

Peru Mining 2015



**SPECIAL PDAC
PRE-RELEASE
EDITION**

Mining in Peru

Will 2015 mark a breakthrough in new project development?

2015 is the last year of Ollanta Humala's administration, and the electoral winds are already starting to be felt across the country in preparation for the 2016 presidential poll. According to optimists in the mining industry, this is good because the government will try to push new mine development and infrastructure projects in order to strengthen its legacy before leaving office. Pessimists, on the other hand, think that the government will have no interest in complicating its life by pushing through controversial mining projects. In truth, the actions of the government alone will not determine what happens, but the government could certainly use an economic boost. After a series of downward corrections, it was recently published that Peru's GDP only grew by 2.35% in 2014, the lowest rate since 2009, and the depression in demand and decline in prices for mineral commodities are certainly dragging down growth.

There are two projects expected to be highlights for Peru's mining industry in 2015, but the outlook for each depends on different factors for success. The first is Southern Copper's Tía María, at which money has already been approved to start developing the mine, but where community support will be required. The second is Anglo American's Quellaveco, which is more linked to corporate strategic production decisions.

Peru's copper output stayed practically flat in 2014 at 1.38 million metric tons (mt), but the upward trend of the last year is assured moving forwards. Hudbay Minerals' Constancia, which started production in December, will reach commercial production this year to add 82,000 mt annually to Peru's copper portfolio. Freeport McMoRan's Cerro Verde's gigantic expansion from 120,000 mt per day (mt/d) to 360,000 mt/d should be ready by late 2015 or early 2016. Chinalco is also investing \$1.5 billion to expand its Toromocho operation, which produced a lower than expected 70,000 mt of copper last year due to technical and environmental problems.

Former Glencore Xstrata project Las Bambas, now \$62.5%-owned by MMG Limited, will be a key addition to the country's copper production, with 2 million mt of copper during its first five years of operation, starting 2016. Construction was 80% complete by the end of 2014, according to MMG. The operating consortium is investing around \$3 billion to put the project into production, on top of the nearly \$7-billion acquisition cost last year, a figure that includes the \$1.2 billion that was spent beforehand by Glencore Xstrata.

Other projects worth mentioning are Southern Copper's expansions at Toquepala and Cuajone; Buenaventura's Tambomayo gold project, a \$200-million, 150,000-oz per



year (oz/y) venture, expected to be commissioned in 2016; Rio Alto Mining's Shahuindo gold project, whose phase I will involve a \$70-million investment; Hochschild Mining's Inmaculada, which will start production this year, providing 6 to 7 million oz/y of silver equivalent; and Jinzhao Mining's Pampa de Pongo, a \$1.5-billion iron ore operation plus \$340-million port, which has been quietly advancing and already has received its environmental impact assessment approval.

Looking at production figures besides copper, gold output fell from 4.87 million oz in 2013 to 4.54 million oz last year; zinc production also decreased, from 1.35 million mt to 1.32 million mt; while both silver and lead saw increasing production to reach 123.8 million oz and 278,500 mt, respectively.

All in all, the official guidance is that there will be mining investments worth \$8.5 billion annually in 2015 and 2016, a similar amount to last year. The figures look healthy considering the global commodity-pricing scenario, but the reality is that a big portion of these investments comes from the inertia of past decisions, and does not take into consideration the high opportunity cost of having large ventures in a standstill, such as Yanacocha's Conga project.

"The industry has its cycles. Commodity prices go up and down, and some governments are more proactive than others to promote investments. Comparisons are never nice, but in the previous government, all the variables played in the



Adolfo Vera, president & CEO,
Southern Peaks Mining



Antonio Samaniego, president,
Institute of Mining
Engineers (IIMP)



Peru's copper production will continue its upward trend moving forwards. Photo: Las Bambas concentrator plant under construction, courtesy of MMG.

of projects. The rights of the few should not affect the rights of the many.”

Low costs, the recipe for success

Peru's position as a world-class mining destination is not under question: beyond sociopolitical issues that need to be addressed on a project-by-project basis, with both good and bad outcomes depending on the case, the country offers key ingredients that make it an attractive country for investors. Its geological potential is world-class, and while other countries in Latin America such as Argentina and Colombia offer more untouched exploration opportunities, they present a whole different set of challenges for interested companies.

industry's favor: the authorities tried to promote projects as quickly as possible and, at the same time, commodity prices reached historic high levels,” relates José Vizquerra, Executive Director of Buenaventura Ingenieros and Leader of the Peruvian delegation to PDAC 2015. With uncertainty about future demand trends and the political results of the 2016 presidential elections and with some anti-mining leaders comfortably installed in several regional governments, the prospects for 2017 onwards do not look so buoyant from the perspective of new project development. The government contends that it is aware of the problem and is trying to expedite the cumbersome bureaucracy for exploration projects, but it remains to be seen if these initiatives will

have a positive effect in the short term. Overall exploration expenditures in the country decreased by 50% between 2012 and 2014. In the words of Antonio Samaniego, president of Peru's Institute of Mining Engineers (IIMP), “the main priority in this cycle is not to stop exploration activities. It is a tough call for companies, but it is just a cyclical problem for the industry.” For Adolfo Vera, president & CEO of Southern Peaks Mining, a mid-tier producer, “the crisis in the junior segment is going to take its toll on the industry. Juniors are the ones that feed the value chain with new projects: junior companies started Toromocho and Constancia, for instance. On the other hand, community issues should not stop the development

