

**CHAPTER 44:02 - MINES, QUARRIES, WORKS AND MACHINERY: SUBSIDIARY
LEGISLATION**

INDEX TO SUBSIDIARY LEGISLATION

Mines, Quarries, Works and Machinery Regulations

MINES, QUARRIES, WORKS AND MACHINERY REGULATIONS

(under section 11)

(1st November, 1978)

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S.I. 127, 1978.

PART I
Citation and Interpretation (regs 1-2)

1. Citation

These Regulations may be cited as the Mines, Quarries, Works and Machinery Regulations.

2. Interpretation

In these Regulations, unless the context otherwise requires—

"abandoned place" means any place in which work has ceased and which is no longer in use;

"active dump" means any dump on which dumping operations are currently proceeding and, if a classified dump, has not been recorded by the Engineer as a closed classified dump;

"agent" means a person having, on behalf of the owner, the care or direction of a mine, quarry or plant or a part thereof;

"air receiver" means—

- (a) any vessel, other than a pipe coil or an accessory, fitting or part of a compressor, for containing compressed air and connected to an air compressing plant;
- (b) any vessel for containing compressed air or compressed exhaust gases and used for the purpose of starting an internal combustion engine;
- (c) any vessel in which any liquid is stored and from which it is forced by compressed air; and
- (d) any fixed or portable vessel not being part of a spraying pistol used for the purpose of spraying by means of compressed air any paint, varnish, lacquer or similar material;

"approved" means approved in writing by the Chief Government Mining Engineer;

"authorized safe working pressure" means, in the case of pressure vessels and steam containers, that pressure specified by an inspector or approved inspecting authority which is entered in the record maintained for such pressure vessels and steam containers;

"auxiliary fan" means any fan temporarily installed in any part of a mine to provide adequate ventilation in that part of the mine;

"banksman" means any person authorized by the manager to be stationed at a shaft bank to supervise the loading and unloading of persons or material at the bank and to give the necessary signals;

"blasting cable" means any cable or conductor used at a mine, quarry or works to supply current from a blasting box or other device for electric blasting;

"booster fan" means any fan installed in a mine to assist a main fan to provide a primary ventilating current in any part of a mine;

"builder's hoist" means an appliance used in connection with building work for raising or lowering material by means of a platform, skip, cage or other receptacle on a fixed guide or guides;

"cage tender" means a person authorized by the manager to be in charge of and supervise the loading and unloading of persons or material at a bank and all stations in use in the shaft

and to give the necessary signals;

"circuit" means an electrical circuit forming a system or branch of a system;

"circuit breaker" means a device for making and breaking an electrical circuit and fitted with some suitable means for automatically breaking the circuit under abnormal conditions;

"classified dump" means a dump of any of the following classes—

- (a) a dump consisting of material accumulated or deposited wholly or mainly in a solid state and not in solution or suspension where—
 - (i) the superficial area of the land covered by the material exceeds 10 000 m² and the height of the dump exceeds 2 m;
 - (ii) the height of the dump exceeds 15 m; or
 - (iii) the average gradient of the land covered by the material exceeds 1 in 12;
- (b) a dump consisting of material accumulated or deposited wholly or mainly in solution or suspension where—
 - (i) the dump is at any point of a greater height than 4 m above the level of any part of the neighbouring land within 50 m of the perimeter of the dump; or
 - (ii) the volume of the dump (including any liquid in it) exceeds 10 000 m³;

Provided that for the purposes of determining whether material has been accumulated or deposited wholly or mainly in a solid state or wholly or mainly in solution or suspension any wall or other structure retaining or confining the dump shall be excluded, but for all other purposes the term "dump" shall include the wall or any other retaining structure;

"closed dump" means any dump on which dumping operations have ceased and, in the case of a classified dump, has been recorded by the Engineer as a closed classified dump;

"colliery" means a fiery or non-fiery coal mine;

"competent person" means a person who, in relation to any duty or function, has had adequate training and experience so as to enable him to perform such duty or function without avoidable danger to himself or to any other person;

"conductor" means an electrical conductor arranged to be electrically connected to a system;

"conveyance", when used in connection with winding plant, means a cage, skip, bucket, bale, kibble, material trailer, counter-weight or any other receptacle or structure attached to or suspended from a winding rope and intended to serve as a means of transport or counter balance;

"covered with insulating material" means adequately covered with insulating material of such quality and thickness that there is no danger of an electrical short circuit or leakage;

"danger" means danger to health or danger to life or limb from shock, burn or other injury to persons, or from fire attendant upon the generation, transformation, distribution or use of electrical energy;

"dangerous occurrence", in relation to a dump, means any occurrence in which any movement of material, fire or any other event indicates that a dump is, or is likely to become, insecure;

"dead" means zero electrical potential and disconnected from any live electrical system;

"diesel engine" means an internal combustion engine powered by fuel oil;

"diesel unit" means any machine, static or mobile, powered by a diesel engine;

"earthed" means connected to the general mass of earth in such manner as will ensure at all times an immediate discharge of electrical energy without danger;

"electrical apparatus" includes electrical cables and conductors and any part of any machinery, apparatus or appliance in which conductors are used, but excludes blasting and signalling apparatus or a telephone;

"electrical power" does not include electricity used in a portable safety lamp, shot-firing apparatus, signalling apparatus or a telephone;

"Engineer" means the Chief Government Mining Engineer;

"excavation work" includes loosening, taking out and removing stone, soil and other material in connection with the making, repairing, re-opening or closing of any trench or similar excavation which is not a working within the meaning of the Act;

"fiery mine" means a mine in which inflammable gas of dangerous limits has been found, or any mine which an inspector has, by notice in writing addressed to the owner of such mine, declared to be subject to the regulations applicable to fiery mines:

Provided that, at any mine in which inflammable gas is only occasionally found, the inspector may in his discretion exempt any ventilating district from all or any of the regulations for fiery mines;

"flexible cable" means any cable or cord which is designed to be movable while in use;

"height", in relation to a dump, means the vertical distance between the horizontal planes passing through the lowest and highest points of the dump;

"holder" means the holder of a prospecting licence or a mining lease;

"inspecting authority" means such insurance company, society, body or individual which

specializes in the examination, inspection, testing or surveying of machinery;

"isolator" means a device suitable for disconnecting a circuit, only where there is no load current;

"ladder scaffold" means a scaffold with a working platform which is supported directly or by means of a crutch or bracket on a rung or rungs of a ladder;

"ladderway" means any shaft, raise or winze in which permanent ladders are installed for the use of any person ascending and descending thereon;

"lifting appliance" means a crab, winch, pulley block or gin wheel used for raising or lowering, and a hoist, crane, sheet legs, excavator, drag line, pile driver, aerial cableway or overhead runway;

"lifting gear" means a chain sling, rope sling, pulley block or similar gear and a ring, link, hook, plate clamp, swivel or eye-bolt;

"live" means electrically charged;

"locked-bell" means a system of bells used for signalling to a winding engine driver, and which cannot be operated unless a special key, to be known as the "key to the locked-bell", remains inserted in the system switch in use at the time;

"main substation" means a substation in which any system voltage exceeds medium voltage;

"man winding" means the conveyance of persons for any purpose by means of a winding plant;

"manager" means the person appointed by the holder to be responsible for the control, management and direction of a mine, quarry or works, in accordance with regulation 6;

"material" means whatever may be conveyed by means of a winding plant, except persons and minerals;

"metallic covering", in relation to any electric cable or conductor, means any metallic covering, armouring, sheath or pipe through which any conductor passes;

"mobile apparatus" means any electrical apparatus which is designed to be moved whilst working, and includes locomotives, cranes, bucket shovels, welding machines and similar apparatus;

"mobile container" means any container mounted on wheels, tracks or skids, whether self-propelled or otherwise, used for the conveyance of fuel oil;

"mobile diesel unit" means any diesel unit mounted on wheels, tracks or skids, whether self-propelled or otherwise;

"onsetter" means a person authorized by the manager to be in charge of and supervise the

loading and unloading of persons or material at any station below the bank where for the time being he is on duty and to give the necessary signals;

"open cast working" means any workings below the original surface of the ground, excluding underground and not including any trench, pit or any other such working;

"person in charge" means the person appointed in accordance with regulation 18;

"portable apparatus" means any electrical apparatus which is designed to be hand-held whilst working, and includes power drills, inspection lamps, testing equipment, welding electrode holders and similar apparatus;

"portable container" means any container which when filled with fuel oil can be easily carried;

"portable fire extinguisher" means an efficient and suitable fire extinguisher of such size and weight that can be readily handled by an individual;

"pressure vessel" means any vessel in the interior or jacket of which a pressure of more than 35 kPa may obtain, but shall not include—

- (a) a boiler;
- (b) a vessel in which the pressure is exerted by a liquid harmless to the vessel, the temperature of which does not exceed the boiling point of the liquid at atmospheric pressure and provided that a cushion of gas or vapour cannot form above the liquid;
- (c) the working cylinder or chamber of a steam, heat or air engine, nor any transmitting column or pipe line;
- (d) a portable gas container;
- (e) a vessel in which the maximum working gauge pressure exceeds 35 kPa but in which the product of the working gauge pressure in kilopascals and the capacity in cubic metres does not exceed 10;

"raise" means every tunnel at any mine at an inclination of more than 10° above the horizontal which is not included under the definition of "ramp" or "shaft";

"ramp" means every excavation at any mine at an inclination of more than 5° above the horizontal in which self-propelled trackless vehicles move;

"re-entry period" means the period of time caused to be fixed by the manager during which no person may enter any place after any primary or secondary blast has occurred;

"scaffold" means any temporary structure on or from which persons perform work in connection with any construction work, and any temporary structure which enables persons to obtain access to or which enables materials to be taken to any place at which such work is performed;

"shaft" means an excavation of limited area compared with its depth, made for finding or mining ore or coal, raising water, ore, rock, or coal, hoisting and lowering men and material, or ventilating underground workings;

"signalling apparatus" means any apparatus or equipment installed to ensure compliance with regulation 400;

"steam container" means any vessel other than a steam pipe or coil constructed with a permanent outlet into the atmosphere or into a space where the pressure is not greater than that of the atmosphere and through which steam is passed at or approximately at or below atmospheric pressure for the purposes of heating, boiling, drying, evaporating or other similar purpose;

"steam receiver" means any vessel or apparatus other than a steam boiler, steam container, steam pipe or coil, or any part of a prime mover used for containing steam under pressure greater than that of the atmosphere;

