

**DEPARTMENT OF MINERALS AND ENERGY**  
*Minerals and Energy for Development and Prosperity*

**MINE HEALTH AND SAFETY INSPECTORATE**



**GUIDELINE FOR THE COMPILATION OF A  
MANDATORY CODE OF PRACTICE**

**ON**

**TRACKLESS MOBILE MACHINERY**

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Chief Inspector of Mines

**DATE FIRST ISSUED:**

**EFFECTIVE DATE:**

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## **PART A: THE GUIDELINE**

### **1. FOREWORD**

1.1 The Commission of Inquiry into Safety and Health in the Mining Industry chaired by the Honourable Mr. Justice RN Leon identified haulage and transport accidents as the second largest category of accidents in mines.

1.2 In an initiative to solve this problem, a tripartite sub-committee was established under the auspices of the Mining Regulation Advisory Committee. The task group prepared a report which recommended amongst other items that a guideline for a mandatory COP for TMMs be drafted.

### **2. LEGAL STATUS OF GUIDELINES AND COPs**

2.1 In accordance with section 9(2) of the MHSA an employer must prepare and implement a mandatory COP of practice on any matter affecting the health or safety of employees and other persons who may be directly affected by activities at the mines if the Chief Inspector of Mines requires it. These COPs must comply with any relevant guidelines issued by the Chief Inspector of Mines (section 9(3)).

2.2 Failure by the employer to prepare or implement a COP in compliance with this guideline is a breach of the MHSA. Any contravention of, or failure to comply with, a COP is not, in it self, a breach of the MHSA, except a convention or failure by an employer that also constitutes a failure to implement the COP. Since the DME does not approve COPs, its focus is not to enforce them either. The focus of the DME is to ensure that employers provide healthy and safe working environments at mines, i.e. Focussing on system failure and compliance with the MHSA, rather than enforcing compliance with COP.

- 2.3 The fact that a contravention of, or failure to comply with, a COP is not a breach of the MHSA does not mean that such breaches will have no legal implications. As far as the employer is concerned, there are numerous specific and general obligations on the employer in the MHSA aimed at ensuring the health and safety of all employees and all persons who are not employees but may be directly affected by the activities at the mine. Where any failure to comply with a COP also constitutes a breach of any of the employer's obligations under the MHSA the employer could be liable to an administrative fine for such breach. An inspector could also issue various instructions to the employer and employees in terms of section 54 to protect the health or safety of persons at the mine. Failure by an employer to comply with such an instruction could render the employer liable to an administrative fine.
- 2.4 As far as employees are concerned, section 22 places a number of obligations on employees, including that they must take reasonable care to protect their own health and safety and the health and safety of other persons who may be affected by their conduct. Where a failure by an employee to comply with a COP would also constitute a breach of the employee's duties in terms of section 22 (or a breach of section 84, 86(1) or 88), the employee could be criminally charged for such breach. As is the case with employers, the inspectorate could issue instructions to employees in terms of section 54 and failure to comply with such an instruction constitutes a criminal offence.
- 2.5 Employers should deal with breaches by employees of COPs in terms of the mine's standard instructions and the employer's disciplinary procedures. This is not the responsibility of the State.

### **3 THE OBJECTIVE OF THIS GUIDELINE**

The objective of this guideline is to enable the employer at every mine to compile a COP, which, if properly implemented and complied with, would improve health and safety in connection with the use of TMMs at a mine.

## 4 DEFINITIONS AND ACRONYMS

In this guideline for a COP or any amendment thereof, unless the context otherwise indicates:

“**COP**” means Code of Practice;

“**DME**” means Department of Minerals and Energy;

“**MHSA**” means Mine Health and Safety Act, 1996 (Act No. 29 of 1996);

“**SIMRAC**” means Safety in Mines Research Advisory Committee;

“**TMM**” means any Trackless Mobile Machine, self propelled or otherwise, that is –

- (a) used for the purpose of performing mining, transport or associated operations underground or on surface at a mine ; or
- (b) is mobile by virtue of its movement on wheels, skids, caterpillar tracks, mechanical shoes or any other device fitted to the machine,

but excludes

- any such machine that is railbound;
- scraper winches and scoops, and
- static winches and winding machinery installations and any equipment attached thereto.