Peru has a wide array of expertise and service providers to support the industry and is not affected by the high power costs and water restrictions that Chile, the world's largest copper producer, suffers. At the end of the day, a good asset in Peru is as good as it gets, as proven by the recent acquisition of Rio Alto Mining by Tahoe Resources for \$1.12 billion. Being able to produce profitably despite defensive prices globally is a key advantage for many Peruvian mines. Sierra Metals, a mid-tier precious and base metals producer, acquired the Yauricocha mine in Peru in 2011, and in 2014 it had all-in sustaining cash costs of less than \$12/oz of silver. The company also operates two other mines in Mexico.

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Audra Walsh,
president & CEO,
Sierra Metals

Yauricocha is an underground polymetallic mine that has been in operation for over 60 years. Last year it produced over 2.1 million oz of silver last year, on top of some gold, copper, lead and zinc. With current reserves and resources guaranteeing at least five more years of production, there is no indication that the ore will run out soon, assures Sierra's president & CEO, Audra Walsh.

J. Alberto Arias, chairman of the company, declares that he is puzzled by the disconnect between the company's

market valuation and its fundamentals: "In 2010, we did not have Yauricocha and only processed 0.13 million mt; last year we were at 1.71 million mt. Yet our share price was higher back then, compared to today. It is mind-boggling."

Moving forwards, the company plans to continue growth, both internally and through further acquisitions, taking advantage of the synergies created by the mines' cashflow and the operating teams in place in Peru and Mexico. "We primarily look at low-cost opportunities in precious metals. It is definitely a good time to go shopping," says Arias.

Another clear example of the growth opportunities that Peru presents for mid-tier players is Southern Peaks Mining. The company operates Quiruvilca, a base metals asset acquired from Pan American Silver, and Condestable, an underground copper mine bought from Trafigura. With those two mines as its foundations, Southern Peaks is looking at potential acquisitions, and is also moving forwards at Ariana, a 70%-owned project in partnership with Pan American Silver, where a feasibility study has been completed.

Like Yauricocha, Quiruvilca and Condestable are mines that have been in operation for decades. Thinking outside the box is essential for achieving efficiencies, says Adolfo Vera, Southern Peaks' president & CEO: "Condestable is the second-largest underground mine in Peru, yet 70% of its production came from labor-intensive conventional mining (miners drilling with a jack-leg). We are trying to get 40% of our production through sub-level stoping with long-holes, which requires far less people. So far the results have been exceptional".

"You have to be very disciplined in this business. My experience, having been in different mines in different countries, is that discipline is disrupted every time you have money," Vera continues.

Is the low cycle, therefore, actually a good thing for miners? One thing is for sure: it is promoting creativity and innovation in order to lower costs, increase recovery rates and push competitiveness. In other words, it is allowing for profitable mines right at the bottom of the cycle, which is a recipe that will ensure Peru's strength in mining over the next decades.

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Ocaña copper project in Arequipa.
Photo courtesy of Indico Resources.

Junior Companies

Explorers embrace new business models

Junior companies are implementing a wide variety of strategies to survive in the current market, including signing joint ventures, divesting non-core assets, investing in feasibility studies rather than drilling, and shifting the business focus towards a cash flow-creating model. Peru's geological potential remains strong, and even though some companies who cannot afford their exploration commitments are dropping land, other players are seeing more value in acquiring assets with proven information instead of dealing with the risks of greenfield exploration.

"This is my fourth bear market, and I have learned that in different market environments you do different things. When it is easy to get money and properties are expensive, we have tended to focus on early-stage exploration work. Now that properties are worth nothing and money is hard to find, we are looking at acquiring projects already found by others," explains Miles Thompson, president and CEO of Lara Exploration, a company focused on project generation.

Lara Exploration has managed to survive market volatility thanks to the income generated by joint ventures and project transactions. The company is active on many fronts: its main asset today is Liberdade in Brazil, where Chile's Codelco can earn in up to 70%. Together with Goldplata, Lara is setting up a new porphyry explorer with assets in Peru and Colombia. Other transactions in Peru include the sales of the Corina gold project to Hochschild for \$4.1 million plus a royalty and the Grace gold project to Aruntani for \$2 mil-

lion plus a royalty. Together with Redzone Resources, Lara is also looking for a joint venture partner for the Lara and Tingo Este copper projects in Peru.

