

MINING & CONSTRUCTION

MECHANIZED ROCK EXCAVATION WITH ATLAS COPCO – NO 1 / 2012.

Exploration drilling Serbian style



A talk with
the heroes of
heights

[Page 3](#)



Atlas Copco in
pole position
at Intermat

[Page 14](#)



A new
dimension in
stone

[Page 22](#)



Atlas Copco

EDITORIAL



Only one year after the financial crisis of 2008, the mining industry entered yet another boom period resulting in new, record levels in both 2010 and 2011.

At the end of 2008 and through 2009, it became clear just how important our commitment to strong product and business support is for our customers. In addition, over the last two years we have also noticed a new trend with the major mining houses seeking closer and stronger long-term partnerships with suppliers in the development of more modern, productive, safer and reliable equipment.

Our ambition is to be a leading partner in this trend and we have made investments in new resources to meet that goal. For example, we have formed a new division to support our customers with parts, services and competence. We have also formed a team of application specialists, both for tunneling and mining. Furthermore, we are developing our capabilities in automation and continuing to add to our product offering.

In this context, the recent acquisition of GIA Industri AB is a good example. Through this company we have expanded our range to include utility vehicles, continuous loading equipment, electrical trucks and ventilation on demand, to name just a few.

We believe that a broader product range, a more competent organization and a willingness to define the future of the mining industry together with our customers, proves our determination to become the long term partner with more to offer.

DAVID SHELLHAMMER
President, Underground Rock Excavation

CONTENTS

12



20



22



24



32



3

FEATURES

A head for heights in Latin America.

12

Perfect partners in the quarries.

14

M&C previews the Intermat showcase.

18

GIA acquisition brings new opportunities.

20

E-Force, a powerful new family.

22

Solid commitment to dimension stone.

24

Ready to go with simulator training.

26

Exploration in the Jadar Valley.

32

Minetruck MT42 praised in Canada.

34

The Pit Viper rigs of Poltava.

30

FIELD TEST

Top marks for EDGE in Norway.

29

PRODUCTS & PROGRESS

Back on track at Stockholm's City Line.

10

TECHNICALLY SPEAKING

The high altitude challenge.

38

MARKETPLACE & IN BRIEF

News from around the world.

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Atlas Copco



Operator Eduardo Macheo: "I like this machine. I've been able to drill 780 meters with it in one 12 hour shift and I think I can do better."

engine that delivers 1 650 hp at 1 800 rpm, as well as a larger compressor – 3 800 cfm (110 psi/ 7.6 bar) instead of 3 000 cfm.

The high altitude of this region also means extreme cold, especially in winter (July to September), when temperatures often drop to -40 C° . "As a result, the rigs also have to be fitted with a heater and an on-board generator," continues Espindola, adding that the performance of other items such as the water pump, fuel, battery and oil can all be affected by the low temperature.

The rock at Collahuasi has an average compressive strength of 100 MPa with some sectors reaching even 250 MPa. For comparison, the rock at other local mines has a typical strength of 60 MPa.

Blasting is carried out once a day and four different drilling patterns are used, depending on the area. The presence of water decides whether heavy ANFO or ANFO and emulsion explosive is used.

Atlas Copco also supplies all consumables such as rotary bits (including Secoroc Tricone bits), drill pipes, bit adaptors, top sub adaptors and rotary deck bushings.

Stealing the show

Although both rigs are performing well, it is the larger PV-351 that appears to be stealing the show. During M&C's visit, this unit was drilling about 10 percent faster than the

fleet's electric rigs – roughly 58 m per hour compared to an average of 50 m/h for the electric rigs.

This was confirmed by the operator Eduardo Macheo. "I like this machine," he said. "It's fast and I've been able to drill 780 meters with it in one 12 hour shift, including a one hour break, but I can do better. My personal record is 800 meters in one shift and I'm sure I can reach that with the PV-351," he laughs confidently.

Macheo was familiar with this rig from the start having previously worked on a Pit Viper 271 at another copper mine, although not equipped with the Atlas Copco Rig Control System (RCS).

"Before I came here I had the opportunity to operate the PV-271. I had a console, not joysticks, so the joysticks and the whole computerized system were a new experience for me."

The RCS computerized system is standard on all PV-351 rigs and provides a high level of automation, including options like autodrilling, GPS hole navigation, rig remote access with communication, remote tramming, Measure While Drilling, tele-remote operation and other advanced features.

All the functions are controlled through a touch screen, two joysticks and push-buttons on the operator's seat, so when

the seat swivels, so do the joysticks and screen.

When the two Pit Vipers arrived at the mine, Atlas Copco provided two



Best on site: The PV-351 has proved that it drills faster than the electric rigs in the Collahuasi fleet.



THE HEROES OF VELADERO

High altitudes and harsh weather conditions go hand in hand in Latin America, not least in the mountains of Argentina.





Well equipped for the conditions: Carlos Cavanillas, Drilling & Blasting General Supervisor (left) and Ramón Arjona, Drilling & Blasting Senior Supervisor with the PV-271 at work in the background.

rock is hard so on average it takes about 45 minutes to drill a hole,” he says.

Beating the conditions

Veladero extracts 230 000 tonnes of rock per day from its three orebodies – Amable, Filo Federico and Argenta. Gold production in 2011 was 0.96 million ounces.

Working at this altitude means that with every additional meter of elevation, air density and pressure decrease and certain components and materials can no longer be relied on. “Our winters can affect a machine drastically,” says Arjona, explaining that some aspects of the machine such as the air and water circuits freeze easily.

In order to beat the conditions, the PV-271 had to be equipped with special features such as a more powerful engine and compressor and a cold weather kit which includes additional covering of the machinery housing,

allowing for warm start-up and operation in extreme ambient conditions. Arjona says the PV-271 is doing “very well” with reported good availability ratings and adds: “That’s our little princess. We can rely on that machine and that’s what’s important.”

The fact that Atlas Copco was able to equip the rig for the conditions was decisive. Now it is expected to please the miners even more when it is upgraded with the Rig Control System (RCS) technology.

This will provide automated options including autoleveling, autodrilling, GPS hole navigation, rig remote access and communication, wireless remote tramming, measure while drilling data log files and tele-remote operation. As Carlos Cavanillas, Drilling & Blasting General Supervisor, says: “We’re going for the full set of RCS functions and looking forward to using this technology at Veladero.”



View from the top: The Pit Viper 271 working the 15 m high benches at Veladero.

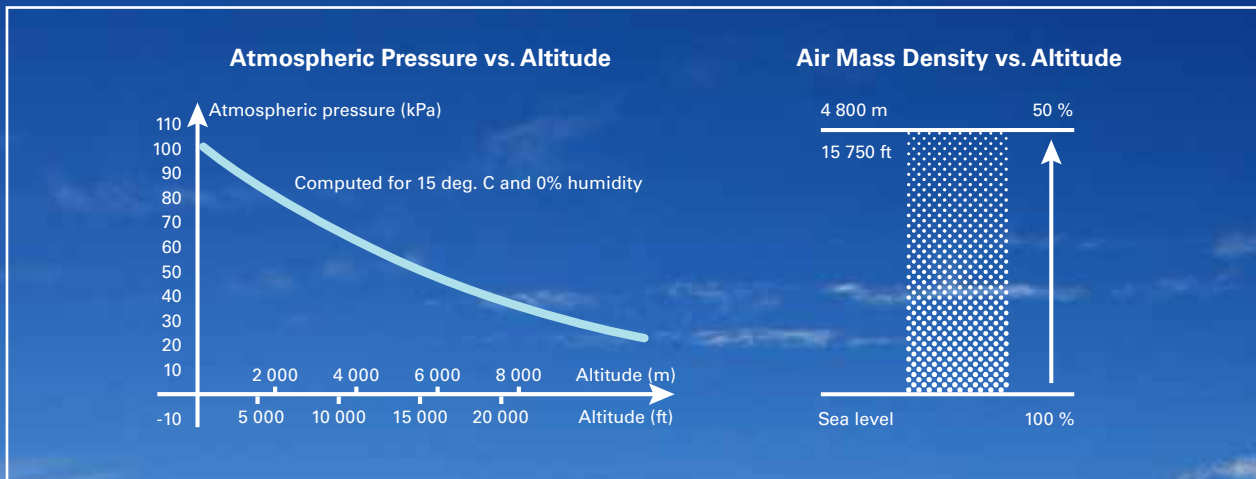
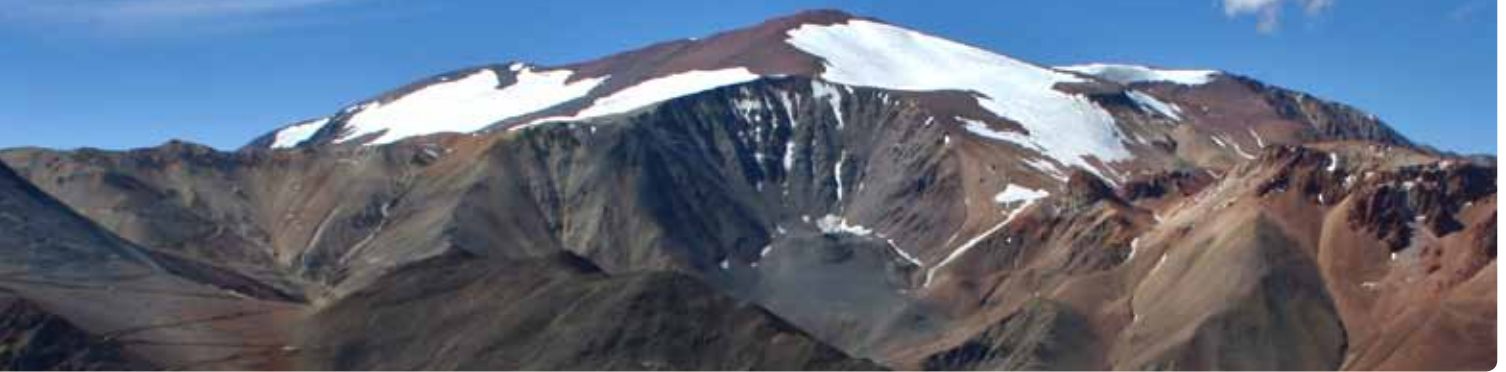


Fig 1



Blasthole Drilling at High Altitude

Easily accessible, high grade ore is becoming scarce. To meet global mineral demand, mining companies must look to challenging locations for economically viable deposits. Naturally this includes mountainous regions at high elevations.

