate around the clock, year-round, producing finished metal in the shortest possible time, at the lowest possible cost, and with the lowest risk to health, life and the environment.

Mine construction is also a specialised field in its own right, and there is huge demand for people able to design, plan and oversee the construction – on time and on budget – of the complex multimillion-dollar infrastructure that is the foundation of any modern mine. Mine construction can take several years, and mobilise a workforce of thousands from all over the world.





MOBILITY OF HIGH-LEVEL SKILLS

Experienced people are in demand, and change jobs and countries

Supply and demand

When something is in short supply, it tends to be in great demand – and mining skills are no exception. Mining companies the world over are struggling to find the right candidates with the right blend of skills and experience.

“There was a time when you could easily find four or five people to fill a high-level position,” says Johan Jansen, CEO of Mopani Copper Mines. “Now you battle to find just one.” And even once you’ve found someone, it’s not always easy to keep them.

Mining companies the world over are struggling to find the right candidates.

Poaching, as it is known in the industry, is common. A walk around Zambia’s mines quickly establishes that many people have worked previously at competitor mines.

All the Human Resource (HR) directors interviewed for this report had stories to tell of the untimely departure – often at the worst possible moment – of promising Zambian mining graduates with several years of experience, often under the mentorship of a seasoned expatriate. Just as they are “ripe” and ready to assume a senior position with more responsibility, they are lured away with a

more interesting or lucrative offer. Not that there is anything wrong with this; it’s just supply and demand at work in the job market. As one HR director says: you can’t stop them.

Mobility can be an advantage too

The growing mobility of mining skills is not always a disadvantage – it also means that mines can tap into a large reservoir of international expertise willing and ready to take on assignments in all four corners of the world.

A 2016 report¹ by the International Labour Organisation, *International Migrant Workers in the Mining Sector*, shows that foreign mining skills – also commonly referred to as expatriates – work to a greater or lesser extent in mining countries around the world. Their numbers were higher during the boom years of the commodity cycle.

For example, in the year 2011-12, Australia issued nearly 6 500 visas to skilled migrants, mainly from the UK, the United States, China, the Philippines, Canada, India and South Africa.

The report quotes the Zambia Ministry of Mines and Minerals Development as saying that in 2015, the countries of origin of foreign expertise in the local mining sector were South Africa, Peru, Chile, Australia, Mongolia, India and China.

“The number of workers employed can vary enormously depending on the project, from 20

to 2000 workers. The level of skills of migrants ranges from professional, to technical and artisanal,” the report says, in reference to Zambia. “[Entire] crews of migrant workers are brought in for i) shaft-sinking and equipping; ii) metallurgical plant construction (new rehabilitation and expansion); and iii) commissioning of specialized mine systems. Individual highly skilled workers are brought in when needed to fill positions such as those of engineers and specialized technicians.”

Great benefit to Zambia

The inflow of foreign mining expertise into Zambia over the past 20 years has been of great benefit, enabling the country to rehabilitate and refurbish existing mines, construct entirely new mines, and help existing mines operate at global levels of efficiency and competitiveness.

An example is FQM Kansanshi’s \$900-million, technologically advanced smelter,

which started operating in 2015. It was constructed in record time, thanks in large part to a 3 000-strong team of highly qualified welders from Asia – known as Coded Welders – who specialise in the construction of this kind of infrastructure. Many of them had worked together on similar projects in other parts of the world.

As soon as the construction was complete, they left Zambia for the next international project requiring their skills. The smelter was then brought to full production in an unprecedented five months.

The smelter is one of the most advanced of its kind operating anywhere in the world today. It employs around 750 people, and they include a small core of international experts from countries such as Australia, New Zealand, South Africa, Canada, Russia and Kazakhstan. The staff often joke that “it’s like the United Nations in here”.



ZAMBIANS ON THE MOVE

Skilled, experienced Zambians work all over the world

Zambia's international brigade

Mining talent knows no national boundaries, and Zambians also work in other mining countries. A combination of good university degrees, solid graduate development programmes and years of on-the-job experience has made certain categories of Zambians very marketable internationally.

This mobility is aided by the fact that the major shareholders in Zambia's mines are large global multinationals with mining operations all over the world. Employees therefore routinely move between operations, on both short-term and long-term assignments.

Take Barrick Lumwana mine in North-Western province. It is owned by Canadian company Barrick, which also has mining operations in the United States, Peru, Argentina and the Dominican Republic.