## 5 SCOPE

This guideline covers the significant health and safety aspects associated with the design, application, organisational work methods, competency criteria for drivers/operators as well as the provision of personal and protective equipment as it relates to TMMs.

## 6 MEMBERSHIP OF TASK GROUP

6.1 This document was prepared by the Mining Regulation Advisory Committee Task Group on Haulage and Transport.

6.2 The members originally appointed were the following:

Messrs	LJA	Bezuidenhout (Chairperson)	State
	F	Wilmans	- State
	HA	Schaffler	- Employers
	JJ	Lock	- Employers
	TC	Muntingh	- Employers

6.3 The task group proceeded with the following members and alternates who attended until the completion of the guideline for the COP.

Messrs	LJA	Bezuidenhout	- State
	HA	Schaffler	- Employers
	JH	van Dyk	- Employers
	JP	Visser	- Employers
	LC	Botha	- Employers
	DJ	van Niekerk	- Employers
		(from 26/06/1997)	
	TC	Muntingh	- Labour

**PART B: AUTHOR'S GUIDE**

- 1.1 The COP must, where possible, follow the sequence laid out in Part C “Format and Content of the COP.” The pages as well as the chapters and sections must be numbered to facilitate cross-referencing. Wording must be unambiguous and concise.
- 1.2 It should be indicated in the COP and on each annex to the COP whether-
  - 1.2.1 the annex forms part of the guideline and must be complied with or incorporated in the COP or whether aspects thereof must be complied with or incorporated in the COP; or
  - 1.2.2 the annex is merely attached as information for consideration in the preparation of the COP (i.e. compliance is discretionary).
- 1.3 When annexes are used the numbering should be preceded by the letter allocated to that particular annex and the numbering should start at one (1) again. (e.g. 1, 2, 3, ..... A1, A2, A3,...).
- 1.4 Whenever possible illustrations, tables, graphs and the like, should be used to avoid long descriptions and/or explanations.
- 1.5 When reference has been made in the text to publications or reports, references to these sources must be included in the text as footnotes or sidenotes as well as in a separate bibliography.

## **PART C: FORMAT AND CONTENT OF THE MANDATORY COP**

### **1. TITLE PAGE**

The COP should have a title page reflecting at least the following -

- 1.1 name of mine;
- 1.2 the Heading : “Mandatory Code of Practice for the Operation of TMM”;
- 1.3 a statement to the effect that the COP was drawn up in accordance with Guideline DME Reference Number DME 16/3/2/2-A2 issued by the Chief Inspector of Mines;
- 1.4 the mines reference number for the COP;
- 1.5 effective date; and
- 1.6 revision dates.

### **2. TABLE OF CONTENTS**

The COP must have a comprehensive table of contents.

### **3. STATUS OF MANDATORY COP**

Under this heading the COP must contain statements to the effect that -

- 3.1 the mandatory COP was drawn up in accordance with Guideline DME Reference Number DME 16/3/2/2-A2 issued by the Chief Inspector of Mines;
- 3.2 this is a mandatory COP in terms of sections 9(2) and (3) of the MHSA;
- 3.3 **the COP may be used in an accident investigation/inquiry to ascertain compliance and also to establish whether the COP is effective and fit for purpose;**

- 3.4 the COP supersedes all previous relevant COPs; and
- 3.5 all managerial instructions or recommended procedures (Voluntary COPs) and standards on the relevant topics must comply with the COP and must be reviewed to ensure compliance.

#### **4 MEMBERS OF DRAFTING COMMITTEE**

- 4.1 In terms of section 9(4) of the MHSa the **employer must consult with the health and safety committee** on the preparation, implementation or revision of any COP.

This statement says that the health and safety committee must be consulted when drafting a COP. They need not draft COP themselves. They do not have to sign the COP if the manager has alternative means to proof that they have been consulted.

- 4.2 It is recommended that the employers should, after consultation with the employees in terms of the MHSa, appoint a committee responsible for the drafting of the COP.

The committee appointed in terms of 4.2 may be professionals and may include a “vertical slice” of the mine employees.

- 4.3 The members of the drafting committee assisting the employer in drafting the COP should be listed giving their full names, designations, affiliations and experience. This committee should include competent persons sufficient in number effectively to draft the COP.