By Brian Fox, Atlas Copco Drilling Solutions, U.S.A.

Experience has shown that high elevations have adverse effects on people and machinery and that this can start as low as 5 000 feet. Today, several mines are operating at altitudes exceeding 16 400 feet where the working conditions can be extremely demanding.

The primary problem with altitude is the decreased mass density of air (Fig 1). To understand this concept, we must first look at the composition of air. Air molecules consist of nitrogen (78%), oxygen (21%) and other gases (1%), and have a given molecular weight. As gravity pulls the air towards the ground, these molecules are subject to the additional weight of

all the molecules above. This additional weight means the air pressure is highest at sea level, and diminishes with increases in elevation. The reduced mass density of air poses two problems. First, the air molecules and their density are what carry the drill cuttings out of the hole. If there are fewer molecules per cubic foot of air, there is less carrying capacity. Second, while the oxygen content is the same (21%) at sea level and high elevations, there are fewer molecules and therefore less oxygen available for humans or engines.

Air, like most substances, expands when heated and contracts when it cools. The molecules move further apart with an

increase in heat, and thus reduce the density of the air. The majority of heat carried by air molecules is via conduction from the earth, which is heated throughout the day by the sun. Air temperature becomes colder at a fairly uniform rate, approximately 3.5°F (1.9°C) per 1 000 ft), as it moves further from the heat source. Therefore, high altitude creates a situation where cold weather provisions are needed for proper operation of the drill.

Rotary drilling and compressors

At sea level, an air compressor will compress a certain volume of air at atmospheric pressure to a higher pressure, yet lower volume. It is often misstated that compressors produce less cfm at high altitude. As an example, let's start with a 1 900 cfm compressor, rotary drilling at sea level. The compressor rating is the intake cfm, meaning it can pull 1 900 cubic feet of air into the compressor every minute.

Uphole Velocities

		Compressor			
		At Sea Level/15° C (59° F)		At 15 000 ft/ -14° C (7° F)	
		Rating: 1 900 cfm	Rating: 2 600 cfm	Rating: 1 900 cfm	Rating 2 600 cfm
Hole Ø (in)	Drill Rod Ø (in)	Effective Vol. 1 900 cfm	Effective Vol. 2 600 cfm	Effective Vol. 1 221 cfm	Effective Vol. 1 670 cfm
10 5/8	7 5/8	6 434 ft/min ^(A)	8 804 ft/min	4 087 ft/min	5 592 ft/min ^(B)
10 5/8	8 5/8	9 149 ft/min	12 520 ft/min	5 812 ft/min ^(C)	7 953 ft/min
9 7/8	7 5/8	8 946 ft/min	12 242 ft/min	5 682 ft/min	7 776 ft/min
9 7/8	8 5/8	15 232 ft/min	20 855 ft/min	9 675 ft/min	13 240 ft/min

1 900 cfm = 53.8 m³/min
 1 000 ft = 304 m
 5 000 ft/min = 25.4 m/s

Fig 2. Comparison of compressor performance at high altitude vs sea level and subsequent effect on uphole velocity in rotary drilling using a Pit Viper 271 drill rig.

At 15 000 feet (4 572 m), the same compressor is still taking in 1 900 cubic feet of air per minute. However, the number of molecules of air is reduced by approximately 42%, calculated by comparing the air pressure at sea level (101 kPa, 14.7 psi) to the pressure at elevation (59 kPa, 8.6 psi).

To compensate for the lower density, correction factors are used to calculate the effective, not actual, intake cfm required to produce the same performance as at sea level. In this case, the reduced air pressure effectively cuts the compressor to an equivalent intake capacity of 1 106 cfm (assuming the same temperature as at sea level). Taking into account the lower temperature and corresponding increase in density, the intake capacity would move up to 1 221 cfm at 7°F (-14°C).

Uphole velocity

To determine how much air is required, a calculation of uphole velocity needs to be made. Uphole velocity is calculated from the intake air volume and the annular area, which is the gap between the wall of the hole and the drill rod. A minimum uphole velocity is often stated as 5 000 ft/min but in reality is affected by the density, size and shape of the chips, and factors such as the pressure of chips or water in the hole and the condition of the borehole wall.

Using a Pit Viper 271 as an example, the table above (Fig 2) shows a comparison. At sea level, 1 900 cfm for a 10 5/8" bit with a 7 5/8" rod works well (A), even as the rod wears down. At high altitude, the large reduction in air density requires either a larger compressor (B) (2 600 cfm) or a larger (8 5/8") diameter drill rod (C).

The preferred option is a larger compressor, as using larger rods cuts the clearance between the wall of the hole and the rod to

such a small gap that larger cuttings must be reground to a smaller size before exiting the hole, thus accelerating bit wear. Going to a smaller diameter bit will improve uphole velocity as well, though this is not always feasible given the blasting requirements.

Power drain

Diesel engines face considerable difficulty at high altitude as they rely on the oxygen in the air for proper combustion. Engines have varying altitude limits and power de-rate curves. Manufacturers are able to maintain full power to the altitude rating by changing the engine timing, turbocharger configuration and compression ratios. Above this altitude rating horsepower begins to decrease.

As a rule of thumb a diesel engine will de-rate its output by 3% per 1 000 ft above altitude limit. For example, an 800 hp diesel engine might have an altitude limit of 8 000 ft. At 15 000 ft the power would be 21% less, or 632 hp. However, because the air compressor is working with lower density air, its power requirement is reduced by 1.5% per 1 000 ft. The 1 900 cfm compressor itself requires approximately 430 hp to provide full flow and pressure. At 15 000 ft, the load drops by 22.5% to 333 hp, effectively cutting the total load from 720 hp to 623 hp, safely below the de-rated power.

For best results, it is preferable to go with a larger displacement engine with a higher output to offset the reduction in power due to altitude. However, it is not always possible to provide larger engines as the drills are designed to handle a particular size engine from the beginning and space is not available.


Another alternative is electric power. Electric motors do not rely on combustion for power and are not subject to power loss due to lack of oxygen. The only impact on

motors is the decreased cooling capacity at altitude.

The decision to go with electric power has to take other factors into consideration such as how electricity is generated and the demand for mobility of the rig. In such a case, a diesel powered rig can still be the best alternative if it can be configured to meet the required performance. Electric power may offer higher capacity but this might be offset by the mobility and higher utilization of a diesel powered rig.

Human impact

Aside from the engine, compressor and cooling systems, there is little impact on the drill simply from the altitude. The biggest impact is on the operators and technicians working on the drills. The human body compensates for the decreased amount of oxygen with higher respiratory and heart rates along with a gradual increase in red blood cells that carry oxygen (known as acclimatization).

Mining companies are very careful when it comes to ensuring the safety of their employees and contractors. Examination by medical experts is required before allowing work in these tough conditions, and full onsite medical services are available to deal with problems. Ultimately, autonomous drilling will play a significant role as mining companies push to higher elevations. 



Brian Fox is Vice President Marketing at Atlas Copco Drilling Solutions. He is a member of the team behind the development of the Pit Viper drill rig series in Garland, Texas.

doba



The perfect pair for Minera San Pedro: Far left, the Powercrusher PC1055 J at work. Below, the PowerROCT35 with, from left, Pedro Arsenio, Atlas Copco Product Specialist, Federico Schroeder, General Manager, Minero San Pedro, Gabriel Joaquin, Product Manager, Atlas Copco, Martin Schroeder and Nicolas Vínés, of Michelotti e Hijos, one of the quarry's many customers.



Gabriel Joaquin, Atlas Copco's Product Manager for surface mining in Argentina, puts it in a nutshell: "The PowerROC T35 combines productivity, drilling quality and cost efficiency. The 18 kW, double dampened rock drill allows high penetration and more drilling power but uses less energy which reduces fuel consumption."

Joaquin adds that higher penetration rate, straight holes and long rod life is "every driller's dream" and that the PowerROC T35 with its hydraulic cylinder feed system, rigid aluminium feed beam and precise feed force, makes that dream a reality.