"We've had several examples of Zambian employees with a skill-set required by other Barrick mining operations around the world," says Sam Ash, General Manager at Barrick Lumwana. "It's all about placing people in areas where their skills are most valued and can be put to best use."

Mali and Sudan

Kawana Chingumbe is Engineering Superintendent at Barrick Lumwana mine. An engineering degree from the University of Zambia's School of Mines, coupled with several years of valuable experience in senior planning roles at Konkola Copper Mines and Equinox Minerals, gave him the platform for a move further afield into Africa.

He joined AngloGold Ashanti and worked for their gold mine in Mali, also in a senior planning role. As part of the skills-transfer programme required of expatriates at the mine, Chingumbe mentored a young Malian. After two years there, he moved to another gold mine, this time in Sudan, where he worked for nearly three years.

"The move from copper to gold, working with new people and new cultures – it was an interesting and valuable experience, both personally and professionally," he says. "It has broadened my horizons."

"It's all about placing people in areas where their skills are most valued and can be put to best use."

Living extremes of temperature

Anthony Mukutuma, from First Quantum Minerals (FQM), runs the company's Guelb Moghrein copper-gold mine in Mauritania, where he is General Manager. Before that, he was Plant Manager for four years at FQM's Kevitsa mine in Finland, which mines nickel, copper, gold and PGMs (Platinum Group Metals).

He still recalls the harsh transition from the freezing cold of Finland to the blazing desert heat of Mauritania. "I flew from Finland one



morning, with the temperature at -32°C, and arrived that afternoon in Mauritania, where the temperature was 40°C – and it was winter!”

“Working in Mauritania has reinforced my conviction that Zambia has a good pool of mining skills.”

Mukutuma started his long career in the Konkola Division of the then Zambia Consolidated Copper Mines. He shone at Birmingham University, earning a top Honours degree in Chemical Engineering and Minerals Engineering; and more recently, an MBA in Accounting and Finance from Liverpool University – with distinction.

Mukutuma has more than 20 years of experience in operations, and the management of mineral processing and hydro-metallurgical plants.

“Working in Mauritania has reinforced my conviction that Zambia has a good pool of mining skills,” he says. “Mauritania, on the other hand, is not a mining country, and is particularly short of experienced engineers.”

Settled in South Africa

As deputy chairman of AngloAmerican South Africa, 59-year-old Norman Mbazima is part of a multinational whose mines straddle the globe: Anglo made \$1.6 billion of profit in 2016, employed more than 87 000 people and paid \$3.6 billion in wages and benefits¹.

Norman started his mining career in 1980 with National Consolidated Copper Mines (NCCM), after sailing through his accountancy studies in the UK. However, after barely four years,

the slow pace of career progression – he describes it as “a lack of upward velocity” – led him to quit and join accountancy firm Deloitte, where he had a stellar career, making partner within barely seven years.

The road to South Africa opened up in 2000, when Mbazima got to work on the privatisation of Konkola Copper Mines (KCM), which had been acquired by AngloAmerican. Impressed with Mbazima’s work, Anglo asked him to come and join them in South Africa after selling out of KCM in 2002.

“It was an easy decision,” he recalls. He relocated to Anglo’s headquarters in Johannesburg and embarked on a 15-year career that has seen him working on a global stage, in a variety of roles – Global CFO of Coal; Finance Director and CEO of the Platinum Division; CEO of the steel company SCAW Metals; CEO of Thermal Coal; and CEO of Kumba Iron Ore. He is currently helping out on the final restructuring of the Anglo group in South Africa.

“I have been very blessed,” he says. He doesn’t really consider himself as a traditional expat, insofar as he is a permanent resident in South Africa, and is not preparing any local South African to take over his job. “I consider both South Africa and Zambia home.”



TACKLING THE SKILLS CRISIS

The focus is on training, as well as hiring international expertise

Multiple training initiatives

In the face of the global mining skills shortage, a dedicated focus on training has taken hold in the world's mining companies. It targets both new and existing employees, and includes ongoing education, coaching, mentoring and first-hand exposure to different mines and mining techniques.

Ongoing education typically involves sending students to attend courses at various institutions. This is common at all Zambian mines. For example, since 2007, Konkola Copper Mines has awarded more than 400 scholarships, at school and university level, to deserving people both from within the company and the broader community. Many are sent to top international universities in Australia, India, South Africa and Namibia¹.

