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Case Study

More Coal, less Problems – Wirtgen Surface Miner 2200 SM 3.8 for Chinese Coal Producer

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For the further development of Chinese industry a constant and reliable supply with energy is of uttermost importance. Up to now, coal is the only energy resource availble within China in sufficient amount and therefore mostly and increasingly utilised.

The first Wirtgen 2200 SM 3.8 surface miner is being used in the Chinese province of Xinjiang. With immediate effect, this advanced surface miner replaced the conventional mining equipment used locally. Wirtgen experts are providing support for the project.

Project Support from A to Z

The Yihua Xinjiang Wucaiwan coal mine is situated in the north-west of China near the borders with Russia, Kazakhstan and Mongolia. Contractor Xinjiang Jianyun Engineering Co. Ltd. has been mining coal here for about two years, making use of the eco-friendly surface mining technology. Previously, the sought-after fossil fuel was mined using conventional methods, i.e. drilling and blasting. However, this often resulted in fires in the mine, as the coal was highly flammable at the open coal faces damaged by blasting. In order to increase safety at the mine, the mine operator decided to introduce surface mining as the new mining method.

This move simultaneously boosted the cost effectiveness and quality of mining.

Project Planning

However, simply choosing the right machines for the specified mining output is not the sole criterion when planning mining projects. Factors such as the geological properties of the area, sedimentation and on-site logistical conditions are also key factors.This is where expertise and best-practise experience are called for – and with more than 30 years of experience in surface mining, these are qualities that Wirtgen can contribute to every project. “The Wirtgen specialists provided us with in-depth advice right from the start and assisted us in developing the ideal solution,” said Chen Jianyun.The owner of Xinjiang Jianyun Engineering Co. Ltd. values the partnership-based cooperation and the reliability of the surface miner. He and Wirtgen first set out the requirements in preliminary talks. The area being mined is 2 · 300 · 35 m so manoeuvrability was the key factor for the machine in question. Also, the operator wanted to increase production from 3000 t to 7000 t per day. This proved to be the only way to meet the enormous demand from the main customers, who operate a cogeneration plant and a fertilizer plant that is currently undergoing construction.What’s more, the coal is extremely fragile and fine-grained. Consequently, it produces a great deal of dust. Various requirements on the gradation of the cut material and the coal seam (with a thickness ranging from 1.3 to 10.63 m) had to be taken into consideration during the planning stage.

The 2200 SM 3.8 surface miner operates according to the windrowing method: after cutting the material, it deposits it in three windrows behind it. (Pictures: © Wirtgen)

“Once we’d been apprised of the underlying conditions, we advised our customer to use the new 2200 SM 3.8 surface miner. Though based on the same machine concept as the 2200 SM/3800, its production capacity is approximately 25 % higher and the specific fuel consumption approximately 15 % lower,” explained Bernhard Schimm, Manager of the Mining Division of Wirtgen GmbH. The newly advanced machine selectively mines soft rock, achieving a maximum in

performance and cost efficiency. “We scrutinized the results of tests with the prototype of the new 3.8 generation in an Indian coal mine and concluded that the 2200 SM 3.8 ideally fulfils our requirements,” Chen Jianyun agreed.

Selective Mining: Maximum Output and Top Quality

The centerpiece of the compact, yet powerful 2200 SM 3.8 is the 3.8-m-wide cutting drum which offers numerous innovative features. It cuts coal or salt with unconfined compressive strengths of up to 35 MPa and deposits the material in three windrows behind the machine. This results in maximum cutting performance with optimum utilization of the engine capacity. Other benefits are its low fuel consumption, the optimised use of cutting tools and minimized content of fines due to the gentle material transport system. The modified drum speed combined with a reduced cutting depth and travel speed enabled the grain size distribution to be additionally optimised on site and the fines content to be reduced by a further 10 %.

The 2200 SM 3.8 has a cutting width of 3.8 m and a cutting depth of up to 350 mm

Two side plates which can be raised and lowered hydraulically reliably seal the cutting drum. With the drum effectively sealed, the formation of dust during milling is reduced considerably. Furthermore, the miner is also equipped with an additional dust protection plate for this application.The effectiveness of these measures to reduce the formation of dust was already evident during the six-day practical test. The mechanical cutting drum drive system with its three power belts also proved highly efficient on the test site. The virtually loss-free transfer of power ensures maximum efficiency and tremendous daily output rates combined

with simple maintenance.Maximum output during selective mining of the coal seam is ensured by three material discharge openings in the scraper plate that allow large quantities of cut rock to be deposited as a windrow. Wheeled loaders subsequently load the material onto trucks independently of the cutting process.

Saving Time when it becomes critical

Operating in the confined space of the mine, the 2200 SM 3.8 truly came into its own. The large steering angle of the smooth hydraulically adjustable all-track steering results in a turning radius of just 2.5 m. The crab steering mode allows rapid manoeuvring. Meanwhile, the large ground clearance with individually height-adjustable crawler tracks allows operation on uneven terrain and reversing.What’s more, the selectable hydraulic differential lock ensures optimum traction on any surface. The enormous gradability and longitudinal slope of the surface miner allow it to operate in difficult peripheral areas and to produce separate access roads and ramps. The 2200 SM 3.8 is thus also a valuable asset for job site routing.

24/7 On-site Service

As a matter of fact, surface miners are usually in operation around the clock. The surface miner in Zhundong coal field, works 24 hours a day for 330 days per year. Consequently, a reliable supply with original parts as well as the deployment of excellently trained Wirtgen service engineers are extremely important.As Chen Jianyun approves wholeheartidly: “Every minute that the surface miner is not working costs money and minimizes our profit. The knowledge that we could always rely on support from Wirtgen was a key factor in our choice of partner.”