Minera San Pedro is a case in point. "This dream is certainly true for our operations," says Schroeder. "The rig offers great versatility as we can use it in different applications, from mining, hydraulic and civil

works to mountain road works. It is agile, ergonomically designed but also a simple machine to operate."

Powercrusher partner


In order to offer a complete service from drilling to processed material, Minera San Pedro teamed the PowerROC up with the jaw crusher Powercrusher PC1055 – creating the perfect combo. The company already had a PC1375 impact crusher and HCS3715 screener from Atlas Copco.

"The Powercrusher PC1055 was the most suitable equipment when we compared performance and fuel consumption," says Schroeder. "It can be transported without dismantling as it is very compact and the Quattro system, allows the rock to be reduced to an even smaller size inside

the machine which is very important."

This unique Quattro system causes a figure-8 motion in the moving jaw, increasing the feed capacity and generating a post-crush stage at the crusher's outlet.

An important advantage of sourcing both drill rig and crusher from the same supplier is uniform and regular service. For this reason, Atlas Copco provides high quality after sales services, adapted to the customer's specific needs.

Schroeder concludes: "Atlas Copco was the obvious choice for crushing as well as drilling due to their state-of-the-art technology. Now we are achieving the level we wanted and we are very much in tune with safety and the environment and focusing on improving our service to our clients." 

HEADING FOR PARIS

Energy Efficient Solutions on Show at **INTERMAT 2012**



Atlas Copco has an impressive array of innovative products lined up for this year's InterMat construction show in Paris with energy efficiency and sustainable productivity as a central theme.

WHEN INTERMAT 2012 OPENS its doors April 14 at the Villepinte Center north of Paris, the Atlas Copco booth will clearly be one of the main attractions with energy efficiency and sustainable productivity as the central theme.

The Atlas Copco showcase, covering everything from air compressors and drill

rigs to equipment for demolition, crushing, soil compaction and road paving, will highlight the equipment needed to meet high productivity demands at the lowest possible cost of ownership. Here, M&C has selected four stars from the lineup and also examines what Stage 3B legislation means for compressor owners.

Cutting the cost of diesel

Atlas Copco's new SmartROC T35 and T40 drill rigs have been given top ratings by contractors in five countries, not least for low running costs resulting from a dramatic improvement in fuel consumption.



SMARTROC T35/T40 DRILL RIG is a major cost saver for drilling contractors.

During field tests in five countries the rig has proven that it is capable of slashing fuel costs by up to 50 percent under normal drilling conditions.


The reason is a completely new design platform which automatically regulates the amount of energy required for any given function, optimizing the power supply to vital components and decreasing the risk of waste through hydraulic leakage.

As a result, the engine is always run at optimum efficiency irrespective of the task being performed, reducing both fuel consumption and refuelling frequency, which saves even more money in terms of extended uptime. Furthermore, this new generation drill rig – the SmartROC T40

being the larger – has also returned impressive ratings for performance, technology, service and operator comfort.

Extensive tests were conducted in Sweden, Norway, Germany, Poland and Turkey. The results revealed up to 50 percent lower fuel consumption, 25–30 kg per engine hour reduction in CO² emissions from the Tier 4 engine and availability of 95 percent.

The rigs are primarily designed for construction drilling projects as well as quarrying and have far exceeded expectations. In Sweden and Germany for example, the SmartROC T40 rig's fuel consumption was reported to be as low as 10–15 liters of diesel per hour under favorable conditions.

An improved silencer kit and radio remote control are offered as options. 



Big money saver: The SmartROCT40 drill rig keeps fuel costs to an absolute minimum.

Efficiency on the road

This new generation compactors as well as new pavers combine low fuel consumption and low CO² emissions with high performance and serviceability.

THE FIFTH GENERATION OF CA single drum vibratory compactors, CA5000, CA6000 and CA6500 from Dynapac, are the first of their kind with cross-mounted engines making them exceptionally serviceable.

Operator comfort and maneuverability are excellent while noise and fuel consumption have been drastically reduced. The compactors have static linear loads of 50, 60 and 65 kg/cm and are available with Stage 3B engines that use a mix of biodiesel and diesel fuel. A “Best-Point” fuel saving system minimizes fuel consumption and CO² emissions by ensuring that the compactor does not consume more power than it needs at any time.

The CA6000D can be equipped with a Sustainability Package which features an rpm management system, biodegradable fill-for-life hydraulic fluid, a 50 hours service kit, an electrical engine block heater

and working lights with LED lamps.

Also making its debut in Paris is the new SD type of wheeled asphalt paver with a working width up to 9 m which will be presented together with the new tracked paver SD2500CS – both equipped with CanBus related PLC-electrics. The compact F5CS tracked paver with conventional electrics rounds off the Dynapac paver range. Both SD pavers in the show are powered by water cooled Cummins QSB 6.7 diesel engines, ensuring low emission and low fuel consumption. Service is made simple by an effective design concept, such as concentrating all pumps to one side. The fuel tank capacity on the new range has also been increased to 315 liters, maximizing the intervals for refilling.

Top: The Dynapac CA6000D compactor.
Right: The SD2500W wheeled asphalt paver.



Breaking barriers

When it comes to heavy duty hydraulic breakers Atlas Copco has excelled once again, this time with the HB 4100 which is 130 kg lighter than its predecessor.

HYDRAULIC BREAKER HB 4100 is a considerable improvement in terms of performance and efficiency and Atlas Copco reports increases in the double-digit percentage range.

Reduced weight and better performance means that similar results can now be achieved with this smaller unit and the lighter weight enables smaller excavators to be used which saves investment and operating costs.

Gordon Hambach, Business Line Manager, Hydraulic Breakers explains: “The follow-up costs of an investment in a hydraulic breaker are many times greater than the pure purchase price. The reduction of this total cost of ownership is realized through the conserving of resources such as energy and work time, as well as through

durability and simple maintenance concepts.” Against this background, the guide system of the breaker has been changed to make it even more stable and resilient. “Hydraulic breakers are subjected to the most extreme conditions,” Hambach adds. “A new covering for the retaining bar offers more protection, especially in the lower part of the hydraulic breaker which has to take a lot of wear and tear. We have also reinforced the service window and the recesses for the lateral swivel threaded connections.

There is also circumferential wear protection, which has proven its worth with all heavy hydraulic breakers from Atlas Copco.” With a service weight of 4 100 kg, the HB 4100 is suitable for carriers of 40–70 tonnes.

The new HD 4100 breaker: Lighter, powerful and more cost effective.



Superiority in the tunnels



The Boomer E2 C face drilling rig, a member of the newly-launched E-force range, continues to prove its superiority in high productivity tunneling around the world.

When it comes to underground construction, visitors to the Intermat show will be able to get a close-up view of Atlas Copco's well proven Boomer E2 C face drilling rig.

This two-boom, hydraulic and computerized tunneling and mining rig continues to be the rig of choice for tunnel drillers around the world – and with good reason.

Equipped with the high powered rock drills COP 1838ME or COP 3038, the Boomer E2 C features the heavy duty and high precision BUT 45 booms which provide a coverage area of up to 112 square meters.


The rig offers automatic rod handling

as an option and the entire system is controlled by the advanced Atlas Copco Rig Control System (RCS), enabling all operations to be optimized for maximum productivity.

The RCS system allows several levels of automation to be used to suit different requirements and has integrated diagnostics and data logging to assist with equipment maintenance. The cabin is ergonomically designed for maximum comfort and equipped with a full color display screen.



The rig of choice for tunnelers: The Boomer E2 C from the E-force range.

(Read more on the E-force, p 20-21). 

