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SECTION A: TRANSPORT

1 AIM

To eliminate or minimise the risk of fatalities, injuries and incidents arising from the use of transport equipment underground.

2 APPLICATION

This Standard applies to all underground transport equipment, including rubber tyre mounted and rail mounted equipment designed specifically for underground use. Examples of underground transport equipment covered by this Standard include rail bound locomotives, load haul dump machines, personnel transporters, multi-purpose vehicles, graders and all transport machinery with a machine-mounted operator.

NOTE: Where vehicles/equipment would be required for both underground and surface work, the most stringent control would apply as stipulated in either the Light Vehicles or the Underground Equipment Standard.

Where underground transport machinery falls outside those mentioned above, a risk-based approach should be used to determine the level of compliance needed for each of the specific requirements of this Standard. Examples of underground transport machinery excluded from this Standard include crawler mounted development loaders, continuous miners and face production equipment without a machine- mounted operator.

This Standard applies to all Anglo American Group managed businesses and operations, including contractors and visitors when involved in controlled activities.

3 REASON FOR INCLUSION

Underground transport equipment is a core risk for underground operations. Several fatalities and high-potential incidents have occurred involving underground transport equipment. The causes of and factors contributing to these incidents have been:

- interactions between equipment/equipment and equipment/pedestrians (e.g. passing or working close by)
- speeding
- non-adherence to operating procedures
- falling objects
- unplanned/inadvertent movements of equipment down inclines and slopes
- operator error due to fatigue or substance abuse
- failure of braking systems
- poor visibility and noise
- poor/faulty trackwork and road conditions
- overturning, overbalancing.

4 REQUIREMENTS

Application of the Anglo Fatal Risk Standards is mandatory at all Anglo American managed businesses and operations. This mandatory nature is indicated by the use of the word “shall” within the Standards.

In some places, the word “should” is used. This means that the primary intent remains, but specific circumstances may mean that implementation of the requirements is not reasonably practicable.

Any deviation from the specifications set forth in these Standards should be formally approved following an exemption procedure.

The exemption procedure comprises the following steps:

1. Documented and detailed description of the implementation difficulties,
2. Documented and detailed risk assessment of the situation under proposed alternative control measures,
3. Documented formal approval from the Divisional Head of Safety and the Divisional Chief Executive Officer that the level of risk as a result of the alternative control measures is understood, tolerable for the organisation and in line with the Anglo American Group vision of Zero Harm.

5 PLANT AND EQUIPMENT REQUIREMENTS

1. Underground transport equipment shall have the following minimum safety requirements unless otherwise stated as “should”:
   - should have falling object protection system (e.g. canopy or cab structure) as determined through the risk assessment process
   - automatic reversing alarm for non-track and track-bound machinery, except for bi-directional machines, which shall be fitted with an automatic system to indicate direction of travel (e.g. alternating light system)
   - flashing light/s mounted on personnel transport equipment and underground light vehicles
   - should have seat belts and/or passenger restraints
   - fail-to-safe brakes (excluding underground light vehicles with emergency brakes) and train brake systems, the design of which shall be based on risk assessments that consider runaway trains, decoupling, etc.
   - a combined automatic and manual fire suppression system, in addition to a portable fire extinguisher (with the exception of electrically-operated equipment, for which a risk-based approach shall be used)
   - restricted area and/or pinch point access controls or guarding where practicable (e.g. articulation locks for all articulated equipment, coupling devices for trains, with the locking mechanism able to be applied from a position of safety)
   - equipment should be fitted with a speed limiting device (the specific design requirements for this system should be determined using a risk assessment)

- appropriately specified collision-avoidance technology and/or procedures
- security systems to prevent unauthorised operation.

2. Design, selection, maintenance and operation criteria shall be in place for all remote controlled equipment.

3. Design and maintenance requirements shall be in place for all transport roadways and railways. Requirements shall include, but not be limited to, the following:
   - safe operating width, height, inclination, gradient, surface
   - regular measurement of track gauge and super-elevation, and rail head wear
   - demarcation of changed/special conditions
   - traffic flow and control
   - signage
   - shaft station and intersection stopping devices.

4. Risk assessments shall be undertaken as part of the design (due consideration to ergonomics), selection, commissioning, operation, modification and maintenance processes for all underground transport equipment.

5. Design, selection, maintenance and operation criteria shall be in place for all trailers (e.g. interactive braking systems). Where towing is to be considered, a risk assessment process shall be followed to ensure safe operation.