"Mining is not a business that you easily can run on a quarter-to-quarter or year-to-year basis. You need to have a sustained effort, so the junior model of finding project, raising a couple of million dollars, drilling and hoping to get lucky is a lottery ticket. We consider it to be a kamikaze business strategy because you are hostage to the need to finance regularly. The prospect generator model is tried and tested in our business, as well as in the oil and gas industry," insists Thompson.

Another growing business option for entrepreneurs in Peru's metals business is gold processing plants, due to the sizeable gold production coming from small miners. Companies like Dynacor have demonstrated that investing in your own processing facility can pay attractive dividends, which can then be used to support exploration activities without having to raise funds in the stock exchange. Now, other players are focusing solely on the gold processing model as their core activity.

"The junior resource space has been pretty tough for a while. We were an exploration company, but as with everybody else, we could not raise the necessary capital to continue exploring. We looked at the gold milling business, which is a cash flow business, much less risky than punching holes," affirms Mark Wright, vice president, operations and new projects at Inca One Gold Corp, whose headquarters is in Vancouver.



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The company acquired the Chala gold plant in the region of Arequipa and obtained debt financing for \$5 million to scale up the facility to 100 metric tons (mt) per day and fund the initial ore acquisition, where grade is averaging 0.9 ounces (oz) per mt, according to the company.

The tolling business model presents significant challenges, though: for years, Peru has suffered from an illegal mining problem that causes serious health, safety and environmental problems in affected areas. The government’s formalization process in place is moving very slowly, so it is still tricky to track the origin of the ore in a sector that moves 1 million oz per year in the country.

“The formalization process opens the door to having a business within the legal framework. We want to be instrumental in this change. We buy 100% of our ore from legal miners, and many others are formalizing, which increases our potential client base. Moving forward, the idea is to have properties up and down the coast that can effectively service the Peruvian market”, assures Jaime Polar, vice president, operations and development at Inca One Gold.

Traditional juniors look at production

One of the key paradigm changes of the current market is that investors do not want the risks associated to exploration activities, and want instead to perceive that a project can be put into production rapidly and efficiently. In this respect, many companies are trying to make the most of their outlined resources to assess if that is possible, through feasibility and engineering studies.

In the words of Bob Baxter, president and CEO of Indico Resources, “there is certain apathy today in the investors community, which draws a line between early-stage projects and advanced projects, and do not want to consider anything that is not at a fairly advanced stage. The way we can add value to our shareholders is moving the project towards production, probably via a joint venture mechanism”.

Indico’s main asset is Ocaña, where there is an inferred resource of 50 million mt of soluble supergene copper. The company believes that it can increase that figure significantly as mineralization extends to the east. “We have been running our internal models on an 80 million-mt



Miles Thompson,
president and CEO,
Lara Exploration

situation and believe that on our side of the fence, within our property, we can have the potential for a 25,000 mt per year operation for 10 years, which could be easily augmented if we could add the neighboring property, which offers similar mineralization”, says Baxter.

The capital expenditure to put Ocaña into production is estimated at \$100 million, which is certainly modest for a copper project, but still out of reach for a junior company in today’s market; hence, the strategy of finding a partner. In the meantime, the company expects to have completed a preliminary economic assessment (PEA) for Ocaña by August 2015.

In the precious metals segment, Andean Gold is focused on moving towards production as well. The company recently renegotiated the acquisition of its Urumalqui gold-silver project and now owns 100% of it. The project has a 43-101 resource estimate for nearly 2 million mt, which does not include further exploration campaigns since 2012. Alexander Peña, the company’s newly-appointed president & CEO, estimates that Urumalqui can be put into production at a cost of just \$10 million.







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PERU'S WORLDWIDE PRODUCTION RANKING (2013)

Source: USGS

Gold	5
Silver	3
Copper	3
Lead	4
Zinc	3
Tin	3
Molybdenum	4

“Although grade is not extraordinary, we expect the mining to be cheap, since all the resource is contained within a package of 1,500 meters long and 200 meters deep. We are very confident with the resource that we already have and our strategy is to move towards production, not to do more exploration.”

Peña further develops on the milestone of finally owning 100% of the project. “We can raise funds for Urumalqui, rather than dilute our share price on the stock exchange. Today, you have companies that have zero debt, \$10 million in the bank and a market valuation of \$5 million. How is it possible that a company is worth less than its monetary assets? The current market is terrible for juniors,” says Peña.