THE ATLAS COPCO LINEUP AT INTERMAT

<p>ROAD CONSTRUCTION</p> <ul style="list-style-type: none"> ▶ Soil Roller CA3000 ▶ Soil Roller CA5000 ▶ Soil Roller CA6500 ▶ Electric asphalt roller CC900E ▶ Asphalt Roller CC1200 ▶ Asphalt Roller CC224 ▶ Pneumatic Roller CP274 ▶ Planer PL1000 ▶ Bits-model ▶ Paver SD2500CS / V5100TVE (screed) ▶ Paver F5CSE + V5100TVE (screed) ▶ DCA-Simulator 	<p>ROCK BOLTS</p> <ul style="list-style-type: none"> ▶ Swellex <p>OVERBURDEN DRILLING</p> <ul style="list-style-type: none"> ▶ Odex bits ▶ Symmetrix bits ▶ Elemex bits ▶ Terracore ITH ▶ Terracore bits <p>DEMOLITION & CONSTRUCTION</p> <ul style="list-style-type: none"> ▶ CC 1700 U CombiCutter ▶ BP 2050 R Bulk Pulverizers ▶ MG 1800 Grapple ▶ HC 850 Compactor ▶ SB 102 ▶ SB 452 ▶ MB 1200 ▶ HB 4100 ▶ TEX 05 P Pneumatic chipper ▶ TEX 09 PS Pneumatic chipper ▶ TEX 12 PE Pneumatic breaker ▶ TEX 190 PE pneumatic breaker ▶ Cobra Pro Petrol Driven Breaker ▶ LP9-20 P Hydraulic Power Pack ▶ LH 190 PE Hydraulic Hammer ▶ LS 14 Hydraulic cut off saw 	<ul style="list-style-type: none"> ▶ LCD 500 Hydraulic Core drill ▶ LWP 2 Hydraulic Waterpump ▶ LPD-RV Hydraulic Postdriver ▶ LT 6004 Rammer ▶ LF 75 Plate ▶ LG 300 D Reversible plate ▶ LP 6500 Drum Roller ▶ LP 8504 Trench Compactor ▶ Mechanical Poker display 	<ul style="list-style-type: none"> ▶ Electrical Poker display ▶ AMG 3200 Poker drive unit ▶ CF D 33 Frequency converter ▶ CF 67 T Frequency converter ▶ AME 1500 Poker drive unit ▶ AME 600 + HA35/1 Drive Unit + poker ▶ BV 30 Vibration screed + profile 1.8 m ▶ BG 370 Trowel 	<p>CRUSHERS</p> <ul style="list-style-type: none"> ▶ Powercrusher PC 4 <p>COMPRESSORS</p> <ul style="list-style-type: none"> ▶ XAS 27 ▶ XAS 87 ▶ XAS 37 ▶ XAHS 186 ▶ XAHS 347 ▶ Drillair Tier 3B ▶ XRY577 ▶ Booster <p>GENERATORS</p> <ul style="list-style-type: none"> ▶ QAX 30 	<ul style="list-style-type: none"> ▶ QAS 40 ▶ QAS200 ▶ QAC 1250 generator <p>LIGHTING SYSTEMS</p> <ul style="list-style-type: none"> ▶ H40 lighting tower <div style="text-align: right;">  </div>
<p>The Atlas Copco booth: Hall 5B, stand F027/ O157 www.atlascopco.com/intermat2012</p>					
				<p>LOOKING FOR THE FUTURE?</p> <p>Atlas Copco also plans to give Intermt visitors a glimpse of the future by putting three concept drill rig models on display. The models, ROC Xone, ROC Xtwo and ROC Xthree will be kept tightly under wraps until opening day. A must-see!</p>	

Expanding into New

Acquisition of Sweden's GIA expands Atlas Copco's offering

“ This will help our customers to further increase their productivity.



Björn Lifvergren General Manager, Atlas Copco GIA



Hägglöader continuous loaders...



...Kiruna Electric trucks



...ventilation systems

Atlas Copco's acquisition of the underground business of the Swedish company GIA Industri brings electric mine trucks, utility vehicles, ventilation systems and other new products to the Atlas Copco range.

The acquisition earlier this year of GIA Industri of Sweden has resulted in a wide range of complementary products for underground mining and construction.

This means that in addition to drill rigs, bolters, loaders and trucks, Atlas Copco can now also offer electrical haulage trucks, locomotives and shuttle car systems for underground transportation, charging and service trucks, Hägglöader continuous loaders as well as complete ventilation systems.

“We are entering new market segments and will be able to serve customers with an even broader product portfolio,” said Bob Fassl, Business Area President for Atlas Copco Mining and Rock Excavation Technique. “We especially look forward to offering the Kiruna Electric haulage truck with its strong environmental profile.”

GIA Industri AB was founded in 1884 and has been owned since 1994 by Vätterleden

Invest AB. Based in Grängesberg in the old mining region of Bergslagen, south-central Sweden, the underground equipment business has 113 employees. It is represented in Sweden, China and Australia. As part of Atlas Copco's Underground Rock Excavation Division, the products will now be available through Atlas Copco's global sales and service network as well as through selected GIA distributors.

Exciting development

Björn Lifvergren, the newly appointed General Manager of Atlas Copco GIA, sees global opportunities ahead for both companies' present and future customers.

Areas Under Ground



...charging trucks



...scissor lift trucks.

GIA Industri AB was founded 1884 and is located in Grängesberg in the south-central part of Sweden. Its product range includes locomotives and rail cars for underground use, utility vehicles and equipment for charging, cable bolting and scaling, Häggloader continuous loaders as well as complete ventilation systems.

“This is a very exciting development for Atlas Copco and our customers. Not only do the products of GIA complement our range of underground products extremely well, they also open up many new possibilities for future cooperation around the world,” he says.

“Atlas Copco is a world leader in drill and blast and haulage products. With the GIA range we can now offer electrical trucks and also a wide range of the auxiliary equipment that is used in mining. Furthermore, these products will be available to all customers through our global sales and service organization.”

Among the most interesting new products

in the GIA portfolio are ventilation systems for underground operations. These include control systems for providing customers with ventilation on demand.

In a mine, for instance, such systems enable ventilation to be used selectively, directing it only to those areas where work is in progress, thereby lowering energy costs substantially.


Continues Lifvergren: “This is a completely new and exciting area for us and fits perfectly with our efforts to help customers reduce their production costs.

“We have the necessary equipment, knowhow and service enabling customers to source state-of-the art ventilation

systems from Atlas Copco in most areas of the world.”

Positive response

Atlas Copco plans to establish GIA product specialists to support its worldwide customer centers and train its new staff at the Grängesberg HQ in Sweden.

The response received from customers has so far been positive, especially in relation to the news that aftermarket services for GIA products will now be taken care of by Atlas Copco’s service organization. 

For more information on GIA, go to www.atlascopco.com/gia



A major new development for underground drillers is now being launched featuring a range of top class drill and bolting rigs for mining and tunneling incorporating the world's most successful boom.

E-FORCE S

Since its launch in 2005, the BUT 45 heavy duty boom has become world renowned. Mounted on the Boomer E-series drill rigs it quickly earned itself a reputation for strength, sturdiness, precision and reach.

But this highly acclaimed boom is no longer exclusive to the Boomer range – it is now also available on the latest Simba and Boltec rigs as well.

As a result, the Simba and Boltec rigs now join forces with the Boomer to make up a completely new family of

Atlas Copco drill rigs – the E-force family.

With the BUT 45 installed across the full range, Atlas Copco's powerful rock drills and Rig Control System (RCS), the E-force is set to have a major impact on drilling performance and productivity.

Fifteen models

The E-force family comprises 15 different models, both electric and diesel powered with the BUT 45 as the key, common component. In all cases, the boom's high precision substantially reduces positioning

time between holes, speeding up the drilling. Furthermore, the BUT's strength and sturdiness enables all Boomer rigs to carry a rod handling system.

High stability for Simba

The Simba rigs in the E-force set a new standard for fast, precise and productive rock drilling, even under the toughest mining conditions. The increased carrying capacity of the BUT boom enables the RHS 35 rod handling system to be used and the boom can also be extended up to 1.6 m with



E-force in action: Boomer E2 C.



E-force in action: Simba E7 C.



E-force in action: Boltec EC.

ET FOR TAKE-OFF

Winning boom design behind launch of new drill rig family

the shorter extension of 1 m used for the highest load. Their four stingers also enable these rigs to be set up easily, accurately and with maximum stability. The Simba E-series can also carry Atlas Copco's most powerful rock drills.

Big benefits for Boltec


The Boltec member of the E-force family takes safety and efficiency to a new level. Its BUT 45 boom can be extended 2.5 m and the feed by 600 mm, enabling the rig to reach coverage areas of 12 m x 8 m in

one setup. Equipped with the new, faster COP 1435 rock drill, this versatile and robust unit can be used with a wide range of bolt lengths and can also be adapted for ground reinforcement applications. The first E-force Boltec rig to be delivered is now being successfully used by the Kemi mine in Finland. This unit, Boltec EC EH-DH, is both electrically and diesel powered.

New E-versions

With the launch of E-force, new rig versions have also been added such as the

Boomer E1 C in a special diesel-hydraulic version (DH) which can be used anywhere such as in new mine projects where the infrastructure is not yet in place.

All in all, the new E-force family offers the most extensive range of options available (the Boomer has no less than 25 feeds and 60–85 standard options) and there is a wide choice of rock drills ranging from 16–30 kW. 

For a full description of the new E-force family, go to e-forcefamily.com

A WHOLE NEW

Atlas Copco makes a solid commitment to the dimension stone industry

The recent acquisition of Perfora S.p.A of Italy marks a renewed commitment to the global dimension stone industry, giving specialists in this field access to Atlas Copco's drilling and product development knowhow.



Perfora performance: Perfora's product range covers various types of hydraulic and pneumatic drill rigs as well as frames, hydraulic power packs, diamond wire saws and block splitting tools such as above at the Comita quarry in Sardinia and at the Augelli Marmi quarry in Puglia (insert).

Atlas Copco has now made a major new commitment to the dimension stone industry (DSI) with the acquisition earlier this year of the Italian specialist Perfora, a company that manufactures and sells DS cutting and drilling equipment.

Bob Fassl, Business Area President of Atlas Copco Mining and Rock Excavation Technique says: "Perfora is a leading supplier in this segment, with a strong customer focus and high quality products. As part of the Atlas Copco Group, Perfora now becomes a unique, global supplier of tailor made equipment for dimension stone producers."

Despite global economic difficulties, the dimension stone industry is growing and natural stone materials are in demand for building and decoration whenever it is economically viable. In addition, dimension stone quarries are now shifting from

pneumatic to hydraulically driven and automated equipment.

Aiming to be No. 1

Perfora now operates within Atlas Copco's Surface Drilling Division. Divisional President Markku Teräsvasara, points out that the current shift towards fleet modernization is driven by increasing energy and labor costs.