"steeply inclined", in connection with shafts, raises, winzes or other ground excavation, means an inclination to the horizontal of more than 35°;

"subordinate" means a person under the direction, supervision or control of another person;

"substation" means an assemblage of electrical switchgear including any necessary housing, for the control of electrical power, in which any system voltage does not exceed medium voltage;

"suspended scaffold" means a scaffold suspended by means of ropes or chains which is capable of being lowered or raised by such ropes or chains, but does not include a boatswain's chair or such similar appliance;

"system" means an electrical system in which all the conductors and apparatus are electrically connected to a common course of electromotive force;

"toxic" means any substance in such concentration as is capable of causing injury to or harmful pathological change in any part of a person by absorption or inhalation;

"trackless vehicle" means any vehicle having wheels, tracks or skids, self-propelled or otherwise, which does not run on a track of rails, excluding winding plant;

"trestle scaffold" means a scaffold in which the supports for the platform are stepladders, tripods or similar movable contrivances;

"underground" means all workings beneath the surface of the ground by which access thereto is by means of an adit, raise, shaft or winze, but does not include open cast workings;

"voltage" means a difference of electrical potential between any two conductors, or between a conductor and earth, and is classified as follows—

- (a) "extra high voltage" means a voltage normally exceeding 6600 volts;
- (b) "high voltage" means a voltage normally exceeding 650 volts but not exceeding 6600 volts;
- (c) "medium voltage" means a voltage normally exceeding 250 volts but not exceeding 650 volts;
- (d) "low voltage" means a voltage normally not exceeding 250 volts;

"winze" means every inclined tunnel at any mine at an inclination of more than 5° below the horizontal which is not included under the definition of "ramp" or "shaft";

"working platform" means that part of a scaffold or cradle upon which persons stand or sit for the purpose of work.

PART II

Management and Control (regs 3-11)

3. Duty of holder, owner or agent

It shall be the duty of every holder, owner or agent to make such financial and other provisions, and take such other steps as may be necessary, to ensure—

- (a) that every operating mine, quarry or works is managed and worked in accordance with the provisions of the Act;
- (b) that all other provisions of these Regulations and all requirements imposed thereunder are, so far as applicable to the mine, quarry or works, duly complied with.

4. Notice required by holder, owner or agent

The holder, owner or agent when commencing, recommencing or abandoning work shall give written notice thereof to the Engineer within seven days of such commencing, recommencing or abandoning and at the same time give his address.

5. Approval of manager

(1) The holder, owner or agent shall not appoint any person to be manager of any mine, quarry or works unless such person holds suitable qualifications or has had adequate experience, or both.

(2) Details of such qualifications or experience shall be submitted to the Engineer for written approval prior to appointment.

6. Appointment of manager and additional managers for every operating mine, quarry or works

(1) The holder, owner or agent shall, for each and every operating mine, quarry or works, appoint in writing a manager, who shall at all times be responsible for the control, management

and direction of such mine, quarry or works:

Provided that, where the scale of operations is of such magnitude and complexity that in order to effect proper control of operations it is desirable to appoint one or more additional managers, the holder, owner or agent shall apply in writing to the Engineer, who may at his discretion grant permission and then only if he is satisfied that the responsibilities of each such manager is clearly defined in his respective letter of appointment.

(2) No holder, owner or agent working a mine, quarry or works, on his own account or in partnership with any other person, shall manage such mine, quarry or works except with the prior permission in writing of the Engineer.

(3) No person may be appointed manager of more than one mine except with the prior permission in writing of the Engineer.

7. Working more than seven days without a manager

When any mine, quarry or works or part of a mine, quarry or works is worked for more than seven days except under the control and supervision of a manager, the holder, owner or agent shall be liable to a penalty not exceeding P100 and to a further penalty not exceeding P50 for each day that such mine, quarry or works is so worked.

8. General duties of managers

(1) The occurrence of any breach of these Regulations which comes to the knowledge of the manager shall be reported by him in writing to an inspector, whether that breach has been committed by a person employed in or about the mine, quarry or works or by a contractor working therein or any employee of such a contractor or by any other person.

(2) For so long as a mine, quarry or works is worked without a manager, or in the absence of the manager, the duties, obligations and responsibilities of the manager shall devolve on—

- (a) any person appointed in writing to assist the manager in the daily supervision of the mine, quarry or works; or
- (b) if there is no such person, the holder, owner or agent of the mine, quarry or works,

and each person on whom those duties, obligations and responsibilities devolve under this regulation is accountable for all matters arising in connection with the mine, quarry or works as if he were the manager thereof.

(3) A person having authority or control over the manager or over a person for the time being having the duties of a manager shall not exercise that authority or control in any way to obstruct the manager or that other person in the exercise of his functions under these Regulations.

(4) It shall be deemed to be a term of any agreement pursuant to which a contractor is working that the manager thereof shall have supervision and control of all the work carried out therein by the contractor.

9. Appointment of persons to assist manager

(1) A manager may appoint in writing one competent person to assist him in the control, management and direction of the mine, quarry or works and such person shall have the same responsibilities as the manager, but such appointment shall not be taken to relieve the manager of his personal responsibility under these Regulations.