Life goes on

There are a number of junior and mid-sized companies with significant assets in Peru, and while activity has slowed down, the country continues to offer a rich portfolio of projects for the medium-term. One of the key junior players in the copper segment, Panoro Minerals, is working on PEA studies for its Cotabambas (Cu/Au/Ag) and Antilla (Cu/Mo) projects. Meanwhile, AQM Copper, who holds 30% of the Zafranal copper project together with Teck and Mitsubishi Materials Corporation, is advancing a pre-feasibility drilling program at the project. In precious metals, Minera IRL is looking at financing for its



Alexander Peña,
president & CEO,
Andean Gold

flagship Ollachea gold project, which has the necessary permits in place. The mine should yield around 930,000 oz of gold over nine years. Bear Creek Mining has cut its generative exploration to focus on completing a modified feasibility study at Corani, a very large Ag/Pb/Zn project, while the company continues to work with the Peruvian government to recuperate its Santa Ana project as well. Finally, Lupaka Gold has been granted the permits to start development work at the Invicta gold project, where the company plans to spend \$2.5 million to commence production at an initial rate of 300 mt per day.

Juniors currently drilling include Tinka Resources, which continues to work at Ayawilca (Zn) and Colquipucro (Ag), and Vena Resources at its Esquilache polymetallic project. Vena also holds uranium interests, a commodity where the main player is Macusani Yellowcake. In the middle of last year, the latter company reinforced its position through the acquisition of the Peruvian assets of Azincourt Uranium in the area of Puno.

With all this in mind, the truth is that life must go on in the project generation and development segment. Notwithstanding the challenges, the mining industry cannot afford to let its exploration business die. Good times or bad times, the sector needs explorers and drillers, as there is no other way to replace reserves and sustain mining production in the years ahead.



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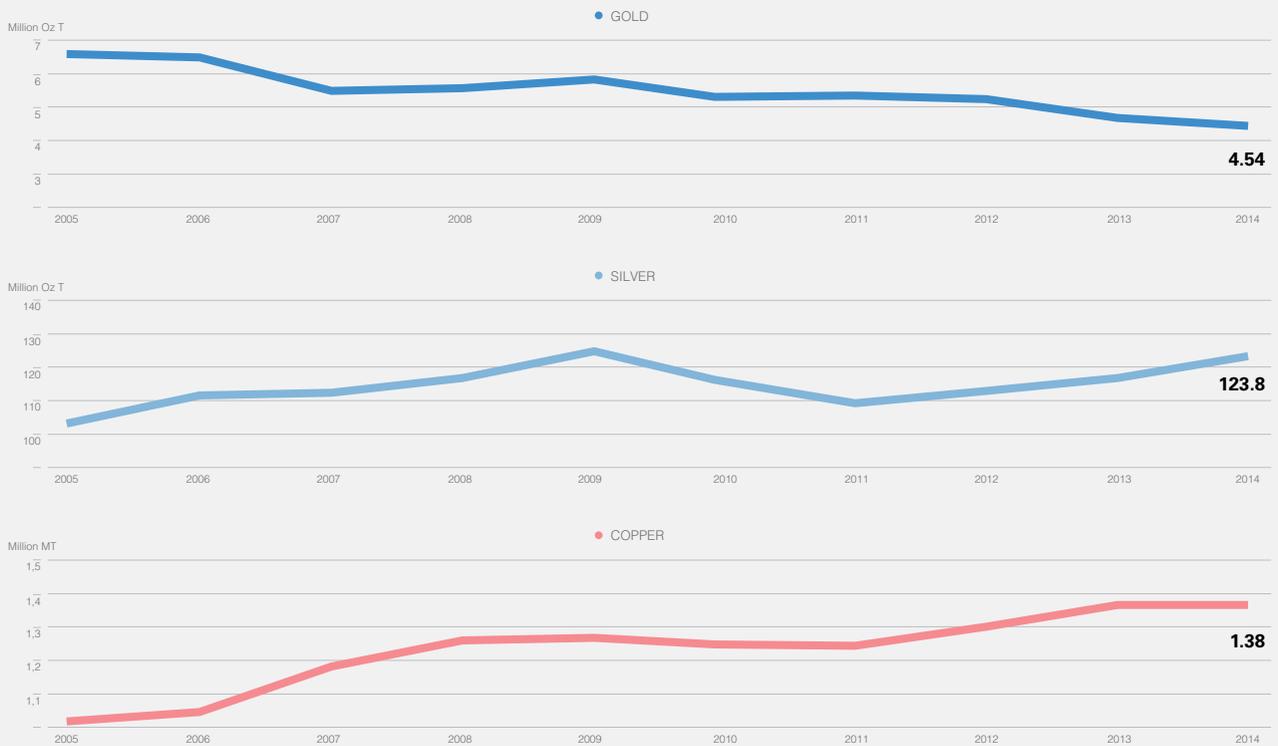
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Technology and services: the innovation push

Companies need to invest some time and money to think outside the box

Faced by challenging economic scenarios, companies have a dilemma to solve: they can do things the same way that they have been done for years, lower some targets, and try to decrease costs in the hope that the storm will pass soon. Or, they reflect and strategize about how to be efficient and profitable even if the storm becomes permanent.

The second option requires more time, creativity and, initially, money in most instances, but it is the long-term results that will prove the adequacy of this strategy. For miners who look at a 20, 30 or 50-year horizon, constantly rethinking processes will certainly pay off.

