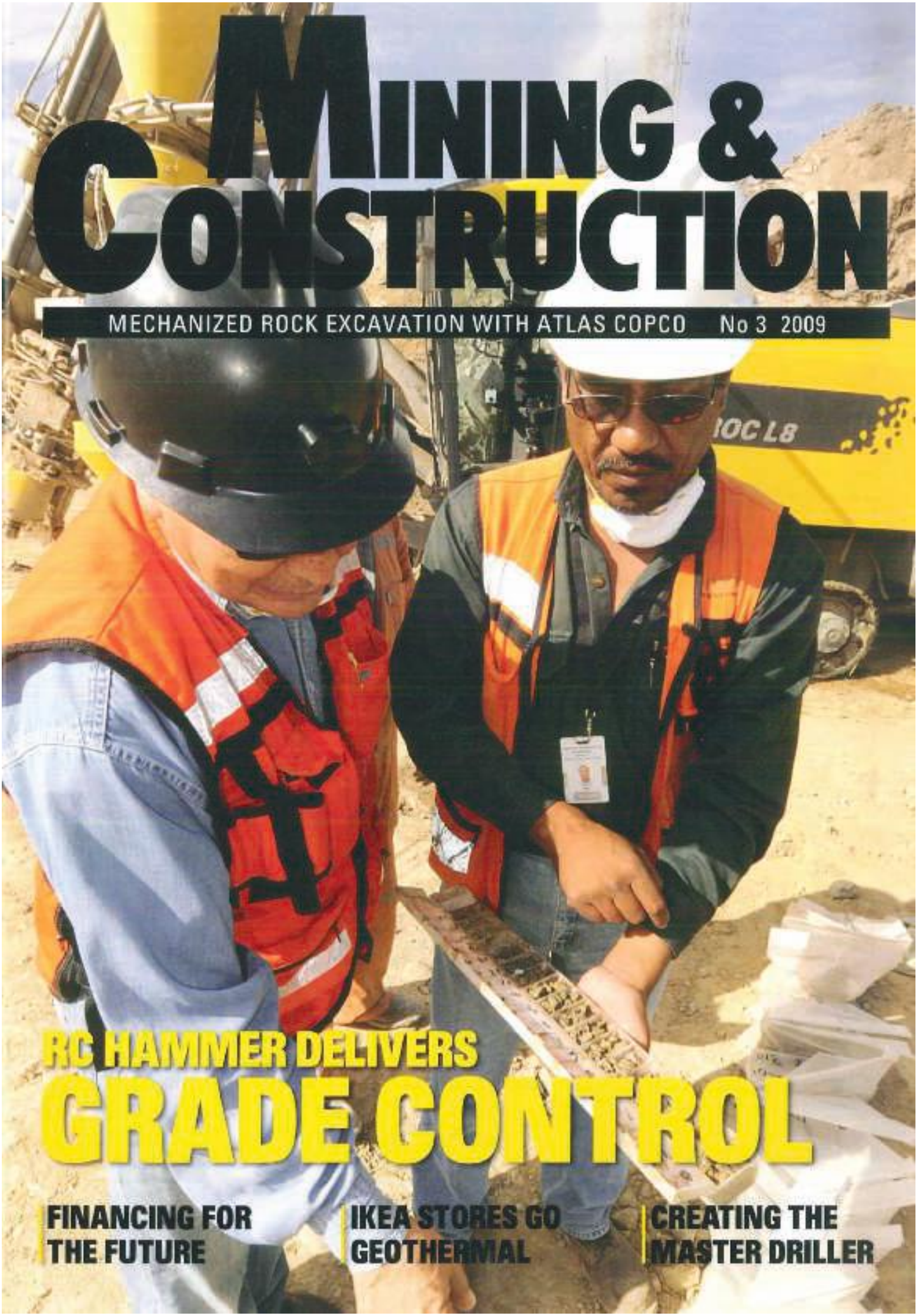


MINING & CONSTRUCTION

MECHANIZED ROCK EXCAVATION WITH ATLAS COPCO No 3 2009

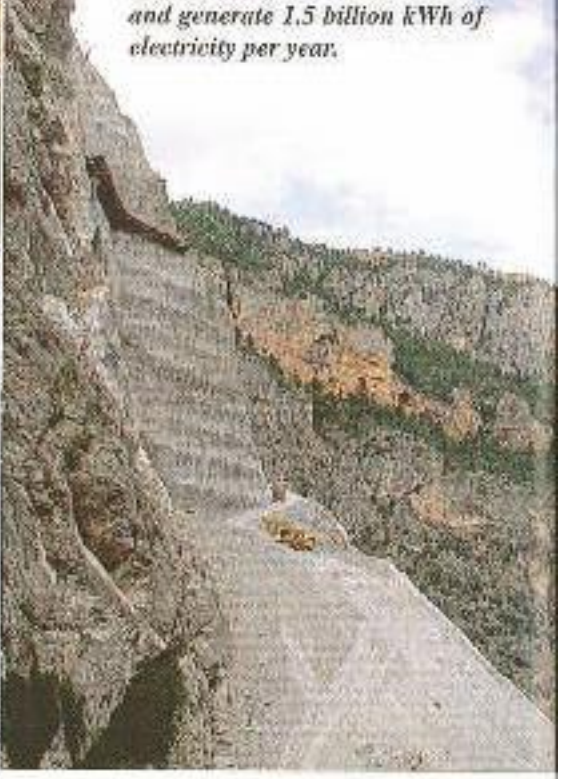
RC HAMMER DELIVERS GRADE CONTROL

FINANCING FOR THE FUTURE

IKEA STORES GO GEOTHERMAL

CREATING THE MASTER DRILLER

Proven performance: Dogus selected Atlas Copco ROC D7 drill rigs for the Boyabat hydropower project after the rigs' impressive performance on an earlier project.



and generate 1.5 billion kWh of electricity per year.

DRILLING FOR P ON THE

The town of Boyabat, northern Turkey is located on the ancient and famous Silk Road. But it is a more modern construction that is putting the town on the map today – the Boyabat dam.

The town of Boyabat (pop. 25 000) in northern Turkey, was once an important trading post on the ancient Silk Road that once brought exotic goods such as silks, spices and gemstones from the East to