Implementing condition-based wear surface management

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ABSTRACT

The management of wear surfaces in mining operations has remained largely unchanged since the inception of mining. Sacrificial wear liners are installed on the inside of chutes, hoppers and other equipment used to transfer bulk ore to protect the asset from abrasive wear caused by the flow of material. These liners are generally replaced at fixed intervals which may be determined based on historical wear rates or may be driven by other maintenance requirements for that asset. This approach does not always yield satisfactory results, especially for critical assets where the impact of downtime on production can be substantial. For such assets, a condition-based maintenance strategy has the potential to significantly increase productivity and reduce the total cost of ownership associated with the asset. However, for such strategy to be successful timely information on the actual condition (remaining thickness) of the wear liners is essential.

This paper describes the development and implementation of a wear monitoring system that can be used to remotely and continuously report on remaining liner material thickness in real time. It details some of the challenges that were overcome when developing the system, including the design of a patented thickness measuring system that can be used in a variety of liner materials and is tolerant to the presence of ore on the wear surface. The paper also explains how a cloud-based approach enables data from the wear sensors to be integrated into external systems such as PI, which has been demonstrated through a collaborative project with one of the largest iron ore producers in the Pilbara. This ability to combine real time liner thickness information with other data sources, such as throughput, provides the foundation for the transition to a condition-based maintenance strategy.