“Miners need to ask themselves: what I can do that will increase my bottom line, without compromising the future of the operation? Can some capital costs for infrastructure be deferred? Can we modify the schedule to defer waste and bring high grade forward? Can we decrease the dilu-

tion of the ore? Is the mine optimized for the prevailing commodity prices?,” explains Paul Murphy, Lima Manager at Mining Plus, an Australian engineering consultancy.

The research and development (R&D) support that providers can bring to the industry is invaluable. Certimin, a large laboratory, has created a new position exclusively dedicated to new technologies. After investing in a mini flotation pilot plant last year, which is already working on several projects for an important base metals producer in the country, the company is introducing aerophotogrammetry services with drones that add to its previous offer in geochemical, metallurgical and environmental analysis.

“Aero-photogrammetry offers multiple applications: we obtain very valuable data to measure the pit and the progress on mineral extraction, to carry out volumetric control, to manage inventory and planning for stockpiles and waste rock dumps, to detect acid concentrations in leaching

pads, to monitor tailings dams and handle geomechanical aspects, among others in the engineering, control and safety areas,” explains Luz Blancas, commercial manager of Certimin.

Álvaro Salazar, general manager of Certimin, assures that “innovation is a fundamental value. In a time where the priority is reducing costs, we are tackling this problem by boosting productivity through new technologies. Analytical services have become a commodity, so we need to differentiate ourselves in other areas. We cannot just start a price war, because that would not be sustainable”.

Exsa, a blasting solutions company, is also reaping the fruits of its R&D activities by introducing a new explosive technology to the market this year, called Quantex. It uses high-density ammonium nitrate, which is easier to source if compared to the traditional, porous ammonium nitrate. Gustavo Gómez Sánchez, commercial manager of Exsa, gives more details: “The main use of this technology is rock fragmentation in surface mining. The product offers cost savings of 15% to 20% and further significant savings on the operational aspects, as well as up to an 18% reduction in greenhouse emissions. In Peru, both Southern Copper, in Toquepala and Cuajone, and Newmont, in Yanacocha, are already using this product.” Exsa is expanding its scope, opening up operations in Chile and increasing its service offering beyond the mere provision of explosives, with activities such as secondary drilling or the design and construction of explosives warehouses within projects such as Minsur’s Mina Justa and MMG’s Las Bambas. Product-wise, the company’s R&D department is working to improve its underground explosives offering, with a focus on dynamite.

Also in underground operations, local equipment manufacturer Resemin has just introduced a new micro-jumbo, the Muki, which is designed to work in extreme narrow-vein operations and allows for mechanization in tunnels where traditional methods were the only option. This has important implications safety-wise (see following article), but

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James Valenzuela,
managing director,
Resemin



Luz Blancas,
commercial manager,
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it also increases productivity, as explained by Resemin's managing director James Valenzuela: "The Muki can radically change mining in extremely narrow veins worldwide. There was not a machine with these features in the market. It is a micro-jumbo with a width of 1.05 meters and can drill a 2.4-meter hole in 40 seconds, as opposed to seven minutes with traditional methods." The Muki is already operating in one of Castrovirreyña's mines in Peru, and Valenzuela expects to sell it worldwide. Resemin exported 43% of the machines that it produced last year.

Meanwhile, global manufacturer Atlas Copco is introducing the Simba S7 C long-hole drill, which incorporates a computerized system, and a new hand-held hydraulic rock drill. Atlas Copco's general manager in Peru, Brian Doffing, provides more insights about the latter: "Peru is one of the two countries that we have selected to do the trials for this product. It can drive efficiencies up by at least 25% over traditional pneumatic drills in hard rock applications."

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“Miners need to ask themselves: what I can do to increase my bottom line, without compromising the future of the operation? Can some capital costs be deferred? Can we modify the schedule to defer waste and bring high grade forward? Can we decrease the dilution of the ore? Is the mine optimized for the prevailing commodity prices?”

- Paul Murphy, Lima manager, Mining Plus

The need for innovation is not just a result of lower market conditions in the mining sector. Peru offers other challenges in terms of social relations, for instance, that push providers to source locally and provide business opportunities for the communities; or serious infrastructure shortages, that affect the economic indicators of projects before and during the operation.

“Peru’s main challenge is its infrastructure deficit. As soon as you go out of Lima, the roads are in very bad condition. Without the necessary infrastructure of roads, energy and ports, all costs go up. There is this belief that companies must do the State’s work, and that way corporate social responsibility becomes public charity. The State should provide the necessary services so companies can operate,” affirms Carlos Soldi, general manager of SVS Ingenieros, now part of SRK, an international engineering consultancy.

