Kumba Iron Ore, Sishen Mine

MULTI DISCIPLINARY TASK TEAM MEETING
24 NOVEMBER 2022

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4.2 CPS Technology – 2022 Overview

CPS Functional Requirements

Clear measurable requirements

Extensive engagements with **limited** number of OEMs and OTMs, specifically MPI and Komatsu, as well as Hexagon.

Some updates to technical documentation

Some local and global recognition for the work done

Some serious criticism

OEM and OTM take up on Functional Requirements

Generally sluggish – Very poor response to Gap reports, with support from mines it is improving, we still don't have a solid industry picture.

Generally limited interest for engagements from OEMs and OTMs with one OEM not willing to engage.

TMM OEMs missing in action – TMM CPS functionality as well as MCI – Nonalignment/passive resistance

- ISO 21815 – 2 2021
- Fail to Safe functionality
- **Operator** override as well as emergency override.
- Tamper proofing
- Log Keeping

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4.2 CPS Technology – 2022 Overview

Test Specification

No appetite for the specification except for Komatsu that showed extensive interest and review comments

Recent observation seems to indicate that there might be a **significant** difference in the team's definition of testing and that of the mines and suppliers

Difference between test and demonstrate

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4.2 CPS Technology – 2022 Overview

Demonstration

Technique used to demonstrate correct operation of the submitted element against operational and observable characteristics **without using physical measurements** (no or minimal instrumentation or test equipment). Demonstration is sometimes called 'field testing'. It generally consists of a set of tests **selected by the supplier** to show that the element response to stimuli is suitable or to show that operators can perform their assigned tasks when using the element. Observations are made and compared with predetermined/expected responses. **Demonstration may be appropriate when requirements or specification are given in statistical terms (e.g. mean time to repair, average power consumption, etc.).**

Test

Technique performed onto the submitted element by which **functional, measurable characteristics**, operability, supportability, or performance capability is **quantitatively verified** when subjected to **controlled conditions** that are real or simulated. Testing often uses **special test equipment or instrumentation** to obtain accurate quantitative data to be analysed.

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4.2 CPS Technology – 2022 Overview

This is a major risk for the mines.
Will escalate for direction

Testing

Proposal for integrated testing rejected
No appetite for independent TRL 4 test except for Afrimat and Seriti, 1 x ISO 21815-2 2021 test.
Proof of compliance to TRL 4 tests not a requirement from mines
Lab scale tests didn't work

Mine infrastructure

GPS coverage

Skills Transfer

Little to no take up.

4.2 CPS Technology – 2022 Overview

To get a whole industry ready for regulatory compliance with a serious technology challenge in such a short time window is a significant challenge
The MOSH project has and will continue to assist in this endeavour
2023 will be even more challenging than 2022

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