(2) When a manager temporarily relinquishes his responsibilities the person appointed under subregulation (1) shall immediately assume all the responsibilities of the manager, who shall then be relieved of his personal responsibility under these Regulations:

Provided that when the manager is absent such person shall not carry out the duties of manager for more than three consecutive months.

(3) Where no person is appointed under subregulation (1) and the manager temporarily relinquishes his responsibilities such manager shall appoint a competent person to act as manager during his absence and thereupon all responsibilities of the manager shall devolve upon such temporary manager.

(4) A manager may appoint in writing, in addition to any person appointed by him under subregulation (1), such other competent persons as may be necessary to assist him in the control, management and direction of portions of the mine, quarry or works.

(5) Each such person shall, to an extent to be clearly defined in his letter of appointment, have the same responsibilities under these Regulations for his portion of the mine, quarry or works as the manager, but any such appointment shall not be taken to relieve the manager of his personal responsibility under these Regulations.

(6) The Engineer may require the appointment of one or more such competent persons when, in his opinion, this is necessary.

10. Notice of appointment and termination

(1) A holder, owner, agent or manager shall notify the Engineer in writing without delay of the appointment or termination of appointment of a manager and enclose a copy of the letter of appointment or termination of appointment.

(2) A copy of every appointment or termination of appointment made in accordance with these Regulations shall be kept at the office of the manager.

(3) Every letter of appointment issued in accordance with these Regulations shall be countersigned by the person so appointed.

(4) The Engineer shall maintain a record of the names and addresses of all managers whose appointments and terminations as such are notified to him under this regulation.

11. Manager to enforce Regulations

(1) A manager shall take all reasonable means to ensure that the provisions of these

Regulations are observed and enforced on the mine, quarry or works or such part thereof which comes under his control and any manager who fails to do so shall be guilty of an offence.

(2) Every holder shall provide the necessary means for enforcing these Regulations, and any holder who refuses or fails to provide such means at his manager's request shall be guilty of an offence.

PART III

Responsibilities and Duties of Officials and Competent Persons (regs 12-20)

12. Inspection by officials and competent persons

(1) Each part of a mine, quarry or works and all the machinery used in or about a mine, quarry or works shall be inspected by the manager or by some person appointed under these Regulations to assist the manager in the supervision thereof.

(2) A person making an inspection for the purposes of subregulation (1) shall certify in a log book kept for the purpose that the inspection has been made, and in such entry shall specify his findings, including the precautions, repairs or alterations which, in his opinion, are required to ensure greater safety in the working of the mine, quarry or works.

(3) Where such an entry as is referred to in subregulation (2) is made by a person other than the manager of a mine, quarry or works, the manager or any person appointed under regulation 9 shall within seven days of the making of the entry peruse and countersign it.

13. Appointment of electrical engineer and electricians

(1) At every mine, quarry or works at which electricity is used and at which the total rating of all the electrical apparatus installed thereat exceeds 750 kW there shall be appointed by the manager in writing a competent person to be the electrical engineer.

(2) Such electrical engineer may appoint as many competent persons to be subordinate engineers, electricians in charge or electricians as may be required to supervise or effect the proper installation, examination, testing and maintenance of all electrical apparatus in accordance with the following provisions—

- (a) all electrical apparatus shall be under the general charge of the electrical engineer;
- (b) each subordinate engineer shall, to the extent which shall be clearly defined in his letter of appointment, have the same responsibility under these Regulations as the electrical engineer in general charge:

Provided that the appointment of such persons shall not be taken to relieve the electrical engineer appointed in accordance with subregulation (1) of any personal responsibility under these Regulations;

- (c) the manager shall not appoint himself as a competent person under the terms of subregulation (1) except with the written permission of the Engineer.

(3) For every mine, quarry or works at which electricity is used and at which the total rating of all the electrical apparatus installed thereat does not exceed 750 kW there shall be appointed by the manager in writing a competent person to be in general charge of all such electrical apparatus, except that the manager shall not appoint himself as such competent person except with the written permission of the Engineer.

(4) The engineer and any subordinate engineer appointed to assist him shall be technically qualified and suitably experienced.

(5) An electrician in charge, an electrician or a mechanic electrician shall be a competent person.

14. Appointment of mechanical engineer and subordinate engineers

(1) At every mine, quarry or works at which mechanical apparatus is used and at which the total rating of all the mechanical apparatus installed thereat exceeds 750 kW there shall be appointed by the manager in writing a competent person to be the mechanical engineer.

(2) Such mechanical engineer may appoint as many competent persons to be subordinate engineers, mechanics in charge or mechanics as may be required to supervise or effect the proper installation, examination, testing and maintenance of all mechanical apparatus in accordance with the following provisions—

- (a) all mechanical apparatus shall be under the general charge of the mechanical engineer;
- (b) each subordinate engineer shall, to the extent which shall be clearly defined in his letter of appointment, have the same responsibility under these Regulations as the mechanical engineer in general charge:

Provided that the appointment of such persons shall not be taken to relieve the mechanical engineer appointed in accordance with subregulation (1) of any personal responsibility under these Regulations;

- (c) the manager shall not appoint himself as a competent person under the terms of subregulation (1) except with the written permission of the Engineer.

