



Case Study

Titans in Texas: Coal for South Texas' and Northern Mexico's Power Stations

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Coal deposits with thin seams and many interlayers can be mined economically by surface miners, which can cut the exact depth of the coal layer and deliver the coal ready for belt conveyance without further crushing.

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Cutting, crushing and loading in a single pass. Wirtgen surface miner make coal mining simple, economical, eco-friendly and safe.

A 4200 SM is extracting sub-bituminous coal at an open cast mine owned by the North American Coal Corp. in Eagle Pass, Texas, USA - right on the border with Piedras Negras, Coahuila, Mexico. The extracted coal is then transported over the border by train to a multi-unit power plant in Coahuila.

Meanwhile, at another open cast mine in Texas, a further 4200 SM is extracting lignite, just as economically.

The two surface miners – the largest models in Wirtgen’s product range – went into operation in the last two years and are extracting coal with a low sulphur content, operating 24/7.

The 4200 SM is 6.53 m high and has an operating weight of 204 300 kg. It is powered by a highly efficient 1521 HP diesel engine. When cutting soft material such as coal, limestone or gypsum, the 4200 SM cuts down to a depth of 830 mm using a 4200 mm-wide milling drum and operating in an up-cut direction.

Sub-bituminous Coal in Eagle Pass: new Mine, new Extraction Method



The Eagle Pass Mine began selective coal extraction with the 4200 SM in

October 2015.

Eagle Pass Mine is located in an area which has been worked for coal since as early as the late 19th century. Piedras Negras, the name of the town on the other side of the border, translates as “black stones”, a reference to the coal deposits located there.

“Every ton we extract goes to a coal-fired power plant in Mexico,” says John C. Duffey, P.E., Chief Engineer of Camino Real Fuels. A subsidiary of the North American Coal Corp., this company operates the mine for the owner, Dos Republicas Coal Partnership (DRCP). Eagle Pass has replaced the depleted open-cast mine Siglo XXI (21st century) in Mexico, on the other side of the Rio Grande – or Rio Bravo, as it is known in Mexico.

At the mine, a 2550-ha area is available for coal extraction, offering sufficient deposits for 8 years of mining work. The total quantity of deposits is much larger, however. One special feature of this location is the fact that the seams are very thin, some of them only 15 cm thick. “And this is precisely where the Wirtgen surface miner proves invaluable. We use it to selectively extract coal from the rock. This enables us to achieve a high material quality,” explains Duffey.

The four seams lie beneath an 18.3-m layer of top soil and overburden, in a series of layers around 6.0 m thick. “Barely 1.65 to 2.0 m of this is coal,” says Duffey. “We conduct preliminary examinations in an attempt to find out exactly how much coal there is under the surface, but we are often surprised.”

The 4200 SM transfers a 250-t payload onto dumpers. They transport the coal to a transshipment center equipped with five grizzlies and conveyors. Each grizzly supplies one loading conveyor which transports the coal to the train-loading station.



The 4200 SM crushes the lignite to a maximum grain size of 10 cm during the mining process.

“The thin seams can be mined precisely with the Wirtgen 4200 SM, which also saves us a great deal of money for processing,” says Duffey. “We don’t need a primary crusher at the transshipment center anymore, because the 4200 SM crushes the coal directly during loading.” The surface miner crushes the coal to a maximum size of 10 cm while minimizing fines. As coal fines tend to block the loading conveyors at the transfer points when there is a high moisture content, a low proportion of fines is a great advantage.

“Blasting, excavating and loosening – the 4200 SM does away with all this,” explains Duffey. “We don’t have a permit for blasting and we don’t blast coal or surrounding rock. Almost 95% of our coal is crushed and loaded by the 4200 SM. The remaining 5% – for instance, material located in inaccessible corners or right at the end of a drift – is broken up by bulldozers and loaded by front loaders.”

Lignite in South Texas: fast Loading



The surface miners loading conveyor can be slewed 90° to either side.

At the other open cast mine in Texas, the lignite used to be extracted by two smaller, older surface miners. The Wirtgen 4200 SM was bought in 2014, when

these two miners were approaching the end of their service lives.

“The 4200 SM is technologically superior in terms of its hydraulics and control system. What is more, it loads dumpers 30 to 40% faster than the older models,” say the drivers.

“I love this machine,” says the thrilled driver of the 4200 SM, as he stands beside his equipment. “The 4200 SM runs much more quietly than our previous surface miner. The cabin is very comfortable and the machine is so easy to operate. The video cameras also show me the area directly behind the cutting drum unit, ensuring that I don’t penetrate too deep into the interburden.”

Compared with the mining methods used in the past, the 4200 SM produces fewer fines and more material in the target grain size. The selective mining method extracts material with a high degree of purity, reducing coal washing costs at the processing plant. This also enhances the quality of the end product, enabling the coal to be sold at a more profitable price.

Wirtgen Surface Miners: economical and safe



The driver loads a tandem coal train within minutes in the mine in South Texas.

In many cases, the use of surface miners offers a more economical, eco-friendlier and safer alternative to conventional mining by drilling and blasting. The surface miner can cut, crush and load the material in a single pass. Dispensing with drilling and blasting, the application causes no destructive vibrations, making this process a great deal safer. Dust and noise pollution is also much lower. As a result, material can even be extracted in areas directly adjacent to residential areas and industrial estates.

Apart from reducing machinery and personnel costs, the process is also much more time-saving than conventional methods. What is more, surface miners produce level, stable surfaces – a great advantage for mine logistics as it means that ordinary trucks can travel over the routed access roads. Not only can they transport the material more quickly, but they are also more cost-effective to acquire and maintain than dumpers.

Efficient Material Extraction



The loaded tandem coal train drives some 26 km to unload the material at the power plant.

Surface miners operate in a similar way to road milling machines working on asphalt or concrete. A special cutting drum cuts and crushes the material. Robust loading conveyor systems then load the material onto trucks or dumpers or deposit it in windrows behind the machine. Alternatively, the material can also be sidecast.

A high-precision, automated leveling system ensures a constant cutting depth. This extremely precise method supports selective mining of a wide range of materials - for instance, coal, limestone, gypsum, salt, bauxite, iron ore, etc.

The mechanically driven cutting drum, on which the cutting tools are arranged in a helical pattern, work against the direction of travel, cutting the material and crushing it. Ejectors on the milling drum help to transfer the material to the loading conveyor system.

The main loading conveyor takes the material from the drum housing and transports it to the rear of the machine, where it is then transferred to the slewing, height-adjustable discharge conveyor. The discharge conveyor loads the material onto trucks or dumpers or sidecasts it alongside the machine. The height of the discharge conveyor can be adapted flexibly to the height of any transport truck.

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