"The acquisition of Perfora is therefore good timing," he explains. "Together we will be able to offer modern equipment to a growing worldwide market. Our goal is to become the No. 1 global player of tailor-made DSI quarrying equipment."

Prior to the acquisition, Perfora was a privately owned company based in Bagnolo, northern Italy, with some 43 employees and annual revenues of about EUR 10 million.

The company's products, which include

diamond wire saws and drill rigs specially designed for dimension stone applications, are distributed through direct sales and local distributors in selected countries.

Improved services

Perfora is no stranger to the Atlas Copco Group. The two companies have cooperated for the past two years in the production of the FlexiROC T20 R surface drill rig. This has been a highly successful joint venture.

Piergiorgio Picotto, Managing Director of Perfora, told M&C: "Atlas Copco has a widespread distribution network in key markets and an organization that can offer improved services to our customers.

"We also see potential synergies in product development that will allow us to maintain and strengthen our position in the DSI segment."

Perfora's legal name will be changed to

DIMENSION



In the Comiti quarry: Antonello Lucianu (left) owner of Virginio SRL, with Franco Putzu, Perfora's representative in Sardinia.



In the Augelli Marmi quarry, Puglia: Leonardo and Michele Augelli (left and right) with Roberto Santamato, Perfora's representative.

Atlas Copco Stonetec but it will continue to be known by its customers as Perfora for the foreseeable future.

Satisfied customers

Perfora hydraulic mobile drilling units are highly successful in Italy and among the company's many satisfied customers are Virginio SRL at the Comiti quarry in Sardinia and the Augelli family, which runs the Augelli Marmi quarry in Puglia.

The Comiti quarry is worked on four levels using three Perfora Girodrill 200 rigs, a Rock Buggy and two Speed Cut 100 cutters. The process starts with horizontal and vertical drilling with a Rock Buggy. The bank is subsequently wire cut using the Speed Cut 100. Finally the Girodrill is used to square off the granite blocks.


Antonello Lucianu, Virginio's owner, says: "We have been working in this sector

for more than 25 years, extracting granite blocks and selling them throughout the world. Our objective has always been to produce quality. Since I took charge 12 years ago we have aimed to use the best available technology, and the real turning point for us came when we stopped working with 'our hands' and started to drill and cut with Perfora machines."

The arrival of Perfora products was also a defining moment for the Augelli Marmi quarry. Owned by Michele Augelli and his son Leonardo, the company's continuous investment in technology at its various deposits across the country has made it an industry leader in decorative stone, marble, granite, travertine and onyx.

"Most of the time we use the Perfora hydraulic drill for the initial squaring of the marble block," explains Michele Augelli. "After that, a second squaring is carried out

with a single blade or disc, followed by the cutting of slabs with a gang saw. We also rely on the Handdrill 100 for horizontal drilling of blast holes to remove the material from the face. Up until 2001, we carried out the first squaring with helical diamond wire."

He continues: "Perfora's hydraulic drilling units have revolutionized our operations. We put down our jackhammers and diamond wires and let the blue units take their place. Previously, in order to drill a series of holes on a 10-meter bank, we needed four people for two days. Now it takes only one person one day to do the same job. These machines have also increased our mobility in the quarry and make it possible to work the rock mass from any point." 

For more information on Perfora go to www.perfora.com.

SIMULATOR TRAINING

Atlas Copco innovation can cut operator training by half

More and more mining companies are turning to Atlas Copco training simulators to optimize their training programs in the face of a growing shortage of skilled labour. BHP Billiton of Western Australia is one mining company that has adopted this method successfully and is reaping the benefit. M&C was allowed in to the classroom.



While the mining industry is enjoying a period of strong growth and expansion it also faces one of its biggest future challenges – a major shortage of skilled operators.

There are many reasons for this, not least the need to hire large numbers of people for new mining projects, partly to meet the high demand for metals and minerals, but also to compensate for the loss of experienced “hands” that will soon move into retirement.

In Australia alone, according to one report, more than 150 000 new jobs will need to be filled by 2015.

Against this background, operators need to be trained faster, better and more cost-effectively than ever before – a fact that has not escaped BHP Billiton which is among those companies now using Atlas Copco drill rig simulators together with the training program Master Driller.

Major changes in sight

BHP Billiton is going through a major equipment change at its iron ore mines, gradually moving from contractors’ equipment to its own fleet. In addition, the company plans to start up two new mines, one in 2012 and one in 2013, coupled with a far-reaching program of standardization.

There is a variety of drill rigs at the company’s six mine sites, but over the next few years the entire fleet is expected to consist of Atlas Copco Pit Viper 271 blasthole drills. In addition to the greater efficiency of these single pass rigs, the mine will achieve commonality of parts, consumables and human resources.

Even before the first Pit Viper had been shipped to the first site, Yandi Mine, training was already under way in Perth using a simulator and the Master Driller program.

In the classroom we met Dan Rolston, Drill & Blast Superintendent at the Yandi Mine, who, despite many years of drilling experience, was taking the course alongside drillers Ben Zeller, David Jack and Bill Thorpe. Rolston has even used a Pit Viper drill in the past, although not one with the Atlas Copco Rig Control System (RCS).

He said: “We all have varying levels of experience; some have no big drill experience and others have only seen the levers in big rigs. I think this is great exposure to technology and I can see how the drillers’ skills have increased.”

Mixed backgrounds

The trainees were a mix of ages, talents and backgrounds. One was an experienced 58-year-old who has been drilling for 28 years and purchased his first computer only three weeks earlier. One was 47 and had drilled for years with some computer experience. A third was 28 with eight years of drilling experience and many years of computer gaming.

During the three-day course, the group studied drill startup and stop, safety procedures, towering-up, propelling, advanced propelling, drilling and advanced drilling.

Ben Zeller’s drilling performance typified the course for all the drillers. As he simulated the drilling of five holes, his skills level increased, completing the last two holes in half the time it took to do the

first one. This section had an overall time limit of one hour. On the first attempt, he failed it by two minutes. Repeating the level, he finished it in just 32 minutes. By the second run, each operator had cut his time in half and had become proficient with the controls.

Thinking ahead

Bill Thorpe said that without the simulator training he would have figured out how to operate the rig, but that the course got him up to speed so that he will be ready to drill when the new rig arrives on site. Zeller added: “The simulator is definitely safer. You can’t damage the simulator like you can the drill itself.”

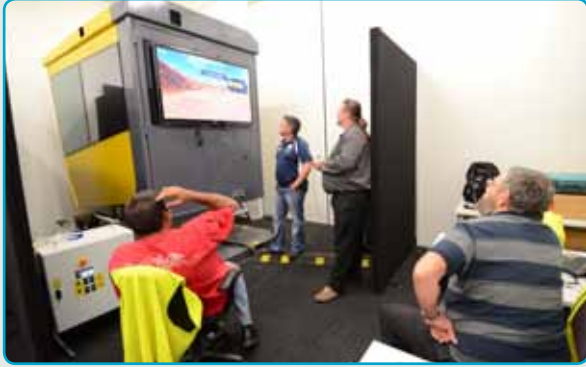
Rolston said he liked the fact that his crew will be able to drill on the first day the PV-271 arrives. “This has made them more than efficient, they will all know the same things and will be able to help each other.”

Phil Schmidt, Drill & Blast Superintendent for BHP Billiton’s Jimblebar mine, which is due to open in 2012, complimented the management team for “thinking ahead, focused on working smarter.”

FOOTNOTE:

Atlas Copco provides simulators and training programs for underground and surface drill rigs as well as loaders and trucks. These are produced in cooperation with Oryx Simulations of Sweden, one of the world’s leading manufacturers of equipment simulators. According to Urban Wikman, the company’s CEO, studies show that drill rig trainees can be brought “up to speed” in less than half the time it takes to train an operator using conventional means. In addition to the Pit Viper, simulators are available for Boomer, Simba, SmartROC and FlexiROC rigs.

GOES GLOBAL



Pictures from left:

Instructor Brett Randall with Phil Schmidt, Drill & Blast Superintendent for BHP Billiton's Jumblebar mine.

Brett Randall in the "cabin" with David Jack.

Studying performance on the simulator's external screen.



Checking drilling parameters in the classroom: From left, Dan Rollston, Ben Zeller, David Jack and Bill Thorpe with Atlas Copco's instructor Brett Randall (standing).



Dan Rolston, Drill and Blast Superintendent, comments: "This is great exposure to technology and I can see how the operators' skills have increased."

WORLDWIDE TREND

With a shortage of skilled labor threatening the future sustainability of the mining industry, the use of Atlas Copco simulators and training programs is a major contributing factor in the effort to meet the challenge.

Simulator training is rapidly becoming the method of choice from the iron ore regions of northern Sweden to the gold fields of Australia and the copper mines of Mongolia.

At LKAB in Sweden, Training Manager Stefan Backefalk says: "We have been using Atlas Copco simulators for about a year and a half. They give our trainees a thorough grounding in how to handle the machines in a stress-free environment, which is very important from a safety point of view. We think it is positive and will continue using this method."

Peter Sjöberg, Atlas Copco's local training representative in Mongolia, says simulators are helping to solve a major challenge for the mine OT/Rio Tinto. "Skilled labor is extremely scarce and the mine's safety standards are very high. Trainees have to complete 250 hours in a simulator before they are allowed to even touch a real machine. The results are very good."