Among others, bad infrastructure becomes a headache for transportation companies, which see their safety and timely deliveries

compromised. Moving the necessary parts and equipment to the mining operations in very remote areas requires a whole engineering job, says Carlos Roldán, general manager of Stiglich Transportes: “Along the coast we have better roads, but they go through cities that have practically invaded the road, so there is high risk of accidents and human life loss. Also, there are so many intersections that the speed is very low. Taking oversized cargo from Callao to the south, for instance, can take us five days. We need to move by night, remove traffic lights and pedestrian bridges, and put them back on immediately after. Sometimes our work starts one year before.”

The mining industry will never stop facing challenges, from lower grades and higher processing volumes to managing water and tailings dams. In this environment, providers will play a key role in supporting the miners with new ideas, as long as mining companies themselves also dedicate some people to listen and evaluate these new ideas as well.



Carlos Soldi, general manager, SVS Ingenieros (SRK)

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Mining safety

'Zero' is more than a simple number

Peru's mining industry suffered 32 fatalities in 2014, a 32% reduction year-on-year. The downward trend seems positive, but surely the relatives of those who died on mining duty will not care about this. Indeed, human safety is that particular parameter where numbers never add up, unless there is a zero at the end of the spreadsheet; hence, the need remains for the industry to keep working on how to reach that goal.

The safety challenge involves a multi-disciplinary approach: from continuous innovation in new, safer technologies, to intensive education and training to ensure that all workers not only understand how to follow the right procedures, but also are dedicated, 100% of the time, to their own safety and to the safety of those around them.

Peru has been a mining country for centuries, yet the experience of such a long history extracting metals does not take out the need for intensive training in this matter. In the words of Steve Dixon, CEO of mining contractor Stracon GyM, "the mining industry in Peru has experienced very strong growth over the last years, and it will grow again after the current slowdown. This means that a lot of inexperienced, young people will enter the industry, and keeping these people



Lowering accident rates requires a combination of new technologies, safe procedures and awareness among workers. Photo: Constancia mine, courtesy of Stracon GyM.

safe will be a huge challenge. The process is never going to end because everyone needs to return home safely every day". Looking at the cold numbers from 2014, rockfall accidents accounted for 28% of deaths, followed by traffic crashes, which were 25%. While accident rates have consistently declined in recent years, Peru's Institute of Mining Safety (ISEM) is implementing a program with associated companies that aims to have zero fatalities by 2021 (see interview on next page).

Innovation and awareness

Creativity is a key ingredient in the industry's drive for lower production costs. The good news about this compulsory bias towards innovations is that better technology and processes have a positive impact on safety. Bearing in mind that a majority of deaths in Peru happen in underground mining environments, mechanization is a key aspect to take operators out of the line of fire.

As portrayed in the previous article, local equipment manufacturer Resemin has come up with a small jumbo, the Muki, for very narrow vein operations. According to James Valenzuela, managing director of Resemin, "old mining was built on rails and wooden frames; many mines are going back to that standard, which poses high risks for operators. It is inconsistent with modernity, but the problem is that until now there was no equipment in the market for these types of veins".

As underground operations go deeper, Peru can learn from the experience of other mining countries, namely South Africa. International engineering firm WorleyParsons, for instance, acquired TWP of South Africa in 2012, and incorporated important expertise designing shafts and introducing mechanized mining models. The company is currently developing two shafts for Peruvian clients. "In Peru there are not many underground miners that have mechanized and modernized their operations. Tradi-

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"Every accident is unacceptable and can be prevented"

Interview with Fernando Borja, Manager, Peru's Institute of Mining Safety (ISEM)

When and why was ISEM created?

In 1996, Peru's mining industry had 120 fatal accidents; it was at that point that stakeholders started to implement new strategies. There were improvements in the regulatory framework and enforcement, and the industry introduced new management systems and new technologies in occupational safety and health (OSH). Additionally, ISEM was created in 1998 as a non-profit organization. At that time, there was not a critical mass of safety professionals, so we started training those in charge of health and safety in the operations, before moving to training initiatives for all workers. Over the last three years we have provided over one million man hours of training annually, which is the equivalent of 600 workers training 365 days a year.

Fatalities in Peru's mining industry decreased from 47 in 2013 to 32 in 2014. Is it possible to reach zero deaths?

We are implementing a program of zero accidents for 2021, which is Peru's bicentenary. Our aim is that the companies participating in this scheme will represent at least 100,000 workers. We are already working with 20 to 25 companies to define the road map. Looking at statistics, from 1996 to 2000, there was a reduction in fatal accidents. From 2000, the evolution in absolute numbers has been fairly flat, but with a downward trend. However, the evolution of the indicators has been remarkably positive. In 1996, when we had 120 deaths, the industry counted 50,000 workers. In 2014, there were 32 fatalities among 200,000 workers. In other words,



fatal accidents have decreased by 75%, even if the mining workforce has quadrupled. Having said this, our goal will always be zero accidents.

What type of accident happens more frequently?

The fatal accident caused by rockfall is the more frequent one, although for a few years traffic accidents accounted for more deaths. Ten years ago, we analyzed the main causes behind rockfall accidents, and as a result companies have been implementing certain measures: for instance, they have created geomechanics departments, provided better training, improved blasting processes, changed mining methods, and acquired better rock support technologies.

