

VEHICLE INTERACTION CONTROL IMPROVEMENT WORK PACKAGE SUMMARY

WBS Reference:	5. New Vehicle Interaction Control Implementation (Phase 4)
Work Packages:	5.6 Operational deployment 5.6.1 Data incorporation 5.6.2 Design & operate review 5.6.3 Site Baseline update
Package Owner:	Project Manager
Owner Organisation:	Your company
Participants:	Facilitation skills and experience, training and communications, a cross-section of experienced operations, technical and maintenance personnel. The entire workforce
Capability required:	Cross sectional team with site operations knowledge and experience. Oversight by project manager, project team and senior operations personnel
<p>Description:</p> <p>After new VI Controls have been proven in an operating environment i.e. they meet User Requirements and all business and operational benefits have been confirmed then fully deploy enhance controls proven at pilot.</p> <p>Reference the Updated Baseline for relevant specification, implementation, and monitoring information to capture relevant data points from new technology.</p> <p>As part of operational deployment, prepare a plan covering:</p> <ul style="list-style-type: none"> • Routine incorporation of control effectiveness data into work planning e.g. separating underground mining activities • Using control effectiveness data for monitoring and verifying the effectiveness of operational controls • Analysis and performance feedback for supervisors, workgroups, and individuals • Minimum equipment and maintenance requirements e.g. what PDS faults require mobile equipment shutdown • Ongoing technology maintenance 	
<p>Completion State:</p> <p>Full deployment and operational integration of the new VI control. Its effectiveness is routinely monitored.</p>	

Case Study:

Glencore Waterval East – Pedestrian Vehicle Detection System (PVDS) – Technology Capability Assessment - Mining Resilience Research Centre University of Pretoria , June 2018

Conclusions

The general conclusions for the assessment of the PVDS at Waterval East Mine can be summarised as follows:

- *The PVDS project team obtained valuable knowledge over the past few years through a trial and error approach to successful implementation and acceptance of the CMS/CAS system. This report highlighted the key learnings that were identified that are relevant to other similar initiatives.*
- *The PVDS implemented at Waterval Mine was tested on a proving ground (at Gerotek, Pretoria, South Africa) and the system was found to be consistent in achieving its requirements, i.e. collision mitigation and avoidance measures as applicable to its operating environment. The suppliers also demonstrated a high degree of professionalism and continuous improvement of their products.*
- *Although the PVDS functions sufficiently and seems to greatly improve TMM related safety, it should be noted that this system came at great cost – in terms of capital and operating cost, as well as in production impacts (the latter was gradually decreased although the current impact was not quantified).*
- *The previous points highlight a few aspects. Firstly, the Waterval Mine team possess great amounts of tacit knowledge that may be leveraged in order to achieve a smoother and more efficient CAS or CMS implementation. Secondly, the financial feasibility and technical requirements for such a system should be investigated on an individual, per operation, basis.*
- *It should be noted that other technical documents, written up by Waterval East and by the suppliers (Nerospec, EiQ, LSC), are available for additional and substantiating information on top of the content within this report. Furthermore, if additional information is required, direct engagements with the PVDS project team would yield valuable insights.*
- *Combining these learnings with official CAS implementation guidelines would allow the creation of a more efficient implementation plan – Something that Waterval Mine in collaboration with its suppliers is currently working on.*

Main key learnings

- *Successful implementation of a technology system that aims to monitor, or that functions by monitoring, the activities and behaviour of people often have difficulty being accepted by the workforce. Successful implementation of a CAS system, like the PVDS, is 80% worker acceptance and change management, and 20% technological development and engineering implementation.*
- *As such, it is crucial to start by identifying factors and approaches that would improve successful end-user adoption – a change management initiative needs to run top-down and in parallel with technology development and implementation.*
- *A system that addresses the majority of TMM related hazards is better than having no system in place – Plan the safety and technical requirements by analysing the user environment of the system to target priority needs.*
- *When referring to EMESRT guidelines, it should be noted that the EMESRT Level 9 is classified as the employment of intervention controls. These intervention controls may be either a forced*
- *(regardless of operator control or interaction) crawl of the TMM or a forced stop. It should be noted then that a forced crawl would allow improved collision management, but not necessarily collision avoidance as a forced stop would. In this regard, the PVDS at Waterval East currently provides L9 collision mitigation (crawl) for vehicle-to-vehicle interactions and L9 collision avoidance (stop within the critical one) for vehicle-to-person interactions.*
- *In developing the PVDS, other spin-off benefits were also realised. Firstly, the neroWEAR makes it possible to monitor brake wear electronically and in real time. This can be implemented on mining equipment irrespective of CMS/CAS initiatives. Secondly, poor or sub-optimal practices may be identified from suppliers and service providers when improved monitoring is implemented. In case of the PVDS brake wear was monitored due to increased cost resulting from the system. As a result, it was found that other system components were not replaced as needed during maintenance which caused uneven brake wear.*

In implementing the PVDS it also came to light that various aspects were not as well defined or in-place as previously thought. Traffic management at Waterval was one such an example. As such, implementing the PVDS led to other benefits as well,

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Published: 20/12/2020	Review period:	Status: Draft	

such as improved traffic management as well as a positive change in employee behaviour where a more considerate, aware and safe approach is now taken toward TMMs. (pages 50-51)

References: