Next Generation Reclaimer Automation – Using Real Time High Resolution 3D LIDAR to Optimize Stockyard Productivity and Ship Loading Efficiency

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ABSTRACT

Recent advances in ruggedized industrial server based control system technology and architecture in combination with latest technologies in the fast evolving 3D LIDAR sensor sector becoming available have enabled the implementation of sophisticated automation algorithms for bucket wheel reclaim machines used in the coal and iron ore industries for stockyard management and ship loading. This paper introduces new and previously unavailable functionality including optimised face up and faster slew turn approaches that not only increase stockyard productivity and ship loading efficiency, but through advanced set point management also addresses the risk of overloading and resultant bogging events.

Unlike conventional reclaimer control, the next generation system utilises robust 3D machine vision at high resolution in real time, which is critical to detect and pre-emptively react to disturbances like partial stockpile face collapses in the immediate reclaimer slew path. Detailed system descriptions including how to successfully and reliably deploy highly suitable but sensitive LIDAR sensors into challenging on-site environmental conditions are followed by site system performance test summaries that contrast standard PLC based reclaimer KPIs with the improvements achieved by the next generation system. Control system or automation based improvements have demonstrably resulted in significant return of investment and may also debottleneck stockyard operation.