6. Underground transport equipment should be fitted with prime power isolation mechanisms.

7. Fail-to-safe equipment control systems (e.g. battery locomotive controllers) shall be in place.

8. Underground transport equipment should be fitted with roadway and haulage illumination capabilities.

6 SYSTEM AND PROCEDURAL REQUIREMENTS

9. A formal selection and acceptance process in accordance with these Standards shall be in place for all new (to site) and modified underground transport equipment prior to commencement of work on site.

10. A procedure shall be in place to address right of way between equipment and pedestrians.

11. A procedure shall be in place to ensure that no person rides illegally on any transport equipment.

12. A procedure shall be in place to ensure safe shunting for rail bound equipment.

13. All people underground shall wear full personal protective equipment and effective reflective clothing.

14. Parking rules shall be in place including, but not limited to, the following:
    - engine should be shut down before the operator leaves the machine, except where safe operating procedures are authorised by the most senior manager of the operation, supported by documented risk assessment (e.g. changing from manual to remote operation)
    - parking brakes shall be applied
    - wheels should be turned into the rib/wall or chocked, and positioned as close as possible to the rib/wall
    - all lifting and elevating attachments should be lowered or secured in the parked position when not in use and all stored energy should be released as per OEM recommendations.

15. A system shall be in place to identify the maintenance and inspection requirements for underground transport equipment. The system shall ensure that records are kept of all maintenance and inspection.

16. A process shall be in place for pre-use and operational checks, including appropriate brake tests (e.g. brake tests on a ramp) to define clearly that transport equipment is safe to operate.

17. Controls shall be in place to ensure the safety of people working in roadways and railways, including work in and around unexpected breakdowns. The controls shall include requirements for unattended broken-down equipment. The risk to employees and/or contractors shall be addressed specifically.

18. A system shall be in place to ensure compatibility between transport equipment, route, road and work area, load, traffic congestion and environmental conditions. The system shall cater for changes to any of the above or changes to a combination of any of the above.

19. A system shall be in place to ensure that transport equipment is controlled with the principle of NO operation when the driver/operator is not in full control of the machine (either directly or remotely).

7 PEOPLE REQUIREMENTS

20. All employees, contractors and visitors shall be inducted in appropriate road safety and site equipment/vehicle hazards.

21. A permit or certification system shall be in place to ensure drivers are competent to operate the type and class of underground transport equipment in its intended environment.

22. A system shall be in place to ensure that drivers receive adequate training to ensure that the equipment intended to be operated or driven can be operated or driven safely. As a minimum, training should include:
    - behaviour-based defensive driving principles
    - equipment familiarisation, taking into account the handling dynamics, maximum number of passengers, load limits and various features

- loading and restraining principles where the equipment intended to be operated is designed for carrying cargo loads
- education and awareness of driving and travel risks that may be encountered within the environment where the equipment may be operated or driven and the requirement of keeping to traffic rules and speed limits
- securing (locking) equipment to prevent unauthorised use
- emergency crash and breakdown procedures
- basic mechanical principles including tyre changing and how to perform an adequate pre-operation check
- Pre-use equipment check, including brake testing.

23. A system shall be in place to ensure any person operating any equipment (e.g. vehicle-mounted cranes and winches) is suitably trained and accredited.

24. Behaviour-based observations shall include the operation and maintenance of underground transport equipment. Any need for additional specific retraining shall incorporate the results of these observations.

25. A fit-for-work policy shall be in place, incorporating the clearly defined maximum levels of drugs (including prescribed medication) and alcohol allowed in the system of drivers/operators.

26. A system shall be in place to manage driver fatigue.

SECTION B: SCRAPER WINCHES AND ATTACHMENTS

1 AIM

To eliminate or minimise the risk of fatalities, injuries and incidents arising from the use of scraper winch systems underground.

2 APPLICATION

This Standard applies to the use of all underground scraper winches, specifically 22kW, 37kW, 55kW and 75kW electrically-powered winches.

Where the design of the scraper winch falls outside those mentioned above, a risk-based approach shall be used to determine the level of compliance needed for each of the specific requirements of this Standard. Examples of such winches include hydraulically-powered winches.

This Standard applies to all Anglo American Group managed businesses and operations, including contractors and visitors when involved in controlled activities.