#### **5 GENERAL INFORMATION**

Relevant information relating to the mine must be stated in this paragraph. The following minimum information must be provided -

- 5.1 a brief description of the mine and its location;
- 5.2 the commodities produced;
- 5.3 the mining methods/mineral excavation processes;
- 5.4 a description of the trackless transport systems, used in or at the mine, listing the types of TMMs and indicating the machine population; and
- 5.5 other relevant COPs.

## **6 TERMS AND DEFINITIONS**

Any word, phrase or term of which the meaning is not absolutely clear or which will have a specific meaning assigned to it in the COP, must be clearly defined. Existing and/or known definitions should be used as far as possible. The drafting committee should avoid jargon and abbreviations that are not in common use or that have not been defined. The definitions section should also include acronyms and technical terms used.

## **7 RISK MANAGEMENT**

- 7.1 Section 11 of the MHSA requires the employer to identify hazards, assess the health and safety risks to which employees may be exposed while they are at work, record the significant hazards identified and risks assessed. The COP must address how the significant risks identified in the risk assessment process must be dealt with, having regard to the requirements of section 11(2) and (3) that, as far as reasonably practicable, attempts should first be made to eliminate the risk, thereafter to control the risk at source, thereafter to minimize the risk and thereafter, insofar as the risk remains, provide personal protective equipment and to institute a programme to monitor the risk.

Paragraph 7.1 calls for risk assessment and to identify significant hazards. Risk assessment must then be done. Significant risks must be identified. The COP must address these significant risks.  
The thought with the topic RISK MANAGEMENT was to inform the mine to consider certain aspects during the HIRA. The result of the HIRA may be

included in the COP. The HIRA document could be a separate document not necessarily included in the COP.

- 7.2 To assist the employer with risk assessment all possible relevant information such as accident statistics, ergonomic studies, research reports, manufacturers specifications, approvals, design criteria and performance figures for all relevant types of TMMs should be obtained and considered. A list of relevant SIMRAC project reports is attached as **ANNEX 1**, which is attached merely for information purposes.

In terms of Section 21(1)(c) the manufacturer has a responsibility for ergonomics. Some equipment however has less than ideal ergonomics. Many reports are available and should be considered by the Employer. Manufacturers should be questioned on what ergonomic standards they apply.

- 7.3 The application and technical specifications of all types of TMMs used at the mine must be available to enable a proper hazard identification and risk assessment to be performed. This information should include items such as, type, make, mass, payload, dimensions, prime mover, power, speed, brakes, turning circles, safety devices, signaling arrangements. The information for those TMMs associated with significant risks must be kept readily available at the mine.
- 7.4 In addition to the periodic review required by section 11(4) the COP should be reviewed and updated after every serious incident involving TMMs, or if significant changes are introduced to procedures, mining and ventilation layouts, mining methods, plant or equipment and material.

## **8 ASPECTS TO BE ADDRESSED IN THE MANDATORY COP**

The COP must set out how the significant risks assessed and identified in terms of the risk assessment process referred to in paragraph 7.1 above will be addressed. The COP must cover at least the aspects set out below unless there is no significant risk associated with that aspect at the mine.

## 8.1 Safe use of TMMs, equipment and tools

The employer must ensure that a management system is in place that ensures that TMMs as well as accompanying equipment and tools are used within their design capacity.

Machines should be used within their design capacity : e.g.

1. LHD should not be used for raising and lowering of persons.
2. A five ton truck should not be used to transport ten ton.

## 8.2 Brakes

8.2.1 The design and provision of an effective service brake system in the manner in which the TMM will be operated requires the use of service brakes for safe operation.

The use of brakes may not be necessary depending on conditions: e.g.

1. Hydrostatic drill rig on level surface
2. Lawnmowers, wheelbarrows, trailers may not need brakes.
3. Vacuum assisted systems may present a problem if the engine cuts.

8.2.2 The design and provision of parking brakes to keep TMMs stationary and prevent inadvertent movement of the TMM, in the manner in which the TMM will be operated requires the use of parking brakes for safe operation.

Park brakes may be necessary for a trailer unless other devices are provided to keep it stationary in terms of 8.4.

