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Equipment
ADTs in mining
Rockbolting

Management in action
Heap leaching
Raise boring

Mine of the month
Siguiri, Guinea

Mining Magazine

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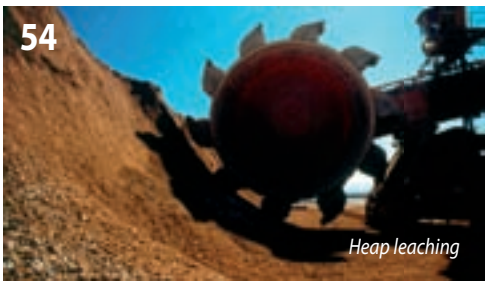
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FRONT COVER



Boart Longyear's Drilling Services crew recently completed a series of complex, wedged-hole projects using only Boart Longyear W-Wall® coring rods – one component of the new High Productivity Coring System. V-Wall® rods were created with productivity and safety in mind, and more of our customers are making the switch to V-Wall® every day. The design is stronger, lighter and more flexible than any rod on the market today.
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Lead-zinc resources in Kosovo

Despite its turbulent recent history, Kosovo has a sizeable, historical, lead-zinc mining industry that is set for redevelopment, according to Muhamedin Hetemi and Sefedin Kastrati

KOSOVO is rich in mineralisation, including lead/zinc/silver, nickel/cobalt, chromium, copper, magnesium, bauxite, iron, manganese and industrial minerals. This paper is focused on the lead/zinc ore resources.

Historically, the most significant lead-zinc mining area is Trepça in northern Kosovo, near the town of Mitrovica, which up until the 1980s employed tens of thousands of workers and accounted for a large proportion of the then Yugoslavia's mineral production.

The company Trepça Mines Ltd was based in London and, after being awarded a concession contract, it started geological exploration in the region in 1927. Production started at the Trepça mine at Stantërg in 1930, with a flotation plant at Zveçan coming online in 1932 and a lead smelter at the same site in 1940.

More than 23,000 employees worked at the mine or associated plants. Other institutions developed over the years, based on the success of the mines, including the Trepça Institute, Trepça Bank and the Enterprise for Foreign Trade, which all became arms of an integrated system.

TARGET PRODUCTION

Ore production	1.748Mt/y
Pb concentrate	104,775t/y (Pb 70%, Ag 1,200g/t)
Zn concentrate	139,444t/y (Zn 48%)

PRODUCTION OF METALS

Pb (99.99%)	60,000t/y
Ag (99.995%)	117,345kg/y
Bi (99.98%)	120,000kg/y
Au (24K)	230kg/y
Zn (99.99%)	50-80,000t/y
Cd (99.99%)	290,000kg/y
In (99.98%)	20,000kg/y
$CuSO_4$	1,000t/y
NPK (fertilisers)	70-100.000t/y



Diagram 1: Pb-Zn resources in Kosovo

> "In 1983, Trepça was still one of the ten most successful companies in the former Yugoslavia. However, post-1985, the Trepça system plunged into crisis"

In 1983, Trepça was still one of the ten most successful companies in the former Yugoslavia. However, post-1985, the Trepça system plunged into crisis as a result of political intervention in the business and weak management.

The peak of the crisis saw the suspension of Kosova autonomy, the expulsion of Albanian experts and employees, and the imposition of interim violent measures in Trepça by the Serbian Assembly.

Since the war in Kosovo in 1999 and the establishment of its status as an autonomous province under the supervision of the International Community, the international authorities have administered the mines and other Trepça assets. Currently, Trepça is under the authority of the KTA (Kosovo Trust Agency), awaiting privatisation.

Recently, tension in the region has risen sharply since Kosovo declared independence on February 17. Most EU states and the US have recognised Pristina's declaration of independence, but Serbia, backed by Russia, regards the move as illegal.

MINERALISATION SUMMARY

The lead and zinc ore reserves are concentrated mainly in the active mines, and partially in nearby locations. Trepça, as an 'integrated system', was previously counted as one of Europe's largest producers of coloured metals (Pb, Zn, Bi), rare metals (Cd) and precious metals (Ag, Au). Lead and zinc concentrates were extracted, and copper has also been successfully concentrated, along with rare metals such as germanium, selenium and tellurium.

The lead and zinc resources are concentrated in three main regions:

■ Trepça Stantërg (central) Region

The ore reserves are located in a number of existing closed mines (see diagram 2) – Trepça, Zijaça, Melenica, Maja e Madhe, Maxhera, Rashani and Vidishiqi. The total reserves of the region are 31.47Mt, with the average metallic content of the ore standing at 3.5% Pb, 2.87% Zn and 67g/t Ag.

■ Kishnica-Novo Bërdo (south) Region

The ore reserves are located in Hajvalia, Badovc, Kishnica and Novo Brdo (see diagram 3). The total reserves of the region are 14.21Mt, with the average metallic content of the ore being 3.76% Pb, 4.87% Zn, 128g/t Ag and 1.1g/t Au.