Europe and beyond. These days, it is still a centre of trade, serving as a bustling commercial hub for more than 100 surrounding villages.

But it is not just the sound of traders, market-goers and troubadours that can be heard in the Kizilirmak valley today – the sound of construction work at the USD 1.2 billion Boyabat dam is also now a regular feature of daily life.

Construction of the 510 MW Boyabat dam and hydropower station on the near-by Kizilirmak River, started in 2008 and is due for completion in 2012. The dam will be the third on the river and lies approximately 30 km from Boyabat and 123 km from the Black Sea.

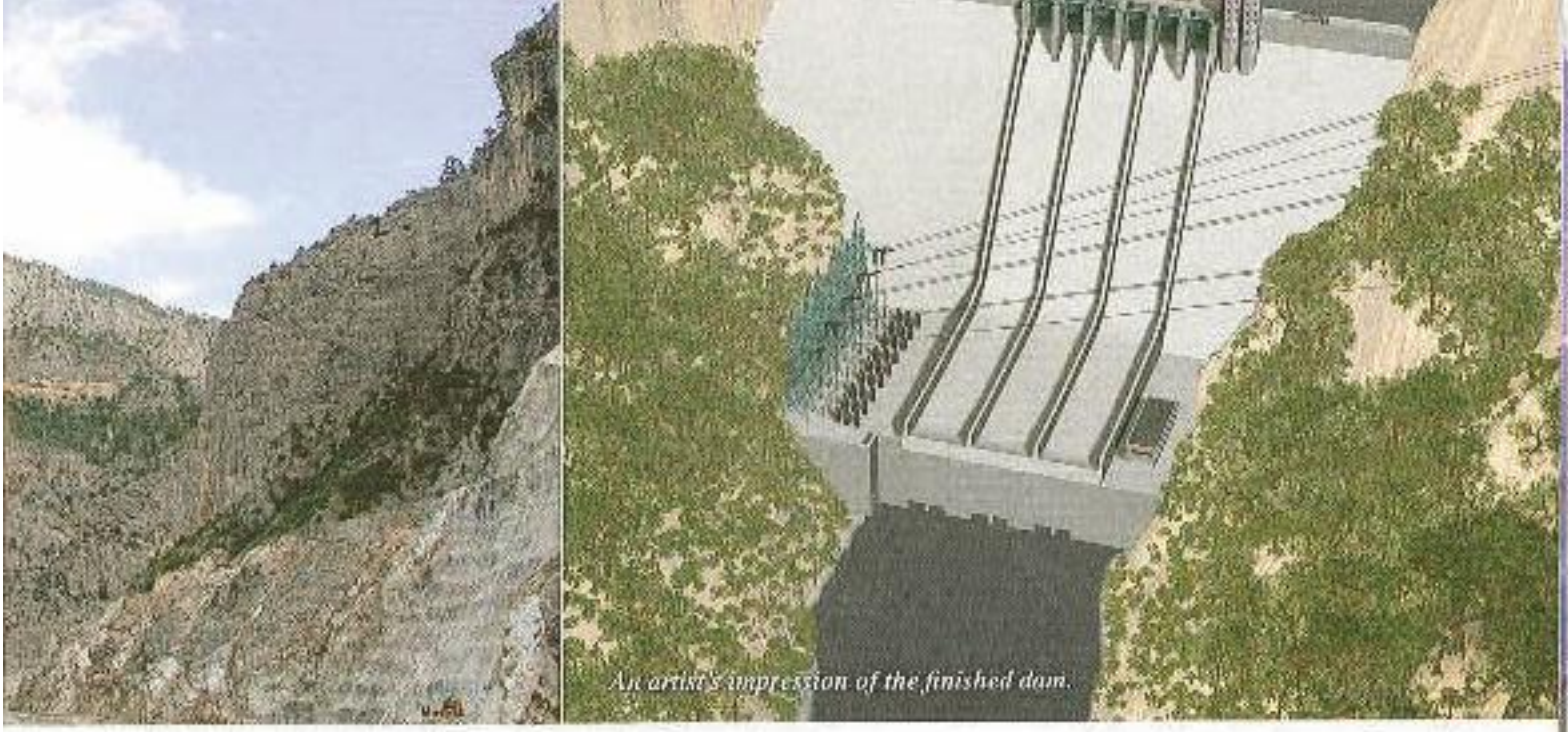
Once finished, it will stand at a height of 195 m from its foundation and will have a crest of 262 m spanning the Kizilirmak valley. The dam is expected to produce 1.5 billion kWh per year for distribution to cities across the country.