(3) For every mine, quarry or works at which mechanical apparatus is used and at which the total rating of all the mechanical apparatus installed thereat does not exceed 750 kW there shall be appointed by the manager in writing a competent person to be in general charge of all such mechanical apparatus, except that the manager shall not appoint himself as such competent person except with the written permission of the Engineer.

(4) A mechanical engineer and any subordinate engineer appointed to assist him shall be technically qualified and suitably experienced.

(5) A mechanic in charge or mechanic shall be a competent person.

15. Appointment of surveyor and ventilation officer

Every manager shall—

- (a) appoint a surveyor to carry out the provisions of Part XXXI of these Regulations; and
- (b) appoint a ventilation officer to carry out the provisions of Part XII of these Regulations:

Provided that where less than 100 persons are employed the duties of surveyor and ventilation officer may be assumed by the manager.

16. Appointment and responsibility of mine captain or overman

(1) Where the duties of the competent person appointed in accordance with regulation 9(4) are primarily concerned with rock drilling and blasting operations such competent person shall be termed a mine captain or overman.

(2) Every mine captain or overman appointed by the manager shall take charge of a section of the mine during a shift or shall be on call for such section of the mine.

(3) Such section shall be clearly defined in writing to the mine captain or overman by the manager, and, where a mine captain or overman is absent from such section and no other mine captain or overman is appointed to replace him, his responsibilities shall be assumed by his immediate more senior official.

(4) The section allocated to any mine captain or overman shall be such that he can carry out an inspection at intervals not exceeding six days of every place in which men work in such section.

17. Appointment and responsibility of shift boss or deputy

(1) Where more than 50 persons are employed at any one time there shall be employed a sufficient number of competent shift bosses or deputies to enable the provisions of these Regulations to be carried out.

(2) Every section shall be under the charge of a shift boss or deputy and such section shall be clearly defined in writing to the shift boss or deputy by the manager or person appointed under regulation 9 in the book provided in accordance with subregulation (8).

(3) Every shift boss or deputy shall, except in an emergency relating to safety and health which prevents him from so doing, at least once during his shift examine every place in the section of the mine assigned to him in which any person is working, and at intervals not exceeding six days shall examine every place in such section through which any person may have occasion to pass.

(4) The section allocated to any shift boss or deputy shall be such that he can without undue exertion examine every working place in it within a period of five hours.

(5) Every shift boss or deputy shall be responsible for ensuring the proper observance of the requirements of these Regulations by any person working in his section whether such person is under his direct supervision or not.

(6) Every shift boss or deputy shall enter in a book to be provided for the purpose details of any breach of these Regulations which he has had occasion to observe in respect of which he has taken action or in respect of which he considers action should be taken.

(7) Every shift boss or deputy shall ensure that at any time in any working place where drilling and blasting operations or lashing operations are being carried out there is only one person in charge at such working place.

(8) The manager shall ensure that a book is provided and kept at places specified by him in which every shift boss or deputy shall, at the completion of his shift, record in ink the particulars of—

- (a) such instructions for the purpose of securing the safety and health of persons which he may have given during the shift;
- (b) such matter requiring the attention of the relieving shift boss or deputy with regard to the safety and health of any person;
- (c) any place in which any person is at work in the section under his charge which has not been visited and the reasons therefor:

Provided that in the case of any shift boss or deputy concerned with surface work the requirements of this subregulation may be modified in a form determined by the manager.

(9) Records made under subregulation (8) shall be examined and countersigned by the relieving shift boss or deputy and by the mine captain or overman in charge of the section for which the shift boss or deputy is responsible or other immediate superior, and in the case of surface workings an immediate superior.

(10) Such records shall be open to inspection at all times by an inspector.

(11) No person appointed to act as a shift boss or deputy shall take immediate charge of any workman in addition to his normal duties except in an emergency.

18. Appointment of person in charge

(1) In every mine, quarry or works the following provisions shall apply—

- (a) every workman whilst at work shall be under the personal supervision of a competent person who for the purposes of these Regulations shall be referred to as the "person in charge";
- (b) persons employed underground or on the surface where rock drilling and blasting operations are being carried out or are employed in any other operation where danger may arise from the presence of any explosive shall be under the personal supervision of a competent person who for the purposes of these Regulations shall be referred to as the "person in charge";
- (c) the person in charge shall be the holder of a Botswana blasting licence valid for the

operation for which he is responsible.

(2) Subject to subregulation (3), the person in charge shall enter any working place assigned to him and the immediate approaches thereto before any other person and he shall examine and make safe or cause to be made safe each such working place and the immediate approaches thereto before permitting any work to take place, and shall ensure that the provisions of these Regulations are observed by any person in such working place and the immediate approaches thereto whether such person is under his personal supervision or not.

(3) A shift boss or deputy or more senior official being the holder of a valid Botswana blasting licence may, in the execution of his duty, enter any working place before the person in charge:

Provided that where he observes anything which is unsafe he shall immediately take such precautions as may be necessary to prevent any person entering until such time as he has either made safe or he has informed the person in charge of the unsafe condition.

(4) Whilst making safe the working places and the approaches thereto the person in charge shall be responsible for the safe disposition of his subordinates in suitable and safe places until he has made such working places and approaches thereto safe.

(5) Notwithstanding the provisions of subregulation (4) the person in charge may be accompanied by one or more persons to assist him in making such places safe.