8.2.3 The design and provision of emergency brakes capable of stopping a TMM and to prevent the TMM from running out of control, in the manner in which the TMM will be operated requires the use of emergency brakes for safe operation.

In the regulations before 1991 emergency brakes had to be fitted to machines operating on inclines more than 10°. Maintenance was prescribed.

Machines used on an incline should have emergency brakes where it can be foreseen that the machine could run out of control if the service brake system fails. This can be calculated by using the angle and length of the incline and the rolling friction of a machine. A maximum velocity can be established also refer to 8.13 and 8.14.

8.2.4 When the brakes mentioned in 8.2.2 and 8.2.3 consist of one braking system, such braking system must comply with the requirements of both systems.

8.2.5 When the functions of the brakes mentioned in 8.2.1, 8.2.2 and 8.2.3 are combined, the design and provision of the braking system must be such that it complies with the requirement for the separate systems and that a fail-safe-principle has been employed.

The definition of “fail-safe” presents a problem. Systems with air accumulators, air over hydraulic and its various variants should be considered. Effectively the system must not fail. If the emergency system applies to one axle only it may not be effective if calculations considering the center of gravity of the machine are done for various angles of incline.

8.2.6 The use and testing of brakes and braking systems to ensure efficacy in terms of brake design specifications.

Descriptions of the brakes, park brakes and emergency brakes should be included. The brake test procedures must be described. Tables should be used. Some of the tables are to be found in the American Federal Regulations, EN, SABS, ISO and SAE standards. Accumulator systems should be tested for number of applications and hold time.

For all of the above National, International or SAE standards can be adopted depending on the way the machine will be used.

### 8.3 Protection of the operator, driver and other persons

- 8.3.1 Protection of driver/operator or other persons on TMMs from objects falling on them.

HIRA should establish whether necessary and to what standard. The USA standard for mobile roof bolting machines is 10 ton vertical and 2 ton horizontal loads.

- 8.3.2 Protection of persons in or on or in close proximity of the TMM should the TMM roll over.

If roll over protection is provided seatbelts must be worn.

Standards are available for roll over protection structures (ROPS). Note that persons in the vicinity must also be protected.

### 8.4 Inadvertent movement of the TMM

The devices and procedures to be used by the driver/operator not to leave a TMM unattended until it is secured to prevent it from -

- 8.4.1 inadvertently moving;

Examples may be the selection of neutral and applying the brake. The components of machines and articulated vehicles should be considered. If a hazard exist where a person may be injured in the articulating point of a machine it must be addressed. Components that may move inadvertently must be addressed.

8.4.2 inadvertently running out of control; or

Machines may be prevented from running out of control by using chocks, turning the steering towards the sidewall, application of park brake etc.

8.4.3 being set in motion by an unauthorised person.

Provision of lockout device and the procedure as to how to use it.

### **8.5 Safe boarding/alighting and /or access to/exit from TMMs**

The design of equipment and procedures to provide for the safe boarding onto, alighting from, riding on or working on top of TMMs.

Items to be considered are steps, handles, grids etc.

### **8.6 Design and operation of tow-bars and coupling devices**

8.6.1 The design of effective tow-bars and coupling devices.

Drawings and calculations must be available. The size of pins and holes should be considered.

8.6.2 The methods and procedures to be used for the safe coupling, towing/pushing and de-coupling of TMMs.

Critical items are communication and removing man from between the machines.

8.6.3 The methods and procedures to prevent inadvertent de-coupling of TMMs being towed or pushed.

Drop nose pins and ball and claw arrangements should be considered.

- 8.6.4 The ratio of the mass of the towing vehicle in relation to the mass of the towed vehicle as well as the combined braking power of both to ensure the two machines can be stopped timeously without causing significant risk to persons.

Some inspectors wanted us to prescribe a 60% to 40% tow vehicle to trailer ratio. If we consider calculations on center of gravity etc. it might not be acceptable. The ratio has to be calculated. The road surface friction efficient should be considered.

## 8.7 Lights fitted to TMMs

- 8.7.1 Light intensity, type, numbers, size, spread and range of light beam.

Area lighting would be preferable on face machines like continuous miners, face drills and roof-bolters. Ten lux on the sidewalls should be adequate (American regulation).

