



Job Report Surface Mining

Precise, blast free cutting of granite in Japan



Wirtgen Surface Mining:

Precise, blast free cutting of granite in Japan

Bernhard Schimm, December 2002

How can rock be removed effectively in hard rock when blasting is not possible?

This was the question the Japanese construction company OKUMURA GUMI DOBOKU was faced with permanently.

In 1989 OKUMURA and Wirtgen jointly started to evaluate the possibility of using the Surface Mining Method for this task. Cuttability and cost analysis for the hard granitic rock came to the result, that this technology is the best solution in cases where blasting is prohibited. So in 1990 OKUMURA purchased a Wirtgen Surface Miner 3500 SM. In the first jobs, e.g. cutting of the foundation for an extension of an



atomic power plant, the 3500 SM showed that the reached production and operating costs were within the expected range. So in 1991 Okumura purchased a Wirtgen Surface Miner 2600 SM, a smaller machine, to carry out secondary jobs. Based on the good experiences with this technology OKUMURA and Wirtgen developed a reinforced Surface Miner 3500 SM-J, which was built in 1994. Using the experiences of the continuous know how exchange between OKUMURA and Wirtgen, in 2001 a special version of the Wirtgen 2500 SM Surface Miner was manufactured.

This machine was commissioned in November 2002. It now works together with the 2600 SM and one 3500 SM on the same job site. These machines cut the trench for the connection road between two new housing development areas. This trench has to be cut into a hill where houses resp. factories stand right and left. Furthermore, power lines are crossing this section.

Depending on the hardness of the rock, weathered to massive granite with 140 to 260 MPa compressive strength and elastic wave velocities of more than 3.500 m/s a daily production (one 9 h shift) of 70 to 600 bcum/h with each machine 3500 SM and 2500 SM is reached. Depending on the



hardness of the rock the cutting tool consumption ranges from 10 to 30 tools for 600 fcum to 60 to 100 tools for 60 fcum. Specially tools, developed from Wirtgen's system partner Betek are used.

Because of the high stresses and vibrations, the Wirtgen Surface Miners are remote controlled. Can you imagine to see a 130 t giant to be manoeuvred by a man standing beside this machine?



The benefits of this operation:

Wirtgen Surface Miners cut a trench into hard rock without blasting. Stable and precise slopes and surfaces are built.

The slope of approx. 45° is cut precisely and step by step with the Wirtgen Surface Miners. No extra work is required.

The surface cut is ideally trafficable. So the trench from the beginning of the construction could be used for material transportation from the advanced second construction site to the central crushing station in the first construction site.

Safe earthmoving and rock removal on construction sites which are close to existing buildings have become possible.



Horses for courses - Wirtgen Surface Miners are the solution for blast free construction of precise profiles.



Wirtgen GmbH
Hohner Str. 2 · 53578 Windhagen · Germany
Phone: +49 (0) 26 45 / 131-0 · Fax: +49 (0) 26 45 / 131-242
Internet: www.wirtgen.com · E-Mail: info@wirtgen.com