(6) The examination for making any place safe in accordance with subregulation (2) by the person in charge shall be such that—

- (a) he shall satisfy himself that there is adequate ventilation;
- (b) he shall ensure by physical examination that any hanging wall, foot wall, sides and faces to the working place and approaches thereto are free from any loose rock which may cause danger;
- (c) he shall ensure the adequacy of any supports, barricades and platforms within the working place and approaches thereto; and
- (d) he shall take such other measures as may be necessary to ensure the safety and health of any person who may work therein or pass therethrough.

(7) The person in charge having made any place referred to in the preceding provisions of this regulation safe in accordance with subregulation (6) shall, during the time that persons are working in any working place under his charge, take all reasonable precautions for the safety of any person present in such working places, and such precautions as he may take shall continue for as long as he allows any person to remain in the working place or until he is relieved of responsibility by another person in charge.

(8) A person in charge shall, on taking over responsibility for any working place, re-examine and take any necessary action in accordance with subregulation (6).

(9) No person except the person in charge, shift boss or deputy or more senior official shall enter a working place until such person has received definite instructions or permission to do so from the person in charge or more senior official for the time being responsible for the safety of such working place.

(10) No person shall be in charge of more working places or persons than he can supervise efficiently or be in charge of working places so scattered that he cannot examine them all within a period of one hour without undue exertion.

19. Determination of number of persons underground

(1) A manager shall ensure that there is in force a system to enable a determination to be made of the number of persons underground.

(2) Any person who knowingly fails to conform to any system in force in accordance with subregulation (1) shall be guilty of an offence.

20. Deputing of work

Except with the express sanction of his lawful superior no person shall depute another person to do his duties, or voluntarily cease to supervise persons under his charge.

PART IV

Duties and Conduct of Persons (regs 21-34)

21. Copies of Regulations and rules to be supplied where applicable

A copy of these Regulations and any special rules made under section 12 of the Act shall be issued free of charge to each employee who, in the opinion of the manager, is required by virtue of his employment to have specific knowledge of these Regulations and such special rules, and the employee shall sign a receipt for such issue and such receipt shall be retained by the mine, quarry or works.

22. Persons observing, knowing or hearing of danger

Any person who observes, knows or hears of any danger or any thing which is dangerous or likely to be or become dangerous or cause danger of any kind to any person or thing shall remove, remedy or repair such danger or thing immediately if he has the knowledge and the means to do so, or, if he is unable to do so because he lacks either such knowledge or such means, he shall forthwith report the matter to a person in authority who shall take immediate steps to rectify the matter.

23. Illegal acts

No person shall—

- (a) omit to do any act which it is his duty to do in accordance with these Regulations;
- (b) omit to do any act the omission of which endangers or is likely to endanger the safety or health of any person or which results in bodily injury to himself or to any other

person;

- (c) negligently commit any act which endangers or is likely to endanger the safety of any person or which results in bodily injury to himself or to any other person;
- (d) fail to observe any lawful order given to him personally in accordance with or for the proper observance of these Regulations or any order whatsoever given in the interest of safety or health; or
- (e) ignore, damage, deface or remove any sign, notice, barricade or other measure provided for the safety of any person, unless they are legally removed for the purpose of maintenance or repair and then only after suitable precautions have been taken.

24. Wilful damage prohibited

No person shall wilfully or through negligence damage, or, without proper authority, use, remove, or render useless, any timber, fencing, casing, guide, lining, means of signalling, signal cover, chain, rope, flange, horn, brake, indicator, ladder, platform, pressure gauge, safety valve, ventilating apparatus, or other appliance or thing provided or furnished in a mine, quarry or works.

25. Complaints of danger

If any person complains to his person in charge or any other official that his working place is dangerous such person in charge or other such official shall take immediate steps consistent with safety to confirm such danger and then, if it is so confirmed, he shall take immediate steps to rectify such danger or prevent access to such place.

26. Duty of persons in charge of things

It shall be the duty of every person who has in his charge or under his control any thing, whether moving or stationary, of such a nature that, in the absence of care or precaution in its use or management, the life, safety or health of any person may be endangered, to use reasonable care and take reasonable precautions to avoid such danger; and he shall be deemed to have caused any consequences which adversely affect the safety or health of any person by reason of any omission to perform that duty.

27. Reckless and negligent acts

Any person who in a manner so rash or through neglect so as to endanger human life or to be likely to cause harm to any other person—

- (a) does any act with fire or any combustible matter, or omits to take precautions against any probable danger from any fire or any combustible matter in his possession;
- (b) dispenses, supplies, sells, administers or gives away any medicine or dangerous substance; or
- (c) does any act with respect to, or omits to take proper precautions against any probable

danger from, the machinery of which he is solely or partly in charge, shall be guilty of an offence.

28. Responsibility of contractors

(1) A contractor shall report to the manager as soon as possible every accident or occurrence arising in the course of the work for which he is contracting to which regulation 35 applies in such manner as the manager shall specify.

(2) Every contractor shall submit to the manager, on or before the third day of every month, a return providing the information required under regulation 596.