In Zambia, mining companies provide financial assistance to the University of Zambia's School of Mines.

Funding and building training institutions

As part of a drive to broaden the available pool of graduates in mining-related disciplines, mining companies in many countries provide

financial assistance to schools and universities. In South Africa, for example, the major mining companies invest heavily in tertiary institutions, financially supporting not just major universities, but also institutions that train artisans².

In Zambia, mining companies provide financial assistance to the University of Zambia's School of Mines, in the form of books, bursaries and the maintenance of vital infrastructure. They also accept students – up to 20 at a time – on internships before they graduate so that they can gain exposure to modern mining technology and techniques.

As part of a vision to create a centre of excellence for the mining industry in North-Western province, FQM Kansanshi has teamed up with the Ministry of Science, Technology and Vocational Training and invested more than \$3 million in the joint development of a technical training facility dubbed SOTTI – Solwezi Trades Training Institute. Since starting in 2014, SOTTI has turned out more than 400 graduates – including many from Barrick Lumwana – in metal fabrication, electrical power and heavy equipment repair.

Mopani has gone even further and invested more than \$20 million in the construction of a technical training school of international standing in Mufulira. With its high-level lecturers and high-tech equipment – including simulators – the centre focuses on coursework that prepares students for the

practical situations they will encounter on the job. Even university mining graduates pass through the school to develop a practical understanding of mining.

"It is this which makes our school unique, even by international standards," says Lourens de Klerk, who heads up the centre. The long-term vision is to prepare graduates to work anywhere in the world. "We can become the training ground for the world's miners," he says³.

Exposure to different working environments

Gaining first-hand exposure to different mines and mining techniques involves sending designated people to spend time at mines in other countries. This is fairly common in Zambia, given the global reach of the mining companies operating here. For example, Mopani's main shareholder, Glencore, operates mines in several countries, including Kazakhstan. A team of Zambians from Mopani were recently sent there to gain international exposure.

Coaching and mentoring

Coaching and mentoring typically involves assigning an understudy to a more senior person, in the context of a formal skills-transfer programme. The understudy is usually a new graduate, or an already experienced person seeking to gain specific expertise or experience in a particular area; the senior person is typically an expatriate with a special blend of skill and experience.

"Your best chance to be successful is when you learn from the best people in the industry," says Mopani Copper Mines CEO, Johan Jansen, commenting on the company's foreign expertise. "That's why we've attracted some of the best people in the world."

Expats, yes – but what kind?

As is already clear from the earlier chapters of this report, the use of expatriates is a common feature of the global mining industry – whether it's in advanced economies like Canada or Australia, or emerging economies such as Tanzania or Zambia.

These sought-after people have the skills, they have the experience and they are highly mobile. They help alleviate critical skill shortages at all stages of the mine life-cycle – from exploration and construction to operation and rehabilitation.

However, a narrow emphasis on skills alone is not enough; equally important, if not more so, is the ability to work effectively within different cultures, and the ability to transfer skills and motivate local staff.

"Mining activities are culturally specific – that is, a mining engineer or tradesperson educated in the US may not have the cultural





training and language skills to work effectively in China or India, and vice-versa,” says a report⁴ by the International Council on Mining and Metals (ICMM). “[There] is a growing requirement for individuals who are not only technically excellent, but also have social skills that facilitate relationship-building with host communities and countries.”

A study⁵ on the role of knowledge transfer by expatriates in multinationals says that expatriates with these particular characteristics are “valuable and rare resources” that can help provide a “competitive advantage”.

“You have to handpick your expats – it’s all about the temperament of the person,” says Mopani’s Jansen. “They must be willing to share their knowledge, and fit in with the Zambian culture.”

Kansanshi’s training programme is not of the “cookie-cutter” variety.

How skills-transfer programmes work

The successful completion of an expatriate’s contract is as much about how well their skills-transfer programme worked as it is about how successfully they did their job. Ng’andwe Chibesa, HR Manager at Barrick Lumwana, explains:

“Each expat is matched to an understudy – that’s a requirement under Barrick Lumwana’s talent management programme, and is also in line with the Zambianisation policy for the

purpose of skills transfer. This also assists in obtaining or extending employment permits with the Department of Immigration.

