

Australia: Surface mining takes over from conventional coal mining

17 August 2015 by Wirtgen (Wirtgen Group)

The New Acland Mine (NAC), located adjacent to the township of Acland (Queensland), is part of the Australian based New Hope Group. Since opening of the mine, coal and interburden have been extracted by means of bulldozers fitted with ripper teeth and assisted by wheel loaders. However, a sharp drop in coal prices compelled the NAC management to look for alternative, more efficient mining methods.

A solution was soon found: the Wirtgen surface mining technology offers the ideal method for the challenging geological conditions in the mine, which comprise up to 27 mostly thin coal seams interspersed by layers of interburden. Compared to conventional methods, the selective surface mining technology simplifies the mining process, thus reducing operating costs and supplying coal of higher quality to the neighboring processing plant.

6-month trial phase completed successfully

Wirtgen surface mining has proven its worth as a tried-and-tested technology in numerous coal mining projects. It was no surprise, therefore, that the 6-month trial phase with defined target performance levels agreed upon between NAC and Wirtgen was a resounding success: the 4200 SM achieved the projected cutting performance of up to 3,000 t / h in the tough everyday mine environment. The point-attack cutting tools used were subjected to in-depth trials and optimized to fit the specific application as they were required to cut not only coal but also hard interburden material. Cooperation with the Wirtgen customer service, which was on permanent stand-by, was also perfected at an early stage. This enabled many areas which typically offer room for improvement when introducing an entirely new technology to be identified and optimized quickly. Since all of the targeted performance rates were met during the trial phase, NAC decided to purchase the 4200 SM.

The advantages of Wirtgen Surface Mining

To maximize exploitation of the coal deposit, the high-performance 4200 SM cuts and loads the material in a single machine pass, producing an even and easily trafficable surface in the process. It was additionally established during the trial phase that, while offering the same performance, the surface miner replaces two

bulldozers and one wheel loader. The resulting savings, mainly in labor and fuel, lead to a significant reduction in operating costs. Additional marks in favor of the 4200 SM include emission measurement results showing significantly reduced machine vibrations and noise levels. Paired with the ergonomically designed cabin, impacts on the operator's health are thus minimized particularly in the long run. A camera system designed exclusively for this operation enables the machine operator to conveniently differentiate between coal and interburden, thus significantly improving coal quality. The strict safety regulations and machine standards specified by the Australian coal industry were fully met by making the relevant machine modifications prior to shipment.

The cutting drum has been specially designed for operation in soft rock and is ideally suited to mining not only coal (unconfined compressive strength = 20 MPa) but also the significantly harder interburden layers (50 MPa). The 4200 SM mines coal in a selective process at exactly the specified cutting depth, producing a clean cutting surface and guaranteeing high degrees of purity. As a result, there are less truck travels required to transport the material to a special coal-washing plant for further processing and to return the separated tailings to the mine. Compared to the mining method used to date, the 4200 SM also produces a smaller percentage of fines (grain size < 2 mm) and a higher percentage of the end product fraction (grain size < 38 mm). In the final analysis, this also improves the efficiency of the processing plant.

Positive conclusion by the management

"I am impressed with the economical, modern and environmentally friendly Wirtgen surface miner. NAC saves hard cash as soon as the miner is in operation," says Andrew McDonald, Managing Director at NAC, praising the highly productive giant machine.

Source: Wirtgen GmbH