



<div>  <div> <b>CAS Project</b>  <b>TMM hazard rating and risk assessment</b>  <b>Data and limitations statement</b> </div>  </div>		
Item #	Item	Description
1	Date	All data included in this Hazard rating and risk assessment is based on data available to TerreSaver on 20 October 2024.
2	Incidents	As of the above date, no BRMO incident data had been received from BRMO.
3	TMM L7, L8 & L9 list	The CAS level rating list was compiled by BRMO (based on the BRMO risk assessment methodology) in 2019 and approved by the CAS Project Steerco #2 on 20 February 2020. (see Steerco #2 extract to the right)
4	Visibility diagrams	Visibility risk is determined from "practical experience" and visibility diagrams. Visibility diagrams available as of the above date are included under the TMM type in the relevant worksheets within this document. No other visibility diagrams appear to be available within the BRMO archives.
5	Procedures	Scaler has 13 related procedures. For a proper risk assessment to be conducted all mine procedures related to TMM operations must be analysed. It is assumed that some 200 procedures would have to be reviewed and this has not been done due to time constraints.
6	Human discretionary decision making	The hazard and risk assessment rating excludes any discretionary decision making made by operators, pedestrians, supervisors or mine management.
7	Enforcement	The hazard and risk assessment rating excludes any mine leadership enforcement of procedural discipline and the effectiveness thereof.
8	Observation	The hazard and risk assessment rating excludes any long term observation of actual operations of each TMM type and the operations that it performs.

## CAS - Background & Context

Steerco meeting #2 - 20<sup>th</sup> Feb 2020

### Compliance with Mine Health & Safety Act (MHSA)

....."where there is a significant risk" of such collisions trackless mobile equipment must be provided with means to automatically detect the presence of pedestrians / equipment to effectively warn the operator and the pedestrian of such a presence.

- "Proximity Awareness" - should already be implemented (2015)

....."where there is a significant risk" of such collisions and no action is taken to prevent a potential collision, further means shall be provided to retard the machine to a safe speed, where after the brakes of the machine are automatically applied.

- "Collision Avoidance" - period of grace:
  1. Electrical/Battery Powered Equipment - no period of grace
  2. New Diesel Equipment - end Collision Avoidance Ready - July 2019
  3. Underground Diesel - end 2020 reg. 8.10.2.1 (B)
  4. Opencast and Open PEs - end 2020 reg. 8.10.2.1 (B)
  5. Surface - end 2020



TMM	Pedestrian Interaction	Vehicle Interaction
Drills	Level 9	Level 7
Roadrollers	Level 9	Level 7
LHDs	Level 9	Level 9 (Crawl)
Dumptrucks	Level 9	Level 9 (Crawl)
Scaler	Level 9	Level 9 (Crawl)
Grader	Level 9	Level 9 (Crawl)
Dozers	Level 9	Level 9 (Crawl)
Bulldozers	Level 9	Level 9 (Crawl)
Manitoux	Level 9	Level 9 (Crawl)
LDO's	Level 9	Level 7
UV's	Level 9	Level 9 (Crawl)
Photo land cruiser-LDV	Level 7	Level 7
Emergency vehicles - Ambulance land cruiser	none	none



- Traffic flow analysis
- Activity analysis
- Mine layout
- Traffic management planning
- Event analysis and improvement

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## BRMO CAS implementation Project - TMM type fitment

27<sup>th</sup> October 2022

**TerreSaver**

Two TMM types that require return to OEM for CAS upgrade:

- **Manitou** – three models to be returned to factory (14 weeks) – after each model has been upgraded then the remaining models can be upgraded on site.
  - **Aard** – three models must be returned to factory (3 months) for upgrade – cannot be upgraded on site.
- **Note:** the above does not include TMMs that after inspection reveal that they are in a poor operational state and need to be brought back to OEM specification prior to upgrade.