■ Kopaonik mines (north) Region

The ore reserves are concentrated in the locations

"In 2005, test production started successfully at the Trepça mines of Stantërg, Artana, Crnac and Belo Brdo, as well as at the three flotation plants"

of Bellobrdo, Crnac, Plakaonica, Kalogjer, Zuta Prlina in the Jelakce, Koporic and Draznja (Batllava Peak) districts (see diagram 4). The total reserves in this region are 8.12Mt, with the metallic content of the ore being 7.55% Pb, 3.6% Zn and 107g/t Ag.

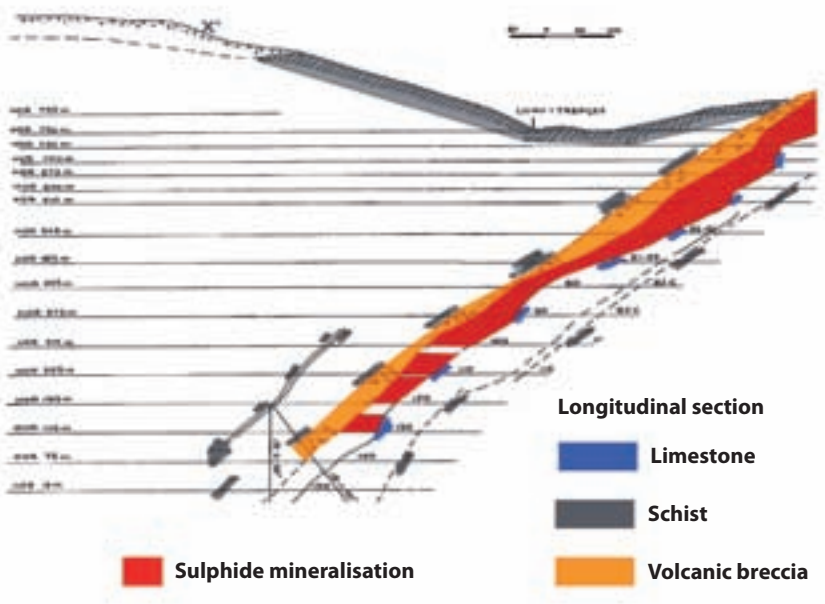
PRODUCTION AT TREPÇA

The Stantërg mine is located in generally competent schists, with the actual mineralisation in breccia and limestone units, accessible from the schist unit. The central shaft, shaft stations, skip-loading stations, haulage ways and other ancillary facilities were all placed within the impermeable schist.

Overhand cut-and-fill stoping was carried out at the mine using hydraulic backfill. Poor control has resulted in some 750,000t of fill being required before mine start-up, as the majority of the stopes had not been backfilled during the last years of operation in the 1990s. In recent years it has been possible to achieve backfilling in several locations in the mine, however.

Underground, the ore was gathered from ore-production passes on Levels 9 and 11, and loaded into ore trains made up of 6t battery trammers and six-to-ten 3.5t ore cars. The ore was then transported on 600mm-gauge rail to the central shaft and dumped into 300t (Level 11) to 450t (Level 9) skip-loading bins, from where it was hoisted up the central shaft to Level 1 (610m) and stored in a 1,000t storage bin.

Diagram 2: Stantërg mine deposit cross-section



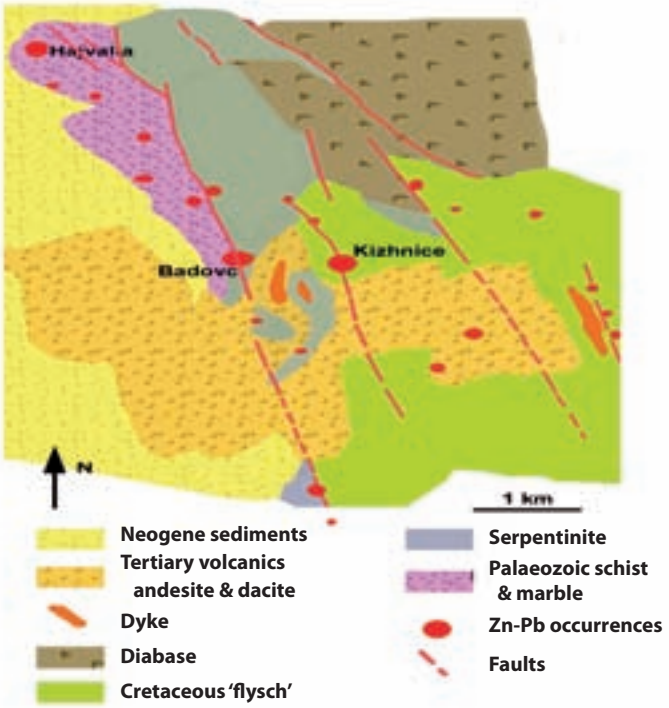
Ore was loaded from the bin into ore trains made up of 10t diesel locomotives and ten 10t ore cars, and was transported on 750mm-gauge rail from the central shaft to the concentrator, through the 3km Tuneli i Pare adit, and dumped directly into a primary gyratory crusher. Because of the limited capacity of the Level 1 storage bin, the Tuneli i Pare rail haul had to be operated on a two-shifts-per-day basis. ➔