29. Responsibility of supervisors

The supervisor at a mine, quarry or works shall—

- (a) have a thorough knowledge and understanding of these Regulations as they apply to the mine, quarry or works or part thereof wherein he has authority;
- (b) enforce these Regulations, and ensure the safety and health of employees during the course of their employment;
- (c) ensure that, with respect to the work in which every workman under his authority is engaged, the workman—
 - (i) is acquainted with the regulations which apply;
 - (ii) is instructed of hazards which may be involved; and
 - (iii) uses the safety devices and equipment required for the protection of persons performing such work.

30. Responsibility of employees

Every person at or in a mine, quarry or works shall—

- (a) be familiar with the regulations which apply to the work in which he is engaged;
- (b) examine his working place and equipment to ensure that they are safe for any work required to be done and are in compliance with these Regulations;
- (c) take precautions to ensure his own safety and the safety of his fellow workmen, during the course of his employment; and
- (d) at all times when the nature of his work requires use all devices and wear all articles of clothing designated for his protection or required to be used and worn by him under these Regulations.

31. No unauthorized person to enter mine, quarry or works

No unauthorized person shall enter any part of a mining or quarrying area in the immediate vicinity of, or within a fence enclosing, any shaft or other mine or quarry working or any plant or machinery.

32. Intoxicating liquor or drugs

No person shall take, consume or have in his possession any intoxicating liquor or narcotic drug while he is in or on any part of any mine, quarry or works.

33. Orderly behaviour

Every person, whether on surface, in open cast workings or underground, shall behave in an orderly manner.

34. Offences

Any person who—

- (a) forges or counterfeits any certificate required by, under or for the purposes of these Regulations;
- (b) gives or signs any such certificate knowing it to be false;
- (c) knowingly utters or makes use of any such certificate so forged, counterfeited or falsified;
- (d) knowingly utters or makes use of, as applying to any person, any such certificate which does not so apply;
- (e) personates any person named in any certificate;
- (f) falsely pretends to be an inspector;
- (g) wilfully connives at any such forging, counterfeiting, giving, signing, uttering, making use of, personating or pretending as aforesaid;
- (h) wilfully makes a false entry in any register, book, notice, certificate or document required by, under or for the purposes of these Regulations, to be kept, served or sent;
- (i) wilfully makes or signs a false declaration required by, under or for the purposes of these Regulations; or
- (j) knowingly makes use of any false entry or declaration as aforesaid,

shall be guilty of an offence.

PART V **Accidents (regs 35-38)**

35. Notification of accidents

(1) A manager shall ensure that the Mining Commissioner and the district inspector are notified immediately and in writing of any accident specified in subregulation (2).

(2) The accidents which are to be notified pursuant to subregulation (1) are those—

- (a) involving the death of a person;
- (b) in which a person becomes unconscious or is incapacitated for 48 hours from heatstroke, heat exhaustion, electric shock or burns, the inhalation of blasting fumes or the inhalation of any poisonous gas or fumes; or
- (c) in which the injuries sustained by a person are so serious that it is possible they may prove fatal:

Provided that, in addition to the foregoing, the manager shall ensure that, in the case of death, the police are notified immediately and the District Commissioner informed forthwith in writing of such death.

(3) A manager shall ensure that notice is given of any accident in which any person sustains serious bodily injury or is incapacitated for more than three days, excluding the day of the accident but including weekends or official holidays.

(4) The notice required to be given under subregulations (1) and (3) shall be in the form approved by the Engineer.

(5) Such completed form shall be despatched so as to arrive at the offices of the Department of Mines within 10 days of the accident.

36. Injury resulting in death

(1) When any injury results in the death of any injured person after notice has been given in accordance with regulation 35, or when any slight injury of which no notice was given results in the death of the injured person, the manager shall immediately notify the Mining Commissioner, the district inspector and the police of such death and shall notify the District Commissioner in writing of such death.

(2) When any injury immediately results in the death of any person injured, the place where the accident occurred shall not be disturbed or altered before the arrival of, or without the consent of, an inspector, unless such interference is unavoidable to prevent further accidents, to remove dead bodies or to rescue persons from danger:

Provided that such regulation shall not apply to any place where any delay would seriously affect safe working or if the inspector fails to visit the place within three days after the notice of the accident has been despatched.

37. Dangerous occurrences which are to be reported

(1) Whether or not personal injury is caused by any occurrence specified in subregulation (2), the manager shall ensure that any such occurrence is reported to the Engineer and the

district inspector within 24 hours and forthwith confirmed in writing.

- (2) The occurrences which are required to be reported are—
- (a) the fracture or failure of any part of any machinery, other than machinery referred to in paragraph (b), whereby the safety of any person has been or may be endangered;
 - (b) any occurrence in connection with winding plant and lift installations involving—
 - (i) the fracture or failure to work efficiently of any essential part, including a winding rope and all its attachments to the conveyance or drum, sheaves, shafts, axles or bearings, brakes, gearing, depth indicators or drums;
 - (ii) the jamming or overloading of any part of the winding plant or the derailment of any conveyance which results in the possible overstrain of the rope;
 - (iii) the failure of any overwind prevention device or safety catch to act when required, or the action of such device or catch when not required;
 - (iv) any conveyance accidentally leaving its guides in a vertical shaft; or
 - (v) any accidental overwind on a certificate winding engine;
 - (c) the accidents ignition or detonation of explosives and any accident due to explosives;
 - (d) the flooding of any considerable portion of the working or the failure of any dam or reservoir used for conserving water or slimes;
 - (e) the collapse, mechanical failure of overturning of any vehicle, crane, derrick, winch, hoist or similar lifting appliance;
 - (f) any accidental explosion or fire due to the ignition of dust, gas, oil or vapour;
 - (g) any accidental fire underground or any accidental large fire on the surface;
 - (h) the explosion or bursting of any receiver or container used for the storage at a pressure greater than atmospheric pressure of any gas or mixture of gases, or of any liquid or solid resulting from the compression of gas;
 - (i) the explosion or bursting of any steam boiler or steam receiver;
 - (j) any electrical short circuit or failure of electrical machinery resulting from the malfunction of any protective device and attended by explosion or fire;
 - (k) the caving of any underground working or any subsidence of the ground which is not normal for the method of mining in practice;
 - (l) any failure of the main ventilation system; and
 - (m) the bursting of any revolving vessel, wheel or grinding wheel moved by mechanical

