



MANDELA MINING PRECINCT
MINDS FOR MINES

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TECHNICAL SUMMARY REPORT

Programme	MMS	Work Package Name	Mechanised Equipment Performance Optimisation
Milestone #	MMS21WP4-8	Milestone Name	Consolidate results, make recommendations and submit final report
Service Provider	UP	Research Lead	Stephan Heyns
Aim of Work package			
The aim of the study is to demonstrate the effective equipment performance and diagnostics monitoring systems with advanced technological systems from the MDB guideline in optimising equipment utilisation and operational monitoring This project set out to investigate and as far as possible demonstrate the use of integrated software platforms in optimising utilisation, performance and condition monitoring of mining equipment during mining operations as derived from the SAMERDI guideline for Best Practice Applications of Mechanised Equipment (SAMERDI, 2021).			
Methodology		Research Findings	
The work package deliverables have been established in the proposal received and approved. The deliverables include: - Project initiation (MS1); - Determine the nature and extent of utilisation, performance and condition measures (MS2); - Identify and describe performance measures (MS3); - Identify existing OEMs as potential industry partners (MS4); - Select three projects for deeper evaluation (MS5); - Capture and analyse operational data (MS6); - Evaluate improvements (MS7); and - Consolidate results, make recommendations and submit final report (MS8). All the milestone deliverables have been completed with the exception of MS7, which was cancelled due to lack of data availability.		Research findings were given in the following categories: 1. A critical comparison and evaluation of utilisation, performance and condition monitoring measures for three selected platforms 2. Alignment of identified performance and utilisation measures with integrated software platforms 3. Technical KPIs 4. Temporal KPIs 5. Spatial KPIs 6. Production KPIs 7. Safety KPIs 8. Maintenance KPIs 9. Quality KPIs 10. Commonly used KPIs 11. Less commonly used KPIs 12. Alignment of identified condition monitoring measures with integrated software platforms 13. Important performance, utilization or condition monitoring measures not previously identified 14. KPI related observations	



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Conclusions		Next Steps/Recommendations
Conclusion were also provided in the following headings: 1. Integrated software platforms - three specific software groups for deep study and analysis, namely: • Sandvik – Deswik (Optimine) • Nerospec – NeroHUB & SIMAC • Epiroc – MineRP (Mobilaris & Certiq) 2. Key performance indicators. The following KPIs were considered: • Technical • Temporal • Spatial • Production • Operator Performance • Utilisation • Safety • Maintenance • Quality In broad terms the set of KPIs identified in the Milestone 3 report provides a representative set of reference KPIs which could serve as a guideline in the specification of appropriate KPIs during the setting up of appropriate KPIs for mining operations 3. Recent developments in integrated software platforms • There remains a disconnect between mine and life of mine planning and short interval control • Reduction of the latency in the decision-making process is critical • Resolving conflicts in scheduling will probably remain critical for a long time It is clear that there is scope for the identification of measures that will capture the extent of integration, interoperability and latency of the availability of information to perform short interval control. Related to the integration of different processes in the mining value chain, there is a clear need to better integrate the maintenance and condition information with the mining, financial and human resource requirements. All of these developments must be viewed against the backdrop of an increasing trend toward digital twinning.		The selection of suitable platforms have been provided, which the milestone deliverable is concluded.
Category	Research	

Attachments

Milestone report:

[MMP REP 2022 MMS21WP4MS4MS4 \[30-11-2022\] A.pdf](#)

Figures:

[Figure 1-Typical ABB application areas.png](#)

[Figure 2-Raptor Schamatic.png](#)

[Figure 3- Optimine system architecture.png](#)