

High hopes at Ho Ping

Taiwan quarry gets the Coprod experience



Mr. Ho Chun-Loi, Deputy Manager of the Chien-Kuo Construction Co., Ltd.

The Taiwanese town of Hualien, is world renowned for its vibrant marble industry. But when it comes to advanced drilling technology, it is the town's limestone quarries that are setting the pace.

The Ho Ping limestone quarry in Taiwan has boosted productivity and environmental standards with the help of state-of-the-art surface drilling technology.

Located some 1,000 m above sea level outside the town of Hualien, it is owned

by Taiwan Cement – the biggest cement manufacturer in Taiwan – and operated by contractor Chien-Kuo Construction Co., whose history dates back to 1949.

Over the years, Chien-Kuo has evolved from mining with manual labour to the use of highly mechanized equipment and environmentally-friendly methods.

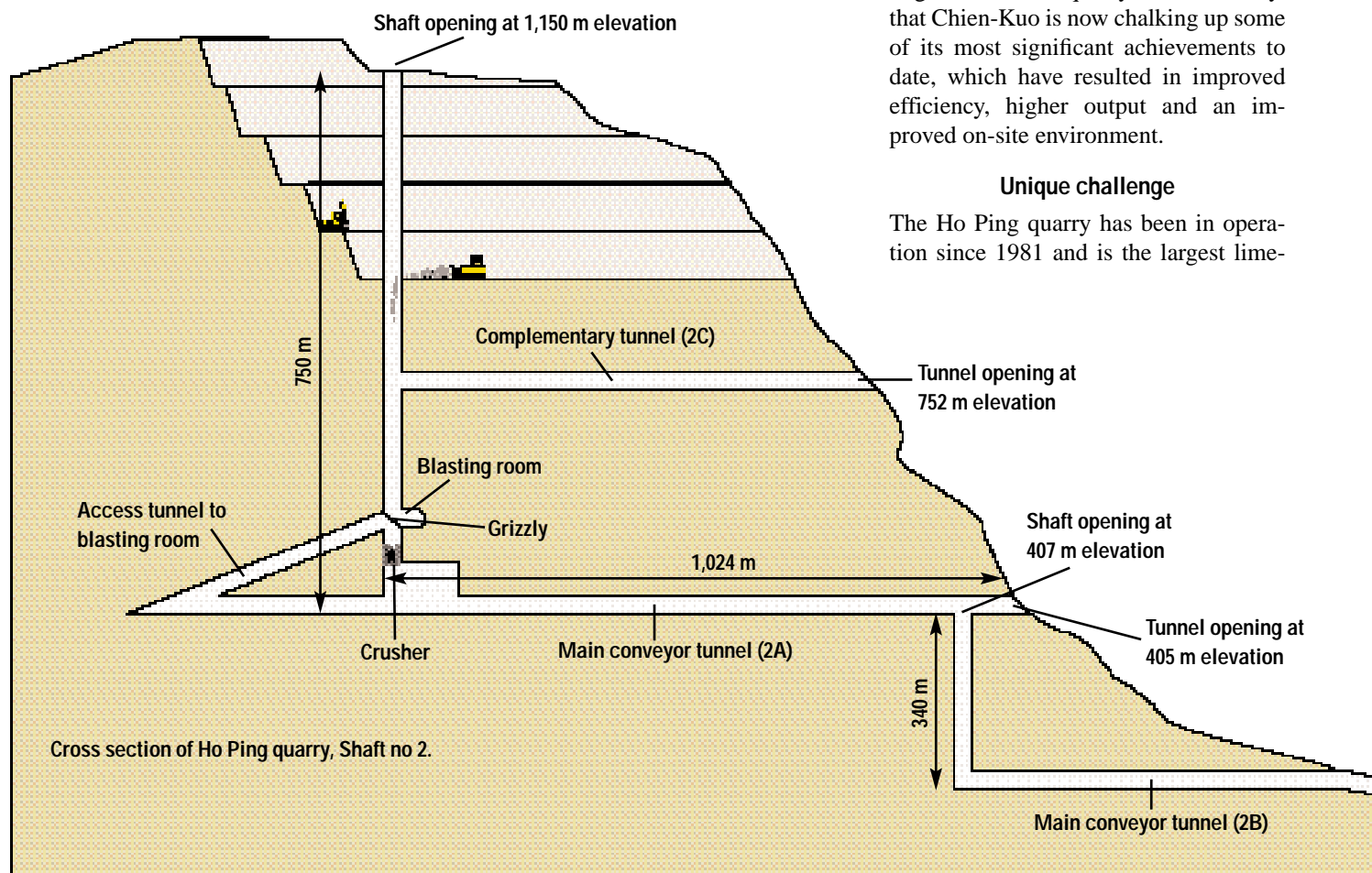
Recognised as an industry leader, the company operates many of the largest quarries in Taiwan and is contracted to work the quarries owned by the country's major cement companies.

The company also operates in other countries including China, Vietnam, Indonesia and the Philippines.

But it is in Taiwan, at Ho Ping, the largest limestone quarry in the country, that Chien-Kuo is now chalking up some of its most significant achievements to date, which have resulted in improved efficiency, higher output and an improved on-site environment.