3 REASON FOR INCLUSION

Underground scraper winch systems are a core risk for underground cleaning operations. Several fatalities and high-potential incidents have occurred involving these machines. The causes of and factors contributing to these incidents have been:

- personnel, while in the “danger triangle” of a deflecting snatchblock, being struck by scraper rope rigging after a failure of the rigging due to either improper installation, overload or equipment failure
- interactions between personnel and the scraper ropes/scraper in the gulley
- unplanned, inadvertent starting of the winch with personnel in the area
- non-adherence to operating and signalling procedures
- signalling devices inoperative
- inadequate guarding of the winch drum
- operator error due to fatigue and substance abuse
- inadequate operator training
- increased exposure to fall of ground incidents during rigging and scraping operations
- scraper and rope fouling support systems affecting ground control.

4 REQUIREMENTS

Application of the Anglo Fatal Risk Standards is mandatory at all Anglo American managed businesses and operations. This mandatory nature is indicated by the use of the word “shall” within the Standards.

In some places, the word “should” is used. This means that the primary intent remains, but specific circumstances may mean that implementation of the requirements is not reasonably practicable.

Any deviation from the specifications set forth in these Standards should be formally approved following an exemption procedure.

The exemption procedure comprises the following steps:

1. Documented and detailed description of the implementation difficulties
2. Documented and detailed risk assessment of the situation under proposed alternative control measures
3. Documented formal approval from the Divisional Head of Safety and the Divisional Chief Executive Officer that the level of risk as a result of the alternative control measures is understood, tolerable for the organisation and in line with the Anglo American Group vision of Zero Harm.

5 PLANT AND EQUIPMENT REQUIREMENTS

27. Underground scraper winch systems shall have the following minimum safety specifications:
    - effective signalling system to ensure that distinct signals can be given to the winch operator from any point along the path traversed by the scraper shovel
    - means to forewarn persons of the intention to commence operation of any scraper winch
    - selection for compatibility, in terms of mechanical design, of all the components that make up the scraper rigging, including the ropes, chains, eyebolts, bolts, shackles and snatch blocks
    - selection of all rigging components so that they are compatible with the most powerful winch at the operation, thus eliminating the risk of using the wrong components for a particular winch
    - motor overload protection set to below the minimum mechanical strength of the components in the load path
    - means for the isolation and safe lockout of the winch in the absence of an operator
    - means to enable the operator, in the event of an emergency, to isolate the power from any position in the immediate vicinity of the winch
    - guarding of the winch drums and couplings to meet the requirements of the Equipment Safeguarding Standard
    - correct installation of the winch in terms of hold-down bolts, alignment, elevation, foundations, etc.
    - appropriate warning signage
    - portable fire extinguisher.

28. Risk assessments shall be undertaken as part of the design, selection, transportation, commissioning, operation, modification and maintenance processes for all underground scraper winch systems.

6 SYSTEM AND PROCEDURAL REQUIREMENTS

29. A formal selection and acceptance process in accordance with these Standards shall be in place for all new (to site) and modified scraper winch equipment prior to commencement of work on site.

30. A periodic review of the scraper rigging standard shall take place to ensure that the standard remains effective/applicable for changing rock conditions, mining layouts and winch sizes.

31. The operating procedure shall have specifications to address, but not be limited to, the following:

- safe transportation of scraper winches to and between operating areas
- scraper winch installation parameters and operating procedures, including the use of the signalling system
- pre-use and operational checks to define clearly that the scraper equipment is safe to operate
- inspection, by a competent person, of all scraper rigging installations to ensure that they comply with this Standard prior to commencement of scraping operations
- safety procedures for persons to cross the pathway of a scraper
- controls to ensure the safety of people working in the vicinity of the scraper winch installation and scraping path.

32. A system shall be in place to identify the maintenance and inspection requirements for underground scraper winches. Records shall be kept of such maintenance and inspections.

33. There shall be a procedure to discharge any stored energy in hydraulic winch installations.

7 PEOPLE REQUIREMENTS

34. A competency-based training system shall be in place for the installation, operation and maintenance of underground scraper winch systems.

35. Key behaviours shall be identified and defined for the safe performance of all activities associated with scraper winch systems.

36. A fit-for-work policy shall be in place, incorporating the clearly- defined maximum levels of drugs (including prescribed medication) and alcohol allowed in the system of operators, and a system shall be in place for fatigue management.

37. Behaviour-based observations shall include the operation and maintenance of underground scraper winches. Any need for additional specific retraining shall incorporate the results of these observations.

38. The formal selection and acceptance process for all new (to site) and modified scraper winch equipment shall consider ergonomic requirements.

APPENDIX A: RECORD OF AMENDMENTS

Issue 1 : New document (L.Menéndez Version 1, December 2007).

Issue 2 : Updated document (L.Menéndez Version 2, May 2008).