BENEFITS OF SIMULATOR TRAINING

- ▶ No risk of damage to equipment or personnel
- ▶ No need to take real equipment out of production
- ▶ Gets operators trained and into production faster
- ▶ Saves resources such as water and fuel
- ▶ Enables all trainees to reach a uniform level of competence

CREATING MASTER DRILLERS

Atlas Copco's Master Driller Program provides three levels of proficiency – Bronze, Silver and Gold.

- ▶ Bronze involves learning in the classroom or e-learning at home. Topics covered include rock types, technique and theory of drilling.
- ▶ Silver includes simulator training. The simulators feature large LED monitors mounted in the window spaces of the "cabin" to provide a realistic environment. The cab moves in response to the actions of the operator using real controls.
- ▶ Gold involves an Atlas Copco product specialist working one on one with trainees at their job sites. Previous training is repeated on real equipment and repeated if necessary. After passing "Gold" an operator receives the certification "Master Driller".

Deep in the heart of

How the country's leading exploration driller is taking core samples at depths of 1 000 meters

In a five square kilometer area of the Jadar River Valley in western Serbia, about 150 km from the capital Belgrade, exploration drillers are working round the clock, all year round, searching for deposits of jadarite, a lithium-borate mineral.

S&V Drilling Mine Services, the leading deep hole drilling company in the country, has been conducting exploration drilling in Serbia since early 2010 on behalf of an international mining group.

To meet the demand for continuous, trouble free drilling, S&V is using two Atlas Copco Mustang 13-F1 deep hole exploration rigs to deliver high quality core samples from a depth of about 1 000 m in the Jadar River Valley.

These Mustang rigs are drilling for deposits of Jadarite (*see Footnote*) and are specifically designed for extreme conditions.

Stanimir 'Steve' Lazarevic, the firm's founder and president, says: "Since we have been using the Mustang rigs we have not had a single problem. There has been no unplanned maintenance to do, with the exception of having to change a few hoses."

Experienced driller

A 30-year veteran of the mining business with experience in Indonesia, Australia, Romania, and Bulgaria, Lazarevic is well-known in the industry in Serbia. He has drilled for zinc, lead, uranium, and other

minerals and metals, both below and above ground. And throughout his professional career he has used many different types of drill rigs.

After returning to Serbia in 2005 to start his own contracting business he decided to use Atlas Copco equipment, starting out with the Diamec 282 diamond core drilling rig. It's a decision he has never regretted.

Valley of potential

The Jadar River site is located near the village of Draginac, close to the city of Loznica (pop: 50 000) in a picturesque valley in the Cer Mountains.

Each core sample is three meters long and after each one is extracted, the section of the hole from which it has been taken is photographed with a special camera inside the hole in order to match the geology to the core. The core is then sent to a laboratory for analysis.

The drilling site is located in a historical area where, during WWI, the Serbian forces famously defeated the Austro-Hungarian Army by first retreating, then attacking – a battle that Lazarevic likes to refer to.

"It's a great feeling to go to into battle

here against the rock and win," he says with a glint in his eye. "I love the power of this rig when it is going at full speed with the engine at 2 000 revs, and then quickly adds "but Mother Nature is more powerful than anything."

All eggs in one basket

Contrary to some exploration drillers, S&V does not have different machines from different suppliers in its fleet.

Lazarevic explains: "A lot of mining companies use different suppliers so as not to put all their eggs in one basket, but I disagree. I have concentrated all my service and parts to Atlas Copco so I can sit down with the engineers and tell them what I want when I order new rigs."

Besides the first Diamec 282, which has almost served out its useful life, the company operates four Mustang rigs; the two Mustang 13-F1 rigs in the Jadar Valley plus a Mustang 13 with boosted pull-back to 18 tonnes and a Mustang 9-F1 working in another field in Crnivrh, in the eastern part of the country, exploring for gold and copper.

S&V employs some 50 drillers and in the



Exploration drilling in Serbia: The Atlas Copco Mustang 13-F1 at work in the Jadar River valley.

Serbia



Jadar River Valley, there are two, three-man crews operating the two rigs.

Perfect samples

When the rigs arrived, a number of modifications were carried out, primarily involving pumps. Due to the ground conditions, a larger flushing pump was installed and a third hydraulic pump was installed to give more power to the rotation unit and the other flushing pumps. This resulted in an increased penetration rate of about three meters per hour.

“There’s no-one in Europe or in Serbia for that matter that drills as fast as this with such perfect core samples, and Steve’s experience with drill rigs is unparalleled,” says Vojislav Tosic, Atlas Copco’s technology and sales specialist in Belgrade.

The team achieves 72 m of core samples every 24 hours, working in two shifts and drilling through water, gypsum, gravel, sand, clay and other materials.

Atlas Copco’s diamond impregnated bits (SC 6-8/3 7FD) are used which, due to their wide flushing channels, are well suited to the geology of the area. The bits are long lasting and begin to wear at 300–600 m.



Deep hole concentration: Driller Marco Zdravkovic, at the controls of his Mustang 13-F rig, says: “This rig is easy to use and I have everything I need at my fingertips.”





Stanimir "Steve" Lazarevic, founder and president of S&V Drilling Mine Services, says: "Our policy is to use just one supplier."

» The Mustang uses HO standard drills, 98 mm in diameter with the triple core barrel system HO3. It takes about 20 days to extract 1 000 m of core barrels and core recovery is 95–100 percent. About 335 rods are used for each 1 000 meter hole.

When the holes are done, they are filled with concrete as a safety precaution to stabilize the ground in the event of an underground mine being established in the area at a future date.

Environmental care

All possible environmental precautions are taken on the site. For example, pits are dug in the ground and lined with tarpaulins to collect the water that is used in the drilling process. This water is then pumped into a tank truck for proper disposal. "I remember the days when machinery of all kinds would spit out oil everywhere. That's not happening here," Lazarevic says.

Fingertip control

Sitting at the controls of the Mustang 13-F1, operator Marco Zdravkovic says:

"Everything in this rig is at my fingertips. The hydraulic foot clamps are also a nice touch as before they were mechanical and people could get injured.

"But here I have simple gauges that tell me about pilot pressures, torque, lifting, top pressures, and rpms. And the whole thing swivels so I can put it where I need it. It's simple. That's what I like about it."

With increased demand for its services, S&V now sees good potential for further expansion. Lazarevic concludes: "We need to meet the increased demand for our services so we expect to be working full speed ahead with two new Atlas Copco rigs later during 2012."

FOOTNOTE: Jadarite is a white silicate mineral which was discovered in 2006 in the Jadar River Valley. The mineral received widespread media attention when it became known that the chemical formula of jadarite is very close to the formula invented for the fictional substance "kryptonite" in the 2006 Superman movie "Superman Returns".

Atlas Copco's Mustang 13 series is the largest member of the Mustang geotechnical drilling family. It has a feed and lifting capacity of 130 kN (29.2 k lbf) and is equipped with a 152 mm rotation unit.

The modular concept allows for a wide selection of options including a variety of rod holders, winches, pumps, jet grouting kits etc., allowing each rig to be designed specifically for the application.

Equipped with the latest Deutz silenced power unit (EU3), the rig's centered and user-friendly control panel enables it to be easily operated by one person.



HAS EDGE



Key components of EDGE: Data processor, display screen, sensor and cable.

FIELD TEST RESULTS

- ▶ Penetration rate: increased by 12 m/h
- ▶ Drilling time saved: 1 h, 40 min
- ▶ Substantial reduction in fuel consumption
- ▶ Water influx: Considerably reduced
- ▶ Bit life: 1 000 m before regrinding



Putting EDGE to the test: Here the equipment is used in the drilling of nine, 500 m deep holes for a major apartment complex near Oslo.



The perfect guide: The EDGE system feeds vital information to the operator, enabling him to continually adjust and optimize the process.

The Pride of Be



Modern, maneuverable, fast on grade and reliable: The Minetruck MT42, pictured here at Bell Creek, is equipped with the Atlas Copco Rig Control System (RCS).

With the continuing surge in the worldwide mining industry, an increasing number of miners are finding Atlas Copco's 42 tonne truck Minetruck MT42 to be the right choice for their haulage needs. M&C visits the Bell Creek mine in Canada to find out why.

Launched in 2009, the Minetruck MT42 has been successfully introduced by many mines around the world.

Positioned between the MT5020 and MT436B, this 42 tonner is easy to maneuver and fast on the ramp at a full load.

The truck has been particularly successful in Canada where it is well suited to many existing operations as

well as the increasing number of smaller sites now being re-opened to meet world demands.

Reg Labelle, National Sales and Business Development Manager for Atlas Copco Canada, says: "Canada has a great deal of older mines whose infrastructure favors the 40-tonne Minetrucks. These are now spreading throughout the provinces

because they are suited to both ramped mines and shaft mines."

Bell Creek, near Timmins, Ontario, is owned by Lake Shore Gold and was the first to get the new truck and eagerly awaited its arrival. Brian Hagan, LSG's Executive Vice President says: "We had talked a couple years earlier that it would be nice if we could combine the size of the MT436 with the larger capacity and speed of a 50 tonner. It was as if Atlas Copco heard us talking."

