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# Molehill out of a Mountain

By Dennis Todd & Mike Sexton

The Appalachian mountain range in the eastern US is a region filled with large deposits of bituminous coal. This coal is known for its ash and sulfur content, as well as the wear it can produce when transferred from one point to another. Over the years, power plants have emerged in this region to provide electricity to the surrounding communities.

In the US, over 50% of the electric energy is produced from coal-fired power plants. Appalachian coal makes up much of the coal used in power plants in the Midwest and eastern regions of the US. Because of its high usage in these plants, over the years it has become a constant adversary to the industry's maintenance departments.



Fig. 1



Fig. 2

With its high sulfur content, Appalachian coal has forced the coal industry to install multi-million dollar scrubber systems to reduce the air pollution. This coal is also corrosive when mixed with moisture. This requires the use of high dollar stainless steel or low wear resistant polymer in its handling, which are often the only viable solutions for these corrosive qualities of the coal.

However, a breakthrough has been made in abrasion protection against Appalachian coal. A few years ago, a power plant in West Virginia experienced severe wear conditions in its coal fuel yard. The plant had used many different wear materials, such as abrasion resistant AR400 and AR500, and Chrome Carbide Overlay (CCO),

without success. A new arrival to the plant in 2006 demonstrated that a viable armor of protection could be used in the war on wear with Appalachian coal. This plant began the testing of **Wear-Concepts' SHC800™ Wear Panels** in a few areas such as in coal chutes and on coal conveyor deflector plates (Figures 1 and 2). The first liner plate shows that the **SHC800™ Panel** could withstand the constant pounding of over 4 million tons of coal coming through this chute. The coal chute deflector plate not only held up to the abrasive wear of the Appalachian coal, it also withstood the constant 20 ft. drop of the coal. The **SHC800™ Wear Panels** were designed to have the wear characteristics of a CCO liner, but the challenge was how to handle the impact. The **SHC800™ Panel's** chemistry has a propitiatory blend of special alloys. In addition, a unique heat treatment process, brings the hardness of the panels to a 55 - 58 HRC which provides



Fig. 3

(continued on page 2)

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the toughness needed to hold up to the impact without the fear of breakage from this type of impact. Because of their good qualities, the plant started to use the wear panels in other impact areas (Figure 3).



Initially, two areas of protection were tested. While the impact wear areas were starting to be solved, another area of the plant continued to have issues. The inner skirtboards were wearing out, increasing coal spillage. A solution was needed. After two years of service, the plant personnel went back to look at the **SHC800™** conveyor deflector liner to see how it had held up to the constant sliding wear of the coal. After two years, the **SHC800™** Panel showed minimal wear and the exterior markings of the

panel were

still very visible (Figure 2). Based on this success, it was decided to use the product for the inner skirtboards in the load out areas of the coal conveyors (Figure 4). The **SHC800™** Wear Panel not only provided a wear resistant surface as a side liner, but also minimized the wear and tearing of the conveyor belts because of the slow constant rate of abrasion and impact resistance. In some areas of the plant where AR500 or CCO was used previously as inner skirtboards, the problem was the irregular wear or the sharp edges that developed on the liners. The pocket openings with the AR500 inner skirtboards, (due to wear) allowed the coal to congregate and eventually created wear on the belt. The CCO, which has a mild steel substrate, wore to a sharp edge and then caused tearing of the belt when adjustments were trying to be made to the inner skirts. But the **SHC800™** Inner SkirtBoard



h a r d - e n e d material that has slow wear attributes and actually polishes the skirtboard over time to provide a much smoother edge near the belt surface. The added benefit to this chemistry also provides a corrosion resistant covering against the wet coal during the spring and fall months. Increasing numbers of **SHC800™** Inner SkirtBoard Panels are being installed with great success.

Over time, other plants heard of the success with the use of the **SHC800™** Inner SkirtBoard Panels and also began to use the product (Figures 5 and 6). Now new coal handling systems are being designed and installed with the use of the **SHC800™** Inner SkirtBoard Panels (Figure 7). Appalachian mountain coal was finally tamed.

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