Haulers, dump-trucks, load haul dumpers etc lights should consider stopping distance and speed. One second should be allowed for reaction time of operator plus at least 1,5 times the stopping distance. A light intensity of 10 lux at that distance should be adequate. Narrow beam lights should be avoided. Illumination of sides of the machine may be necessary. The COP must describe the light intensity and the distances at which it should be achieved.

- 8.7.2 The distinction between front, rear and side lights including colour coding.

Reflectors on the side of vehicles could indicate the direction of travel. (Example: The American road ordinance requires a orange reflector on the front and a red reflector on the back fitted to the side of a vehicle.)

- 8.7.3 Positioning of lights to indicate width of the TMM.

- 8.7.4 Installation and adjustment of lights.
- 8.7.5 The use of reflectors.
- 8.7.6 Glare, reflection and diffusion of lights.
- 8.7.7 Procedure in case of a luminaire or lamp failure.
- 8.7.8 Cleaning and maintenance of lights or lamps.
- 8.7.9 The use of adjustable lights to illuminate places critical to safe operations.
- 8.7.10 Measurements and inspection of lighting equipment.

## **8.8 Physical constraints to operator/driver's vision**

The constraints to the operator's/driver's vision from the driving position for different TMMs and different conditions must be identified and noted on area plans to be included as annexes to the COP. An example of such an area plan is attached as **ANNEX 2**, which is attached merely for information purposes.

## **8.9 Remote controlled TMMs**

Stipulate the conditions under which remote controlled TMMs may be used, including -

Australia has excellent standards for both the design and use of remote controlled machines and the controller. These can be adopted.
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- 8.9.1 identification of remote controllers and allocation to specific TMMs;
- 8.9.2 ensurance that only one remote controller per TMM is in use;
- 8.9.3 secure storage of remote controllers not in use;
- 8.9.4 warning signs indicating the use of remote controlled TMMs;
- 8.9.5 use of a TMM only within the operator's sight including sight via a camera and video screen;
- 8.9.6 safe operator position; and
- 8.9.7 change over from remote to manual control.

## **8.10 Maintenance**

- 8.10.1 Scheduling of maintenance, inspections and over inspections.
- 8.10.2 The use of pre-use checklists to identify components critical for the safe operation of the type of TMM and keeping of such checklists for at least 3 months.
- 8.10.3 The conditions under which TMMs should not be used eg. "Go", "Go but" or "No Go" options.
- 8.10.4 Procedures for changing wheels.

Foam filled tyres need special consideration due to it's weight. Removal of wheel clamps may be hazardous and deflating of the wheel before removal could be considered.
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- 8.10.5 Procedures for changing, inflating and repairing of tyres.

- 8.10.6 Procedures for any repairs that could endanger persons. To ensure safe maintenance, manufacturer's repair manuals should be consulted.
- 8.10.7 The adequate support of a TMM or any of its components which may inadvertently fall on persons.
- 8.10.8 Battery changing procedures on battery powered TMMs.
- 8.10.9 Control and safety systems to be maintained for battery charging bays.

At least the following should be maintained:

1. Clean impervious floor.
2. Minimise acid spillage.
3. Minimum 0,5 m/s ventilation.
4. Description of ventilation system to ensure contaminated air does not affect other working sections.
5. Provision of water and hosepipe.
6. Provision of emergency shower.
7. Provision of appropriate first aid equipment.
8. Fire precautions and drills.
9. Use of non-flammable materials.

- 8.10.10 Other aspects such as rigging, welding, exposure to toxic liquids or fumes, dust, fire fighting, fuel handling, roadways, emergency preparedness and the use of hazardous substances associated with operation and maintenance, must be addressed unless covered in another COP.
- 8.10.11 Appropriate measures to ensure maintenance work in workshops; workbays or any controlled environment in the field or at the face can be undertaken safely.

## **8.11 Health and safety devices on TMMs**

8.11.1 The COP must specify and describe the health and safety devices applicable to each type of TMM covered in the COP if not yet addressed elsewhere. These may be included in the annexes.

8.11.2 The health and safety standards to be addressed must at least include -

8.11.2.1 safety systems to negate unexpected incapacitation of the operator/driver;

If required in terms of HIRA

8.11.2.2 vibration control devices;

Seats with suspension and padding.