What is Peru's safety legislation like?

The main piece of legislation, the DS 055-2010 EM, has incorporated the basis of the main integrated management systems, such as OHSAS 18001. If a company complies with the regulations, it will be easy for them to have a good OSH performance and obtain the relevant certifications. As in every management tool though, it is always possible to introduce improvements.

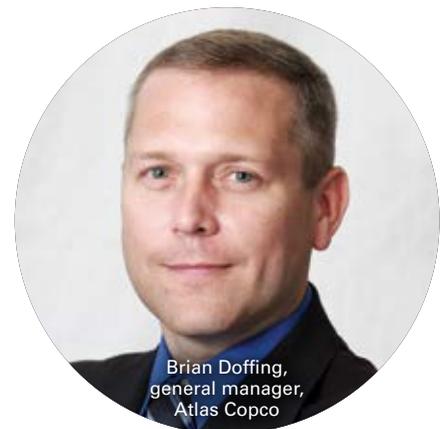
What final message you would like to send to the audience in the mining industry?

People go to work to earn a living, not lose their lives. For this reason, we consider every accident unacceptable and preventable. To achieve that, companies, the state, workers and civil society must work together to eradicate accidents and illnesses from the workplace.

tional methods are still very much in use. We are trying to introduce new models for underground extraction. It does not matter if the client has a disseminated resource or the mineral is contained in veins. We can help them with the best model for each case," affirms Néstor Chacón, business development manager at WorleyParsons. Atlas Copco, a global manufacturer of mining equipment, also looks at new safety features through R&D. Its general manager in Peru, Brian Doffing, gives his view on how to make underground operations safer: "The first level is automation or tele-remote control. We offer systems where we can have a mock setup to drive the machine from 300 meters away. In the future you will be able to control the machine from the surface. The second level is how you can protect

the operators that are inside the machines, so we have override systems that prevent you from taking potentially dangerous actions. Then, the third level is our people." Again, the "people" level is related to training, education, awareness and a safety culture across the organization. Gustavo Gómez Sánchez, commercial manager at blasting solutions company Exsa points out that "by nature, we need to carry safety in our DNA because we handle highly dangerous products. In my opinion, we already are at a very high level in products and processes. Therefore, the next big step is working on the behavioral side of things."

Doffing of Atlas Copco amplifies this point: "We use internal success stories to generate awareness among our people. This year in March we are celebrating



three years with no accidents in 10 of our contracts. If our people working at 4,000 meters above sea level can have zero accidents, then we all can."



"The Antamina project in 1998-99 was the proof that there were many foreign providers coming to work in Peru, and that we had to modernize our processes. The large mining projects of recent years have taught us to work with quality and safety and have pushed us to obtain the relevant certifications. As contractors, quality and safety are a necessity if we want to win work".

- Humberto Palma, president, Haug

"Mining is the sector in Peru with more regulations in terms of safety. The Supreme Decree 055 is not missing any substantial points if compared to the safety regimes of other countries. The national regulation is starting to be applied to other industries, but the mining sector is many years ahead. The regulation is clear, strong and demanding, and allows companies like MSA to innovate".



- José Luis Tamayo, product manager, fall protection, MSA



"The safety standard that serious mining companies have imposed in the Peruvian market has raised the bar for all companies that want to work in the industry. Stiglich is recognized in the market for its experience, team of professionals and safety standards. We are very aware that a human life is priceless".

- Carlos Roldán, general manager, Stiglich Transportes

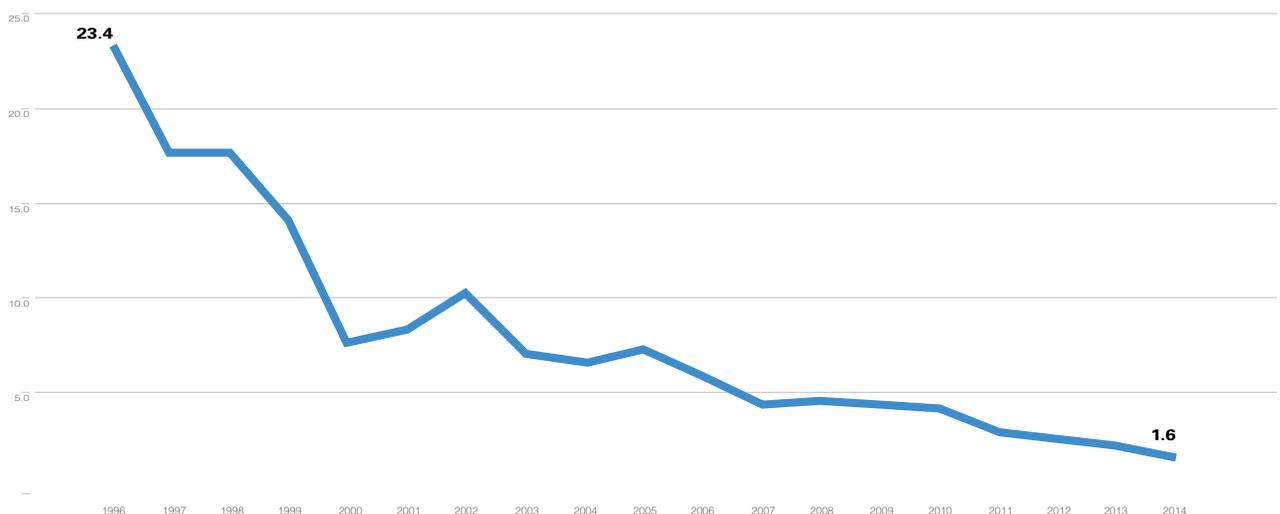
"We have come a long way since safety was looked at as a cost. It is part of operations, and you are not going to be competitive if you are not running a safe operation. We are providing a service to our clients who depend on a good health and safety environment for their people. We do a lot of risk assessment in our engineering and environment work, just like our clients, and we have to be part of that process".