Hagan said the company had no reservations about being first in line due to its trust in Atlas Copco's products and service. "We have a long-standing relationship with Atlas Copco. We were aware of the MT42 from the beginning and followed it throughout development."

Ideal size

LSG produces roughly 550 tonnes of gold ore per day from Bell Creek's 480 m (1 600 ft) deep, narrow vein operation. The company is also heavily focused on advanced exploration to prove out the 1.2 mil-

“ We were aware of the Minetruck MT42 from the beginning and followed it through development.



Brian Hagan Executive Vice President, Lake Shore Gold

Bell Creek

Minetruck MT42 ramps up successes as industry booms



*At the steering wheel:
Minetruck MT42 operator
Jason Pilcz.*

lion ounce resource as quickly as possible. This explains why the company wanted a faster mine truck.

Although Bell Creek could accommodate larger trucks, these vehicles would have been more difficult to maneuver than the agile Minetruck MT42 with its front axle suspension which is a unique feature for a truck of this size. The MT436 is the ideal size, Hagan says – and the company still has one in operation – but the Minetruck MT42 is rated for a payload that is 10 tonnes larger. In addition, with its 520 horse power, fuel-efficient, low-emission Cummins engines the Minetruck MT42 confidently motors up the ramp at more than twice the speed of a MT436, 8 km (5 mph) compared to 3 km/h (2 mph) for the MT436.

Other advantages of the Minetruck MT42 include greater visibility, shorter turning radius, enclosed cab, a jump seat for a passenger or trainer and an air-suspended driver's seat that greatly improves operator comfort.

Jason Pilcz, one of the Minetruck MT42 drivers at Bell Creek, says: "The MT42

shifts don't seem as long as they used to. There's no bouncing around."


The front axle suspension of the Minetruck MT42 gives a very smooth and comfortable ride. The dry, temperature-controlled environment in the cabin and its low noise level also adds to operator productivity and comfort.

High availability

At Bell Creek, three Minetruck MT42 trucks are averaging 39–42 tonnes per trip. Working two, 10 hour shifts in a 24-hour period they have been hauling up to 1 984 tonnes of ore and waste per day.

Bell Creek Maintenance Supervisor Paul Meunier said that although the trucks are run for at least 18 hours per day, they have required no significant downtime.

Maintenance is easy and straightforward, minimizing planned downtime. Meunier noted that his logs show their availability to be higher than 90 percent.

Other Atlas Copco equipment at Bell Creek include three Scooptram loaders and four Boomer drill rigs. 



MINETRUCK MT42 IN A NUTSHELL

- ▶ High power-to-weight ratio provides high speed on grade
- ▶ Proven powertrain components for reliable performance
- ▶ Front axle suspension for superior comfort and productivity
- ▶ First-class cab with great visibility, air suspended seat and low vibration and noise levels
- ▶ FOPS/ROPS certified
- ▶ Air conditioned
- ▶ Spring applied hydraulic released brakes (SAHR) for added safety
- ▶ Atlas Copco Rig Control System (RCS)
- ▶ Articulated steering
- ▶ Oil-free cabin environment
- ▶ Height: 2 705 mm
- ▶ Width: 3 050 mm
- ▶ Turning radius: 45 degrees



Drills of choice: The Pit Viper 275 is used at Poltava GOK to drill 251 mm blast holes for the production of iron ore pellets. These drills represent state-of-the-art large hole drilling technology.



The best there is: Driller Victor Voznuk enjoys the comfortable and ergonomic PV-275 cab.

The Profitable pellets OF POLTAVA

How Ukrainian mine uses modern technology to keep pole position in global iron markets

Poltava GOK (PGOK) is one of the most technically advanced iron ore mines in Ukraine and, arguably, one of the most progressive of its kind in the world. M&C looks at how it made the transition from Iron Curtain to iron exports.

The open pit iron ore mine near the town of Komsomolsk in central Ukraine is one of 10 deposits located on a single 5 km long magnetic anomaly strike. Owned by Poltava GOK, it dates back to the former Soviet Union when efficiency was not its first priority.

However, following Ukraine's independence in 1992, and subsequent privatization, everything changed and today the ore dressing and processing facilities are almost unrecognizable.

PGOK, which is owned by Ferrexpo plc, is a modern, well equipped and highly developed operation which, with annual exports of some 10 million tonnes of iron ore pellets, ranks among the world's top pellet suppliers.

The turning point in the history of PGOK came when the new management made two key decisions: firstly, to concentrate solely on the production of pellets, and secondly,

to invest only in the most modern mining equipment available. And it is the combination of these two goals that has driven the mine to success and given it a solid position among international iron ore producers.

Modern drilling

The iron ore at the PGOK deposit is extracted from medium hard rock and to drill the required 251 mm blastholes, the mine specialists chose the Atlas Copco Pit Viper 275, a top-of-the-line rotary drill featuring the computerized Atlas Copco Rig Control System (see box page 37).

Vladimir Chasnyk, parts and service manager at Atlas Copco Ukraine has this to say: "There's no doubt that PGOK is one of the most modern enterprises in Ukraine. The company is the industry leader with modern equipment and has a determination to keep up with all new technical developments."



"PGOK made up its mind to focus on iron ore pellets – in contrast to the other mines in the country which have a lot of different products – and they recognized the superior performance of the Pit Viper to help them achieve their goals."

Steady progress

By studying the productivity report, it is easy to see why the Pit Viper is the rig of choice here. Since it was first introduced into the fleet in April 2006, productivity and »

Standing tall: The diesel-powered PV-275 at Poltava GOK, drilling 251 mm blastholes on a pattern of 6 x 6 m in waste and 5.5 x 5.5 m in ore.





Road to success: The Pit Viper fleet at work on the PGOK benches which are 10 or 12 m high. During M&C's visit, an average of 6 500 m per month was being achieved with PV rigs.

» output have both steadily increased whereas the number of rigs needed in the fleet to achieve the desired results has successively declined.

Currently PGOK is operating a fleet of 23 drill rigs, eight of them Pit Viper 275. In 2010 there were 19 rigs in the pit and the total number of meters drilled was 780 000 (13% of which was done using three Pit Viper rigs, 17% with three TEREX rigs and 70 % by 13 SBSH (Russian made) rigs.

For 10 months of drilling in 2011, the total number of meters drilled was 920 000, of which half was drilled using the eight Pit Vipers, 8% by TEREX and 42% using SBSH rigs.

Major shift

PGOK has facilities for crushing, concentrating and pelletizing facilities on site and benefits from its sea port JV on the Black Sea, at Yuzhnye, near Odessa, from where it ships pellets to overseas markets.

Vladimir Ivanov, First Deputy Chairman of OJSC (Poltava GOK), confirms that making the shift from the traditional fleet to the more modern Pit Viper has been a major undertaking.

"Efficiency is productivity and because our focus is to be more efficient we are

“Making the shift to the more modern Pit Viper has been a major undertaking.”

Vladimir Ivanov, First Deputy Chairman, OJSC (PGOK).



evaluating every type of equipment. That includes trucks, shovels, loaders, drills, transport systems – everything.

"Our fleet plan has been developed in close cooperation with Atlas Copco Ukraine. Once our fleet includes more Pit Viper drills we will get even more efficiency as maintenance and repairs will be carried out by the specialized Atlas Copco Ukraine service company and this will allow for a considerable increase in equipment availability and drilling volumes."

Mobility and flexibility

Although the increase in productivity can, to a certain extent, be attributed to the advanced functions and efficiency of the Pit

Viper, mobility played a decisive role in the choice. The mine's previous fleet was electric but the PV is diesel powered, which meant that the rigs could move around freely from site to site without the restraints of power cables.

Ivanov confirms that this mobility has been one major productivity driver. Another is the rig's "live tower" capability which allows the rig to be moved with the rotary head at the top of the tower and rods loaded – an operation that was not possible with the older fleet.

The benches are 10 or 12 m high and the drill pattern is 6 x 6 m in waste and 5.5 x 5.5 m in ore. In rotary drilling with tricone bits, high pressure air (24 bar) is used



Keeping ahead of technical developments: Center, Aleksandr Protsenko, Mining and Transport Manager PGOK with Evgeniy Kotlevskiy (left), Atlas Copco Ukraine representative, and Mark Stewart, Atlas Copco Regional Manager.

PGOK'S PIT VIPER FLEET

The PGOK fleet currently includes eight Pit Viper 275 blasthole drills. These are rotary and DTH rigs covering the hole diameter range 171 – 270 mm (6 ¾"–10 5/8").

Designed for multipass drilling and with a 34 tonnes (75 000 lb) bit load capacity, the PV-275 can add unsurpassed productivity to any mining operation. With a 12.2 m long rod the rig can drill a 11.3 m (37 ft) clean holes in a single pass, or it can multipass drill to a total depth of 59.4 m (195 ft) using a 4-rod carousel containing 12.2 m (40 ft) rods.

The unique "live tower" can be raised and lowered with the rotary head at the top and the rods in place, and the optional RCS computerized rig control system allows functions such as remote tramping, auto leveling, auto drilling, and GPS navigation.

The rig utilizes the Atlas Copco patented high strength cable feed system with automatic cable tensioning and hydraulic double-acting feed cylinders. Derived from the Pit Viper 351, the system ensures an accurate head alignment, improved cable life, and decreased downtime for cable tensioning.