8.11.2.3 design, control and maintenance of noise control systems to which the operator/driver and the immediate environment are exposed; and

In terms of Section 11 of the MHSA the risk must first be eliminated, then controlled, then minimized and then personal protective equipment must be provided.

8.11.2.4 provision of effective equipment to warn persons working or travelling in close proximity to the TMM when the vision of the operator/driver is restricted in any direction of travel e.g. audible alarm or hooter or clearly visible flashing light.

## 8.12 TMMs to be operated/driven by competent authorised persons

8.12.1 Procedures and criteria to recruit/select, educate, train and appoint competent persons to operate or drive TMMs.

Selection of operators should include : co-ordination, reaction time, attention span eyesight, angle of vision, night of colour blindness, depth perception, hearing, aggressiveness, reaction during emergency and anthropometrics.

- 8.12.2 Awareness education and training, in terms of the interaction with TMMs, of persons working or travelling in close proximity to the TMM, in compliance with section 10(3) of the MHSA.
- 8.12.3 Keeping of records relating to training of operators of TMMs.
- 8.12.4 Procedures for the written appointment/licensing of competent persons to operate/drive TMMs under prevailing site-specific conditions.
- 8.12.5 Record of written acknowledgement and acceptance of appointment and authorization to drive /to operate a specific type of TMM.
- 8.12.6 A system that will ensure that TMMs are only operated/driven by competent, authorized persons.

### **8.13 Design of excavations and roadways**

- 8.13.1 The design and layout of mining excavations and specifically roadways considering pertinent aspects such as calculations relating to power, brakes, deceleration, holding, skidding, surface friction, incline angle and numbers of persons potentially exposed to the associated significant risks.
- 8.13.2 Safe height, width and turning circle clearances.

Minimum clearances must be specified. (In terms of the ILO convention the employer must specify the minimum safe clearances between the sidewalls, hanging wall and the machine or its load.)
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- 8.13.3 Identification and marking of dangerous areas, obstructions, or restricted clearance.

### **8.14 Inclines**

- 8.14.1 The devices and procedures to be used to render safe the TMMs used on any incline.

To ensure a machine is safe to negotiate an incline certain tests may be required, e.g. brake ramp, steering, stopping the engine, ensuring engine is not overheated, selection of lowest gear, driving for example with bucket downhill so as to use it to stop machine. etc.

8.14.2 The devices and procedures to be used to render safe any incline where TMMs are used.

For example:

- a. Entering incline around a corner or “chicane.”
- b. Brake test ramps – (effectiveness to be ensured)
- c. Robot systems.
- d. Shelters for persons considering calculated speed.
- e. Signs indicating stop, selection of first gear, one vehicle at a time, no-pedestrians. etc.
- f. Run – off areas. (Barriers may be dangerous. Tyres from a barrier constructed of tyres could enter the operator’s cabin and cause injuries.)

## 8.15 Operating rules

It is an ILO requirement to draft “traffic rules”.

8.15.1 Safe start-up, operation, parking and shut-down procedures.

8.15.2 Traffic rules and road signs, including amongst others speed, authority to move, right of way and restricted entry with regard to dangerous areas, obstructions or restricted clearances where persons are exposed to significant risks.

Machines normally have right of way. The operator still has a duty to safety. Restricted entry implies that persons may be prohibited from entering dangerous areas.

8.15.3 General safety rules relating to the interaction between pedestrians, cyclists and TMMs.

Stop and wait in safe position for TMM to pass.

8.15.4 Any other operational procedures, rules and methods related to TMMs affecting the health or safety of persons.

8.15.5 The methods to be used for the safe loading, transport and unloading of persons, equipment, material, minerals or explosives on or from TMMs.

The ILO requires the maximum width and height of material to be described.

## **8.16 Raising/lowering, suspension and transport of persons**

8.16.1 Rules for the use of TMMs for the raising, lowering, transportation or suspension of persons generally and in emergency situations.

E.g. Properly seated, no dangerous materials with persons, speed, etc. for transport. When hoisting hazards are: Over-hoisting, communication, stability, connections, design, safety belts etc.