The dam is being constructed by the Turkish company, Dogus Insaat, and involves drilling a total of 600 000 m over three years. Of this, 400 000 m will be drilled in a nearby quarry for concrete production and 200 000 m will be drilled in pre-splitting holes. Some 13 million tonnes of excavated limestone will be produced from the quarry. A total of 1 000 people are working on the project, including sub-contractors.

The environmental impact of the operation is being monitored by the Ministry of the Environment, a safety team from Dogus Insaat (working to ISO 14001 and 18000 procedures) and the owner of the project, Boyabat Elektrik Uretim ve Tic.Ltd.Sti.

Proven performance

The drilling fleet at Boyabat consists of four Atlas Copco ROC D7 and four ROC 203 rigs. Dogus Insaat had previously



An artist's impression of the finished dam.

OWER
TURKISH SILK ROAD

used Atlas Copco surface drill rigs on another project, a highway construction job in Morocco, where two ROC D7 rigs were used. This experience convinced the company that the same rigs would have the capacity and performance to cope with the Boyabat dam project.

Another factor in choosing these rigs was Atlas Copco's parts, service and maintenance capacity which would be essential given that the Boyabat dam site is remote – 700 km from Istanbul and 400 km from Ankara.

The rigs drill 89 mm holes for production drilling and 70–76 mm holes for presplit drilling. Additionally, a sub-contractor is operating two ROC D7-11 rigs fitted with COP 1840 rock drills and drilling is carried out 22 hours per day. The teams work 14 x 11-hour shifts per week. The blasted rock is removed with back-hoe excavators, loaded onto trucks and transferred to the dump site.

For production drilling, a 2.5 x 3 m drilling pattern is used with an inclination of 4:1, and an inclination of 1.36:1 for presplitting. Bench heights for production drilling vary from 6–12 m. During an average shift, the ROC D7 rigs achieve 300 m per rig per shift for production drilling and 250 m per rig per shift for presplitting.

Quarry Operation Manager, Can Celiksut says: "We are very satisfied with the hole quality in such tough terrain – especially in presplitting holes where we faced big problems because of the inclination of the bench." Celiksut designed the software, DelPat v6.0, used to design the drilling pattern at the site.

Presplit drilling solution

The initial challenge, faced by the drill rigs and operators was encountered on the pre-split holes, spaced every 70 cm. The rock shelf was specified at 40 cm wide or less, with the 7 m holes drilled at an inclination of 40 degrees from the horizontal and it was difficult to place the rig close enough to the slope (the shelf was specified at 40 cm so that the ▶

All in a day's work for the Dogus team: From left, Can Celiksirt, Quarry Operations Manager, with his colleagues Dursun Bozdogan, Erdal Can, Yasin Kuru and Tufan Kirik.

steps created on the hillside would be minimal). The position of the rigs' rod handling carousels and hydraulic valve groups meant the rig could only drill the required inclination and hole depth on 70 cm benches.

A sales and service team from Atlas Copco decided to change the feeds on two of the ROC D7 rigs used for presplitting with the company's underground rock drilling version, the BMH 6821. This allowed the operators to position the feed closer to the slope. As the feed was longer than the previous version, the rod-handling carousel could also be removed. After this modification, the required inclination and hole depth was achieved on a shelf width of just 30 cm.

Full-service

Celiksirt is very satisfied with the solution: "The Atlas Copco sales and service team helped us greatly by solving this problem," he says. "We are grateful to them, especially Atlas Copco's technical development and training manager, Yavuz Akkaya for his great efforts."

Atlas Copco is planning to provide regular on-site training for the drill rig operators and maintenance teams to maximize drilling performance, ensure productivity and increase the drill steel life.

As an additional measure to maintain the high availability of the drilling fleet, Dogus Insaat's Selahattin Kolasinli, Mechanical Machinery Supply & Purchasing co-ordinator, recently signed up for the COP Care maintenance programme that covers all of the site's COP 1840 rock drills. COP Care is a full-service agreement for COP rock drills and comprises five key elements; scheduled service, optimized rig performance, overhaul protocols; extended warranty and remote monitoring.

Bench test: The modified ROC D7 managed to exceed the drill plan specifications that required a maximum 40 cm wide shelf.