Kishnica mine: flotation plant and milling equipment

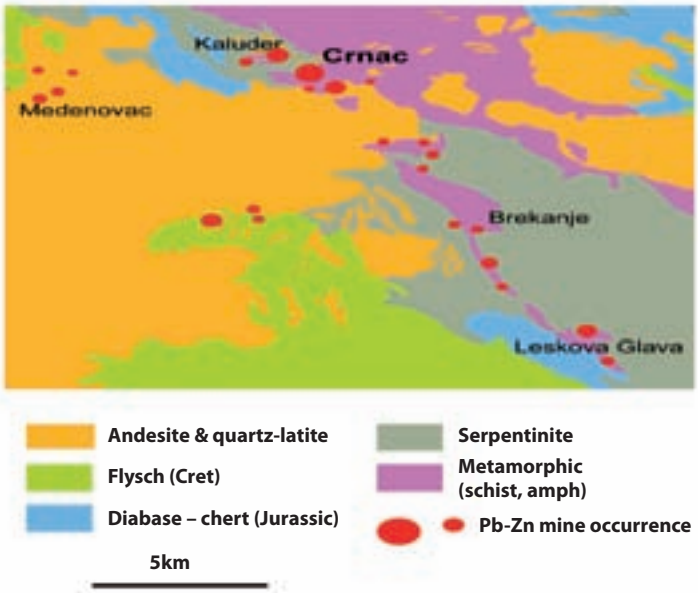


Diagram 3: Kishnica-Novo Berdo regional geology



The Hajvalia – Kishnica District: simplified geology

Diagram 4: Kopaonik mines deposits



"In 2005, test production started successfully at the Trepça mines of Stantërg, Artana, Crnac and Belo Brdo"

REHABILITATION PLANS FOR MINES

A significant programme of rehabilitation was, and is, necessary to bring the mines back into production, including pumping out the flooded mines and rehabilitating underground facilities and equipment. This includes: the repair of existing ventilation equipment and installing new systems, and equipment for both horizontal and vertical transport; and rehabilitation of surface facilities, including offices, labs, explosive storage areas, electricity substations and other infrastructure facilities. The three flotation plants also need sizeable investment for full rehabilitation.

For the wider updating of resources/reserves, a new programme of mineral-deposit sampling is needed, and detailed surveys of the existing, opened areas underground. New employees need to be found and trained/certified for specific tasks in the mine. The required infrastructure for geological exploration also has to be put in place, including drilling equipment, water supply, etc. An application for licences at the Independent Authority also has to be made, along with the completion of environmental status and impact projects, including assessments of environmental threats from historic operations.

ONGOING DEVELOPMENT STRATEGY

In 2005, test production started successfully at the Trepça mines of Stantërg, Artana, Crnac and Belo Brdo, as well as at the three flotation plants. Their future ramp-up to wider production forms part of an overall, ongoing development strategy that includes exploration in the Trepça mineral belt, and the expansion of production capacities in the mines and plants using the most up-to-date technologies and equipment available.

The main focus mines with respective plants are: the Trepça mine in Stantërg with the flotation plant in Tuneli i Parë; the mines in Artana/Novo Brdo and Hajvalia with the flotation plant in Kizhnica; and the mines in Crnac, Belo Brdo and Leposaviç with the flotation plant in Leposaviç. Automatic sampling and computer-based controls are to be installed in the existing flotation plants, while a new mobile flotation plant will be built near the Artana mine.

FUTURE VISION

The mining sector will contribute to Kosovo's economic and social development by establishing (with the support of stakeholders yet independent of financial assistance from the government) the



sustainable and economic production of energy, and other minerals, on the basis of best practice in mining and processing technology.

Trepça requires large investment to reopen the existing, flooded mines (Hajvalia, Badovc and Kizhnica) and acquire the latest technology for drilling ore, blasting and transporting the mined ore. However, with the existing equipment and the undefined political status of Kosovo, it is hard to attract potential investors.

The Kosovo Trust Agency (the privatisation agency under the EU-UNMIK structure) is trying to finalise Trepça's status, and reorganisation and invite potential investors. With those objectives in mind, an investor conference, organised by the Ministry of Energy and Mining, KTA and the Independent Commission of Mines and Minerals, was held in June 2007.

Private companies in Kosovo have not yet shown an interest in the privatisation of the Trepça mines due to their lack of available funding for the large investments that would be needed. However, some international companies have shown an interest in the privatisation of the mines. Other interested parties are awaiting the process of privatisation to commence before assessing their potential involvement.

Muhamedin Hetemi and Sefedin Kastrati are lecturers at the Faculty of Mining and Metallurgy in Mitrovica, Kosovo







Artana mine (from top): sixth level entrance; the mine; old and new wagons



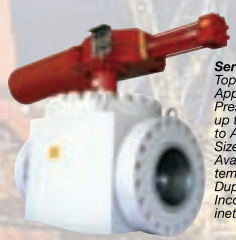


Novobrdo-Artana mine and entrance (right)

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