## **8.17 Illumination of transport environment**

The following factors must be addressed when providing illumination for the general area where transport of persons, material, mineral or explosives takes place by means of TMMs -

8.17.1 positioning and spacing of such lights;

8.17.2 intensity and dispersion of light;

8.17.3 reflectivity of the surrounding area; and

8.17.4 steps to be taken in case of illumination failure.

### **8.18 Visibility of TMMs and persons**

Notwithstanding the fact that road signs and warning devices are addressed in paragraphs 8.15.2 and 8.19, the COP must specifically address -

8.18.1 the placing of signs to warn against the presence of parked, stationary and broken down TMMs that are poorly visible;

Even when machines are not poorly visible the use of signs (triangles) are recommended as it can warn drivers approaching of a machine standing around a corner. The signs can also be placed at distances calculated to be safe considering the speed and stopping distances of TMM's.

8.18.2 measures to ensure the visibility and safety of pedestrians, cyclists or other workers in the proximity of TMMs;

The standards of reflective clothing or alternatives should be describes

8.18.3 timeous warning systems, where employees are required to work in haulages where TMMs are operated/driven, for either the driver/operator or such employees; and

Speed and stopping distance should be considered.

8.18.4 dust control so as not to impair visibility.

We do not intend to take over the task of environmental management personnel, only to ensure visibility.

## **8.19 Warning devices and signals**

8.19.1 Notwithstanding the fact that warning devices may form part of the safety devices described in terms of paragraphs 8.11 and 8.18 the COP must address-

8.19.1.1 the types of warning devices or signals, such as pre-start or tramming devices, which may be required after an assessment of the noise, visibility or other significant risks; and

8.19.1.2 visual or audible signals including the codes for the signals used for communication.

## **8.20 Personal protective equipment**

The issue, use and control of personal protective equipment pertaining to TMMs.

## **PART D: IMPLEMENTATION**

### **1. IMPLEMENTATION PLAN**

- 1.1 The employer must prepare an implementation plan for its COP that makes provision for issues such as organisational structures, responsibilities of functionaries and programmes and schedules for this COP that will enable proper implementation of the COP. (A summary of/and a reference to, a comprehensive implementation plan may be included.)
- 1.2 Information may be graphically represented to facilitate easy interpretation of the data and to highlight trends for the purpose of risk assessment.

### **2. COMPLIANCE WITH THE COP**

The employer must institute measures for monitoring and ensuring compliance with the COP.

### **3. ACCESS TO THE COP AND RELATED DOCUMENTS**

- 3.1 The employer must ensure that a complete COP and related documents are kept readily available at the mine for examination by any affected person.
- 3.2 A registered trade union with members at the mine or where there is no such union, a health and safety representative on the mine, or if there is no health and safety representative, an employee representing the employees on the mine, must be provided with a copy on written request to the manager. A register must be kept of such persons or institutions with copies to facilitate updating of such copies.
- 3.3 The employer must ensure that all employees are fully conversant with those sections of the COP relevant to their respective areas of responsibility.

**ANNEX 1  
REFERENCES  
(FOR INFORMATION ONLY)**

**LIST OF RELEVANT SIMRAC PROJECT REPORTS**

- COL 033      Review of illumination problems pertaining to S.A. collieries.
- COL 203      Engineering and human factors in machinery and transport accidents.  
COL 341 Guidelines for the development of safer use of mobile machines.
- COL 416      The influence of ergonomics of trackless machines on safety and health.
- COL 451      Assessment of illumination and visibility standards in coal mines.
- COL 506      Investigate the causes of transport and tramming accidents on collieries
- GEN 010      Control of diesel exhaust emissions in underground workings.
- GEN 109      Develop remote control systems for mining equipment.
- GEN 420      Methods whereby noise levels of mining equipment may be reduced.
- GEN 501      Investigation of safety and health benefits of stand off controls.
- GEN 503      The measurement of vibration characteristics of mining equipment.
- GEN 603      An ergonomics strategy for the South African mining industry (not finalised yet).
- OTH 202      Transport and tramming accidents on mines other than gold, coal and platinum.
- OTH 308      Influence of road design, construction and practices on transport accidents.

ANNEX 2  
AREA VISIBILITY PLAN  
(FOR INFORMATION ONLY)