“There’s sometimes also a second understudy, because people get poached or they might leave. There’s an individual development plan for each understudy. The mentor and mentee agree on the learning and outcomes. These are reviewed on an annual basis. It’s all very formalised, with presentations and feedback. At the end of the learning period, there might be a contract extension or renewal. Maybe the understudy needs another year; maybe the understudy left and the whole programme has to start again.”

At FQM Kansanshi, the skills-transfer programmes are just as critical in terms of outcomes, but looser and more informal in terms of how they operate. Says Mark Silimi, HR Manager: “Our programmes are very needs-driven and task-driven in terms of the job that needs to be done. It becomes very visible to everyone in the system if the skills have been transferred.”

George Nzoma, Chief Mining Engineer at FQM Kansanshi, is a Zimbabwean who is into his third two-year contract and plays a pivotal role in graduate development. “It’s clear in my work permit that skills transfer is important. I feel a sense of accomplishment when I see the success of the people we’ve trained.”

Kansanshi’s training programme is not of the “cookie-cutter” variety, but is something much broader, says Nzoma. “We’re growing people to be internationally competitive, rather than just to work here at Kansanshi. We often tell them: there is life after First Quantum.”

CONCLUSION

Tackling the skills crisis involves both mines and their host countries

An integrated approach

The global mining skills crisis is here, it is real and it will be around for years to come. It is likely to get considerably worse within the next decade, when all those people currently nearing retirement finally end up exiting the industry, leaving a hole that will need to be filled. What can be done in the meantime?

The information gathered in the compiling of this report suggests that an integrated approach is necessary, involving the world's mines and the countries that host them.

Companies – train, train, train

There's a saying: the best time to plant a tree was 20 years ago; the second-best time is now. This also applies to training in the mining industry. It takes several years to become qualified in mining, and several more years of experience to be of real value.

Tomorrow's graduates in mining engineering and other core fields are at high school today.

Tomorrow's graduates in mining engineering and other core fields are at high school today; they need to be identified, nurtured, sponsored and put through universities and training colleges. Tomorrow's senior

experienced mining personnel are currently in the early stages of their careers; they too need to be identified, nurtured, mentored and incentivised to climb the career ladder and reach their full potential.

The companies that get this right are the ones that will be best placed to withstand the full force of the global mining-skills crunch.

Countries – facilitate the entry of foreign talent

As this report shows, international expertise plays a huge role in allowing a country's mining industry to thrive and grow – producing multiple economic benefits in the form of employment, foreign earnings and tax revenues.

A 2013¹ report by the Australian Mining Council, *Geographic Labour Mobility*, illustrates this. "[The] industry has had to rely on skilled migration for about half of its mining engineers in recent years. There is also evidence that [they] play a vital part in training Australian workers. Without temporary skilled migration, the Australian minerals industry would not have been able to respond to the significant demand in mining experienced over the past decade."

If international mining expertise helps a country's mining industry to thrive and grow, then it follows that governments should, as far as possible, facilitate rather than hinder the hiring process.





“The ease of hiring skilled expatriates is one of the factors which are taken into consideration in the location decision of multinationals,” says a 2013 World Bank report², which cites research showing that a less restrictive skilled immigration regime helps to attract foreign investment.

“Overly restrictive or cumbersome skilled immigration regimes may result in lengthy work permit processing times which potentially imply stalled productivity or loss of strategic or first-mover advantage for companies.”

“The importance of skilled immigration reform cannot be underestimated.”

The report ranks countries according to how long it takes them to grant a temporary work permit; short processing times are two weeks or less; long processing times are five months or more.

According to the HR managers interviewed for this report, it takes between one month and three months to have a work permit approved in Zambia – but this can take longer if there are multiple appeals.

“The importance of skilled immigration reform cannot be underestimated, and is an essential

building block for the sustained global competitiveness of any economy,” the World Bank report concludes.

Skills transfer – the essential ingredient

While it is important for companies to train, and for countries to facilitate as far as possible the smooth entry of international expertise, it is skills transfer that adds value to both.

From the perspective of the mines, the challenge is to secure the right kind of expertise – whether international or local – for the skills transfer to happen.

From the perspective of the country, the challenge is to have the right policies and procedures in place that acknowledges the need for high-skill migration, but does so in a way that focuses on knowledge transfer and efficiency³.

In this way, there can be a balance between the industry’s need for high-skill workers, and a government’s responsibility to promote domestic job creation and employment.



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