





Self Learning Ore Body

Digital Built World Feb 2023

Agenda







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Introduction

- A bit about me and why I'm talking to you today ...
- Mining Geologist, Resource Estimator, Consultant, Change Agitator, Philosopher ... amongst other things
- 30+ years in mining
- +50 mines worldwide, multiple commodities
- I believe mining is essential, so I advocate and work to improve it





Digital Twins in mining

"... digital twin constitutes a useful tool to improve operational planning and reduce operational costs, by avoiding unexpected interruption in production processes and optimizing the maintenance of equipment"





Source: Sánchez, F., Hartlieb, P. 2020. Innovation in the Mining Industry: Technological Trends and a Case Study of the Challenges of Disruptive Innovation. *Mining, Metallurgy & Exploration* **37**, 1385–1399 (2020). www.doi.org/10.1007/s42461-020-00262-1.

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What is a Self Learning Ore Body? D&B L&H Stocks Crush Process Ship Drill Model Plan sense tonnes SCAN SENSE FMS FMS TONNE DEST TONNES XYZ PF/FRAG QUAL. QUAL. QUAL. QUAL. QUAL. XYZ REAGENT Model update via Geostats and/or Machine Learning



Mine Value Chain Reconciliation



Why?

Safer – less people in the mine

Lower **<u>cost</u>**, increase **<u>revenue</u>**, more sustainable, more stable



Efficiency and speed **empower people** to do higher value work



More **<u>transparent</u>** value chain, easier and quicker to see risks and opportunities



Higher level of **<u>Technical Assurance</u>** leads to more confidence in results and decisions



Affordable technology is being developed and applied – sensing, scanning, tracking, computer architecture/capability/mobility, algorithms, optimisation, etc.

Address the **people and change management** challenges

Agnostic and open systems to integrate technology

How?

Web based tools for scalability

Spatial data coupled with **temporal** data in **one environment**

Automate the hack-work (algorithmic approaches)

Feed the **right people** with the **right info** at the **right time** to make **decisions**

<u>**Continuous**</u> feedback and communication – reconciliation and silo busting

Some challenges ...



Making the value proposition clear

Coordinated organisation

Change management

Technology integration and sustainability

Conclusions

- Safer, stable, more sustainable operations
- Value is significant (ESG + \$\$)
- Technology is available
- Change is hard work

Contact Us



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