Unique challenge

The Ho Ping quarry has been in operation since 1981 and is the largest lime-





Hilltop challenge: The drillers at Ho Ping quarry, the largest limestone operation in Taiwan, use Atlas Copco ROC crawlers – including the ROC F9 with Coprod – to drill 127 mm holes up to 30 metres deep. To reduce noise and truck movements, the limestone is tipped down a shaft and transported out via a system of tunnels equipped with conveyors.

stone quarry in the country. It is worked using bench drilling from the top of the Ho Ping hill and is designed to keep noise and vibration to an absolute minimum while maintaining maximum visibility on the site.

This is especially important in winter – at its altitude of 900 metres – where the entire area is often shrouded in mist and can be damp and cold, all of which reduces working hours and safety.

To reduce the noise, dust and danger caused by truck movements, the rock is

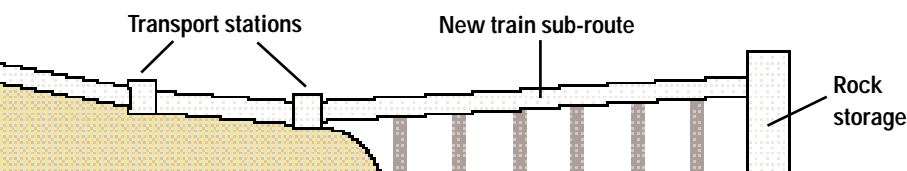
fed down a system of shafts to rotary impact crushers, and transported to a storage facility at the bottom of the hill by conveyors running through a system of tunnels.

There are three major vertical shafts, 6-m in diameter. The first, 900 m-long tunnel went into operation in 1981, the second, 1,100 m-long, began operation in 1986 and work on the third, which will be some 600 m-long, is currently in progress.

Previously, Chien-Kuo used five drill rigs from three competing manufacturers



Hauling made easy: After crushing, the limestone is transported via the conveyor tunnels to a storage facility at the bottom of the hill.



One of a kind: The Taiwanese town of Hualien is one of the world's largest producers of marble. Here, at the nearby Ho Ping quarry, new records are being set in mechanized drilling.



▶ to drill 89 mm holes to a depth of 11 m on a 3.2 m x 6 m-wide grid. Today it has a production fleet consisting of six Atlas Copco ROC F9 CR rigs equipped with the Coprod system. The rigs are drilling 127 mm holes up to 30 m deep – a performance which, according to the contractor, other machines cannot achieve in such fractured rock.

Furthermore, a bench height of 30 m is also regarded as a record in the Taiwan cement quarry industry.

Explains Mr Ho Chun-Loi, Deputy Manager for Chien-Kuo Construction: “The powerful ROC F9 CR rigs are proving to be highly productive compared to their predecessors here at Hualien. The rigs are particularly well suited to the quarry’s loose and fractured rock. The gross penetration rate is also much faster, with a maximum output of 25 m/h compared to 12 m/h with the previous rigs. We are more than satisfied with the results.”

Chien Kuo carries out two blasts per

day, 28 days a month. The drillers are currently drilling 105 mm holes which compare favourably to the 89-102 mm holes drilled by the company’s previous machines.

Straight hole benefits

The Coprod system used with the ROC F9 CR rigs makes it considerably easier to drill straight holes, enhancing productivity and performance in quarrying work.

The system features a drillstring that employs impact rods to transmit impact energy and feed force while rotational

torque and flushing are transmitted by drill pipes. Now, with the latest technology in hand, Chien-Kuo expects to increase Ho Ping’s production by approximately 20 percent, from one million tonnes per month in 2000.

An Atlas Copco service team spent a month on the site, monitoring machine performance, training rig operators and observing the operation to tackle any potential problems. In addition, Chien-Kuo is maintaining an ample stock of parts and consumables to cope with the increasing production rate. M&C 2-02

THE COPROD FACTOR



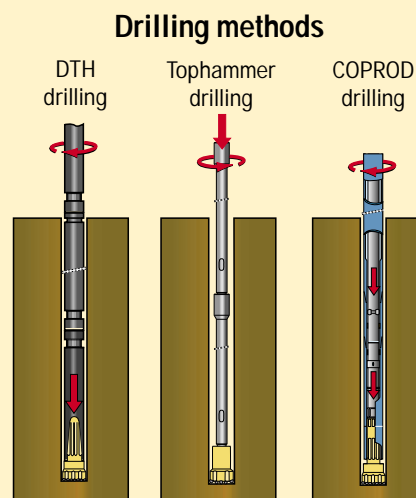
The Coprod system offers the best of two worlds – the hole straightness of down-the-hole drilling and the speed of tophammer drilling.

Since the floating impact rods have no drill threads and transmit impact shock waves from the rock drill directly to the drill bit, there is no energy

loss. The outer drill pipes transmit only rotational torque and flushing, which results in a long service life.

The COPROD system is complemented by the use of special hydraulic rock drills from the COP 1800 and 4050 series. A requirement for all COPROD drilling is the double dampening system, a feature that ensures the impact rods maintain constant contact with the rock. Another feature is the “empty blow protection”, which automatically interrupts percussion while the bit is passing a cavity.

Straight holes means time and cost savings resulting from a more widely spaced drilling pattern with fewer holes and a corresponding reduction in explosives consumption. They also mean



less extra work as the more regular fragmentation reduces the need for secondary blasting and produces more-even bench floors.