Safety is provided by an extensive range of safety interlocks (with the RCS option). These include rotary head protection before tramping, reduced risk of rod bending, carousel and breakout wrench protection, warnings for low fuel, lube and water level and auto leveling and de-leveling when tramping on uneven ground.

Pit Viper 275 is designed to handle drill pipes of 159 mm (6 ¼") up to 219 mm (8") in diameter. The low pressure 7.6 bar (110 psi) version can be used for rotary drilling up to 270 mm (10") in diameter while the high pressure 24 bar (350 psi) version is also designed for rotary drilling up to 270 mm (10 5/8") and with the possibility of using DTH hammers for 250 mm bits.

to clean the holes. The reason, explains Aleksandr Protsenko, is that this extends the life of the consumables.

All of the Atlas Copco equipment is well taken care of under the terms of a full service agreement.

Driller Victor Voznuk, who has more than three years of experience operating the PV-275, says he can drill a 16 m hole in about 15 minutes, which in these conditions is considered to be a good performance.

He says he likes the Pit Viper for its safety features with "fewer opportunities to break things." He adds: "The drills are more comfortable and have a better way of reporting drilling statistics and tracking productivity."

PGOK exploits the Gorishne Plavninskoye and Lavrikovskoye ore deposit which is some 8 km long, 2.5 km wide and 350 m deep, with a gradual dip ranging from 20 to 37 degrees.

Yeristovskiy next in line

Next in line is Yeristovskiy GOK (YGOK) which is already under development. Pre-strip operations have commenced with hard rock mining expected to start in early 2013.

The deposit has an expected life span of approximately 32 years under the current

development plan. It will produce on average 28 Mt of iron ore and 10 Mt of pellets or concentrate equivalent per year.

In total, approximately 1 600 Mt of waste rock is expected to be removed and 800 Mt of ore to be produced, giving a favorable strip ratio of approximately 2:1.


Ferrexpo has engaged international mining experts to assist in developing the operation to an international level.

Bob Garrick, an Australian with many years' experience in the mining industry, says: "We have been given a blank sheet to design the operation from the very start, without the constraints of having to modify an existing operation. As a result, we are able to take advantage of the latest technology available within the industry worldwide.

"We are leading the Ukrainian mining industry with respect to equipment selection, being the first to introduce some of the largest trucks, excavators, rubber tired wheel dozers and graders. With respect to our selection for drilling rigs, it was obvious to us that the Pit Viper options were an ideal solution".

Garrick adds: "We value equipment reliability, life cycle costing as well as in-depth preventative maintenance programs and

product support – all of which Atlas Copco provide. Therefore we are happy with our decision to use the Pit Viper product."

YGOK intends to demonstrate to the industry that it is capable of developing a world class operation. With support from Atlas Copco and the Pit Viper drills this aim will soon become a reality. 

MAJOR IRON ORE RESOURCE

Ferrexpo plc is a Swiss resource company principally involved in the production and export of iron ore pellets used in the manufacture of steel. With (JORC) resources of 6.8 billion tonnes and 14.2 bt of additional classified resources, it claims one of the largest iron ore deposit in the world.

Roughly half of its production is high-quality 65% Fe pellets with the remainder 62% Fe pellets. Average ore grade is around 30% Fe. Ferrexpo became the first Ukrainian company to be listed on the primary market of the London Stock Exchange (15 June, 2007).

Production volumes in 2010 increased by 14% to more than 10.0 Mt of pellets. Around 95% of Ferrexpo's production goes for export, principally to customers in central and eastern Europe and Asia.



Big breaker for a big job: Atlas Copco's pedestal boom system RB850 XD installed at the Khumani mine in South Africa.

Pedestal boom system in place


SOUTH AFRICA Atlas Copco has delivered a pedestal boom system with a unique, hydraulically operated platform to Assmang's new open pit Khumani iron ore mine in the Northern Cape Province.

The RB850 XD, which weighs 25 tonnes excluding its Atlas Copco HB 5800 hydraulic breaker weighing a further 5.8 tonnes, was commissioned in November 2011.

The system will break oversized rock in the mine's crusher and has a horizontal

reach of 12 m and a vertical reach of 4.5 m to cover the 168 m² of the crusher 'mouth'.

Instead of a boom bolted on a static concrete and steel base, it is mounted on a moveable, hydraulically operated base. This is able to move horizontally to a position above the crusher enabling the breaker to break rock lodged in any part of the mouth.

With the crusher producing 3 000 tonnes of rock per hour, the RB850 XD will be in operation around the clock. 


New M&C online site launched

WORLD Mining & Construction Online, M&C's digital "sister" publication, has had a "makeover". The site has been given a more modern design making it more user-friendly, easier to read and interactive.

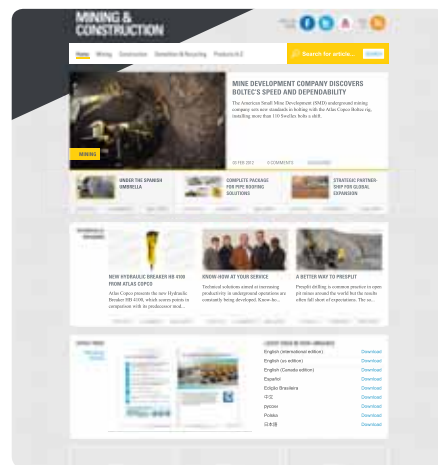
Visitors will find it easier to navigate their way around and that search results will be more relevant. They can now also comment on the content, rate the articles and follow links to related social media channels.

The subject categories and departments on the site remain unchanged so that regular

visitors who are used to the previous design will still recognize "their" M&C Online and feel at home.

The new site will continue to carry all the features and technical articles that appear in the printed magazine as well as many more interesting items on products and developments in the industry which will be continuously uploaded. 

Visit the new M&C Online site now at www.miningandconstruction.com



IN BRIEF



Edge on The Tube

EDGE, the hole monitoring system from Atlas Copco Secoroc, is boosting efficiency in a range of drilling applications, not least in geothermal well drilling and the oil and gas industry.

This is well illustrated in two highly informative movies now available on YouTube. The movies show geothermal wells in Sweden and oil and gas exploration holes being drilled in the U.S. and the difference that Edge makes in terms of speed and productivity. In both cases, contractors confirm that the data collected from deep inside the hole provided by the Edge system has increased performance and reduced costs.



EDGE utilizes sensor technology to detect and translate percussion vibrations to an easy-to-read, real-time display. The display provides a continuous report on how the bit is engaging the rock at the bottom of the hole.

This enables the driller to optimize the hammer and bit performance throughout the drilling, and evaluate the effect instantly. In this way, EDGE allows the operator to "see" what is happening all the way to the bottom of hole.

Links to the Edge movies can be found at: www.atlascopco.com/secoroc

A special evening with Atlas Copco




Many of the delegates travelling to the Sixth International Conference & Exhibition on Mass Mining (June 11-14) in Sudbury, Canada this year have another good reason for making trip. They have been invited to attend a special evening with Atlas Copco that promises to be "a relaxing mix of fun and knowledge, the Canadian way". June 10 Atlas Copco will host the event for customers at Dynamic Earth, a venue within the MassMin conference area. Among the keynote speakers will be Keith Marshall of global mining company Rio Tinto. Marshall has 35 years of international mining experience. Following three years as President of the Oyu Tolgoi project in Mongolia and four years as Managing Director of the Palabora Mining Company in South Africa, he is now Global Practice Leader, Underground Mining Technology and Innovation for Rio Tinto, based in London. The main Massmin event is expected to attract mining professionals from 30 countries.



Celebrating the success of the Pit Viper 270 series: This recently delivered PV-271 features the new cabin, Rig Control System (RCS) and many of the improvements now incorporated into the milestone model.

Milestone for Pit Viper with completion of 250th rig

 **USA** Atlas Copco has produced its 250th Pit Viper 270 marking the successful progress of this popular rotary drill rig. The milestone rig was completed at the assembly line in Texas prior to delivery to an Arizona mine.


The 250th rig is one of the first Pit Viper 270 rigs to get the newly designed cabin, first introduced on the Pit Viper 235. This is an excavator style cab incorporating the Rig Control System (RCS), hydraulic air conditioner and elevated platform for the adjustable suspension chair.

The added elevation, together with larger windows, gives the operator increased visibility during tramming and drilling. Attached to the seat are the joysticks and the control system. The screen and joysticks move as the operator rotates, ensuring that the controls are always within reach. The cab is also extremely quiet (65 dBA).

Design philosophies

While designing the cabin, close attention has been paid to the “15 Design Philosophies” outlined by the Earth Moving Equipment Safety Roundtable (EMESRT), a global initiative from major mining companies that aims to improve health and safety for rig operators as well as maintenance personnel.

Another significant advantage is the integration of the RCS package options, offering a state-of-the-art drilling system while ensuring the implementation of interlocks. With a wide range of options from automatic leveling and drilling to production reporting and GPS, the Rig Control System (RCS) maximizes drilling time and performance.

The PV-270 series also has an energy saving, patent-pending, hydraulically operated automatic clutch option which engages and disengages the compressor, extending the life of the compressor as well as the engine. 

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