

Mining Industry 4.0 and Lean Production

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ABSTRACT

The mining value chain is a term used to describes the chain of processes flowing from reserves definition, mine planning and scheduling through to extraction, processing, transport ending in loaded shipment upon which customer payment is received. Progressive implementation of Industry 4.0 technologies along the value chain, such as ubiquitous sensing, cloud data storage, and A.I. decision support mean that mining companies now have improved visibility, control and optimization of the entire value chain. Improved measurement of processes leads to reduction in uncertainties and enhanced control, improvement and optimisation.

At present, surface mining operations cater for uncertainty by scheduling stripping a long way in advance of extraction of ore or coal, and by maintaining coarse ore stockpiles. "In-pit inventory" and stockpiles tie up working capital. This paper explores how improved situational awareness via Industry 4.0 technologies can lead to leaner mining operations. The economic benefit, as well as the changed risk profile of such operations are explored through the application to a real case study.