CPS Documentation Change Register – 17 November 2022

Refer to the changes registered below between formal Document Revisions

Date	Document Title	Rev	Section/Paragraph before change	Section/Paragraph after change
22 June 2022	**CPS FTPR Specification**	**3**	**Req 7 on page 34: Decelerate TMM to a predefined speed without operator action** S &U: as per TMM OEM specifications S: OEM mean deceleration: 1.5ms^{-2} to safe speed or as per TMM OEM requirements U: OEM (SANS 1589-3) mean deceleration: 1,95 ms^{-2} to safe speed 3km/h, or as per TMM OEM requirements prevent runaway during slowdown intervention	**Req 7 on page 34: Decelerate TMM to a predefined speed without operator action** S&U: as per TMM OEM specifications ISO/TS 21815-2:2021 makes provision for four interventions in the CxD>>MachineCommand message to slow and/or stop the TMM. The interventions are described in Table 25 of ISO/TS 21815-2:2021. The OEM must provide information to the CxD supplier that specifies the deceleration and machine delay expected for each of these interventions. The deceleration and machine delays shall be determined under controlled conditions as specified in ISO 3450:2011 (for surface machines) and in SANS 1589-1:2022 (for underground machines). The CxD developer should be cognisant of the conditions under which these delays and decelerations are applicable and should make the necessary adjustments should machine braking performance depart from the specifications due to factors beyond

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				the TMM OEM's control (such as a decline road, overloaded machine, slippery road surface, etc.).
22 June 2022	**CPS FTPR Specification**	**3**	**Req 14.2 on page 36: Record continuously** Record functions continuously at 1Hz. S&U: Save data	**Req 14.2 on page 36: Record continuously** TMM to record and save information sent & received via MI at 1 Hz for 30s prior to an auto slow and stop incident for accident investigation purposes. S&U: Save data
22 June 2022	**CPS FTPR Specification**	**3**	**Req 14.7 on page 37: Log keeping must be done on multiple independent storage devices** S & U at least 2 fully independent storage devices used to record and store data (RAID)	**Req 14.7 on page 37: Log keeping must be done on multiple independent storage devices** S &U: at least 2 fully independent storage devices used to record and store data (for e.g. RAID or similar backup and data storage redundancy)
30 July 2022	**CPS FTPR Specification**	3	**Req 4.32 on page22 Intersections require priority TMMs not to slowdown and stop** S only: retain specific following distance.	**Req 4.32 on page22 Intersections require priority TMMs not to slowdown and stop** S only: TMMs prioritized according to mine traffic management plan
30 July 2022	**CPS FTPR Specification**	3	**Req 23.4.37 page 23 Enable queuing of TMMs (e.g. waiting at dump/pit/hard park) and prevent overtaking (jumping the queue)** S only: queuing in specific operational processes only. CxDC does not allow overtaking in queue specific following distances ensured	**Req 23.4.37 page 23 Enable queuing of TMMs (e.g. waiting at dump/pit/hard park) and prevent overtaking (jumping the queue** S only: queuing in specific operational processes only CxDC does not allow overtaking in queue

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			speed restriction upheld	specific following distances ensured speed restriction upheld in case of breakdown in queue, mine standard operating procedure followed to allow passing of breakdown
30 July 2022	**CPS FTPR Specification**	3	**Req 4.3.9 on page 23 Prevent collisions in hard park** S only: prevent collisions in hard park ensure minimum following distance based on Hard park speed limit ensure hard park speed limit priority TMM entrance and departure	**Req 4.3.9 on page 23 Prevent collisions in hard park** S only: prevent collisions in hard park ensure minimum following distance based on Hard park speed limit ensure hard park speed limit orderly TMM entrance and departure
21 September 2022	**CPS URS**	4	Surface interaction scenario S5 on page 42	• The CPS must prevent potential collisions by ensuring that intersections can be zoned for priority directions. At a T intersection the CPS will give priority to any TMM on the " main" road and ensure that the TMM that stopped can only start moving when there is no TMM on the main road close enough that the TMM that will be turning will require the TMM on the main road to reduce speed. • The CPS must provide correct functioning despite the presence of berms as per the mines Traffic Management Plan. • The CPS must provide for HME berms and LDV berms as well as intersection berms

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				• The CPS must ensure that TMMs approaching the T intersection slow down and stop if the operator does not adhere to the traffic rules (Slowdown and stop)
21 Sep. 22	**CPS URS**	4	Surface interaction scenarios S8 page 44	• The CPS shall prevent TMM collisions when faster moving TMMs must pass a slower moving TMM on the haul road. • The CPS shall prevent specific types of TMMs to pass other slow moving TMMs eg. FEL passing Grader The CPS shall provide for passing bays where the passing TMM can pass a slow moving TMM, eg. FEL passing Grader •
21 Sep. 22	**CPS URS**	4	Surface interaction scenarios S9 page 45	• The CPS shall prevent potential collisions between TMMs when a TMM has broken down on a road. • The CPS shall give all TMM operators within the vicinity of the broken down TMM an effective warning to deal with the breakdown.
21 Sep. 22	**CPS URS**	4	Definitions and abbreviations	• High Precision Global Navigation Satellite System, capable of measuring position - this is a different from a Standard Precision Global Navigation Satellite System, because it relies on augmentation (either through a terrestrial base station or through satellite-based augmentation) to improve its absolute accuracy. Typically, such a system can achieve cm-level absolute accuracy.
17 November 2022	**CPS FTPR Specification**	4	Req 1 on page 31: CxD and TMM logs must be synchronised with a Universal Time Frame S&U:	Req 1 on page 31: CxD and TMM logs must be synchronised with a Universal Time Frame S&U:

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			UTC + 2h synchronised every hour	UTC + 2h synchronised every hour Less than 100ms discrepancy between time stamps of CxD and TMM logs
17 November 2022	**CPS FTPR Specification**	4	Req 14.1 on page 31: CxD and TMM logs must be synchronised with a Universal Time Frame S&U: UTC + 2h synchronised every hour	Req 14.1 on page 31: CxD and TMM logs must be synchronised with a Universal Time Frame S&U: UTC + 2h synchronised every hour Less than 100ms discrepancy between time stamps of CxD and TMM logs
17 November 2022	**CPS FTPR Specification**	4	Req 14.14 on page 38: Relevant data for every emergency override must be recorded S&U: TMM ID Operator ID date and Time Authorised overrider unique ID duration of override	Req 14.14 on page 38: Relevant data for every emergency override must be recorded S&U: date and Time duration of override
17 November 2022	**CPS FTPR Specification**	4	Req 11 on page 36: Safe Park TMM after auto slow down and stop	Req 11 on page 36: Safe Park TMM after auto slow down and stop

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			S&U: auto engage and lock park brake after execution of CxD or MC initiated auto slow down and stop.	S&U: auto engage and lock park brake OR propel inhibit and service brake after execution of CxD or MC initiated auto slow down and stop.