- Brian Griffin, country manager, Golder Associates

MORTALITY RATE PER 10,000 WORKERS

Source: ISEM



“The mining industry has not stopped working, it looks at the long term”

Cecilia Lozada, General Manager, and José Vizquerra, Leader of Peru’s Delegation to PDAC 2015 at the Canada Peru Chamber of Commerce, discuss this year’s convention.

What is Peru’s participation at PDAC?

JV: Since 2008, the Canada Peru Chamber of Commerce has been organizing the Peruvian delegation, which includes the state, private players and some representatives of local communities. In 2014, Peru was the first country to become a sponsor of the PDAC Convention, which sent a strong message to the world. We are country sponsors again this year.

CL: One of the key sessions in our program will deal with the application of the Extractive Industries Transparency Initiative (EITI). Peru is the first country where this is going to be implemented at a regional level, in Moquegua and soon in Piura. Moreover, Ingemmet wants to promote investments in zinc and will be presenting the concessions map for this metal. Zinc is expected to see increasing demand worldwide, and Peru offers great potential; indeed, it is already the world’s third largest producer. Also, we will host the CEO luncheon, one of the most exclusive events during PDAC, where we will have 120 CEOs, Peruvian and foreign, as well as a number of government ministers.

What is the current situation of the industry, and what can be done to increase Peru’s attractiveness?

JV: The industry has its cycles. Commodity prices go up and down, and some governments are more proactive than others to promote investments. The large mining players have investment options worldwide, and they move their money depending on the economic, political, regulatory and social factors. The Peruvian government has done a great effort to expedite the bureaucratic processes, in areas such as exploration licenses, construction permits, water permits, archeological studies and the like. Yet, this is not enough; there is more room for improvement in order to make Peru more attractive. Comparisons are never nice but, in the previous government, all the variables played in the industry’s favor: the authorities tried to promote projects as quickly as possible and, at the same time, commodity prices reached historic high levels.



Do you expect lower levels of activity in this year’s Convention due to the low cycle?

JV: Notwithstanding the cycles, the PDAC Convention has been held for 82 years. We may not have 30,000 people like in 2011, but there will be over 18,000 people, which is still considerable. Last year, the Peruvian delegation consisted of 400 people. This year, I expect this figure to be 300 at a minimum. Besides, mining is an industry that always looks at the long-term. Antamina took 50 years to be developed, from the times of the Cerro de Pasco Copper Corporation until there was a government that finally created the right conditions. From a technical perspective alone, processes can last 15 years. In this respect, the industry has not stopped working.

One negative aspect of low cycles is that the industry does not hire new people and then there are shortages when the market rebounds. Do you agree?

JV: At BISA, we did a study a few years ago that showed that Peru needed roughly 7,000 engineers with 10 to 15 years of experience. Universities need to get working on this quickly, but the results will not be seen overnight. We need to go to high schools and attract youngsters to study geology, mining engineering and the related subjects, because today mining is not an attractive industry for them.



How can Peru’s mining industry effectively measure the performance of its social responsibility programs?

CL: When you talk about indicators, it is very important to have a baseline; unfortunately, you do not have these in remote communities, so it is essential to collaborate with local NGOs that have experience in this area. Qualitative indicators are very hard to get, but they allow you to measure the impact of a project on the community’s life quality. The quantitative indicators are data such as the level of income or the number of cooperatives. Obtaining these indicators is very hard work, but there are a number of local institutions that are working very well with mining companies for the development of their areas of influence.

GBR would like to thank all companies and institutions interviewed for their time and dedication.

This publication is a pre-release edition of GBR’s full special report on Peruvian mining, that will be released in Q3 2015.

If you would like to be interviewed for the report, please contact Alfonso Tejerina (alfonso@gbreports.com)

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