power, but excluding rubber tyres.

(3) No material or apparatus shall be disturbed or destroyed or the scene of any of the accidents specified in subregulation (2) otherwise altered without the consent of the district inspector unless such interference is unavoidable to prevent further accidents or to rescue persons.

38. Reporting of accidents

(1) A person who is injured in an accident shall report as soon as possible, if he is able to do so, such accident to his immediate superior who shall ensure that the relevant procedure for any accident, as laid down by the manager, is complied with.

PART VI ***First-Aid (regs 39-50)***

39. Provision of first-aid stations and equipment where more than 150 persons are at work on surface

Where at any one time there are more than 150 persons at work on the surface the manager shall ensure that there is provided on the surface—

- (a) an adequate number of accessible first-aid stations suitably situated to the satisfaction of the Engineer after consultation with the Director of Medical Services;
- (b) first-aid stations which shall be—
 - (i) used only for work connected with first-aid and have a red cross clearly marked on the door;
 - (ii) equipped with a self-draining sink, soap, towels, nail-brush, and a constant supply of drinking water and hot and cold running water;
 - (iii) equipped with an operative telephone and have adequate lighting and ventilation;
 - (iv) kept clean and properly maintained and all interior surfaces shall be so constructed as to facilitate this requirement;
 - (v) provided with stretchers, with at least two blankets per stretcher, a suitable table, benches, chairs, and suitable clothes for use by first-aid attendants; and
 - (vi) provided with a supply of dressings, bandages, splints, tourniquets and other surgical accessories for the first-aid treatment of all accidents, burns and other injuries likely to occur, together with an efficient antidote, with instructions for the use of same, for the treatment of cases of gassing; dressings and other accessories shall be maintained in good condition and kept complete in a container which shall be available at all times for use, and which shall be capable of being transported to the scene of any accident or to any place where any injured person lies;

- (c) instructions of action to be taken in the event of a serious accident, including the name and telephone number of the nearest medical practitioner, which shall be predominantly displayed in all first-aid stations; and
- (d) suitable sanitary conveniences near each first-aid station, which shall be kept clean and well lit.

40. Provision of first-aid accommodation and equipment where 150 persons or less are at work on surface

(1) Where at any one time there are 150 persons or less at work on the surface the manager shall ensure that there is provided on the surface suitable accommodation under shelter where first-aid can be rendered.

- (2) Such accommodation shall be—
 - (a) provided with soap, towels, nail-brush, drinking water and hot and cold water;
 - (b) kept clean and properly maintained; and
 - (c) provided with at least one stretcher and two blankets, a supply of bandages, splints, tourniquets, other surgical accessories and antidote for the treatment of cases of gassing, and the conditions required under regulation 39(b)(vi) shall apply to such dressings and other accessories required.

41. First-aid requirements on surface

Where persons are at work on the surface the manager shall ensure to the satisfaction of the Engineer that in any operating section there are sufficient qualified persons employed holding valid first-aid certificates or mining first-aid certificates granted by the Botswana Red Cross Society or any other recognized society or association approved by the Ministry of Health.

42. Provision of first-aid posts and equipment underground

(1) Where persons are at work underground the manager shall ensure to the satisfaction of the Engineer that in any operating section underground there shall be provided at conspicuous and suitable places an adequate number of first-aid posts or canisters or both.

- (2) Every first-aid post shall be—
 - (a) provided with soap, towels, nail-brush, drinking water and clean water;
 - (b) kept clean and properly maintained; and
 - (c) provided with at least one stretcher and two blankets, a supply of dressings, bandages, splints, tourniquets, other surgical accessories and antidotes for the treatment of cases of gassing, and the conditions required under regulation 39(b)(vi) shall apply to such dressings and other accessories required.

(3) Every first-aid canister shall contain the following—

- (a) a suitable stretcher and at least two blankets; and
- (b) a suitable first-aid box, which shall be regularly examined by a qualified person and any shortage in the contents replenished forthwith.

43. First-aid requirements underground

At any mine where persons are at work underground the manager shall ensure to the satisfaction of the Engineer that in any operating section there are sufficient qualified persons employed holding valid mining first-aid certificates granted by the Botswana Red Cross Society or any other recognized society or association approved by the Ministry of Health.

44. Appointment of sufficient qualified persons

(1) Where first-aid stations, accommodation or posts are required under these Regulations the manager shall ensure that there is employed at all times a sufficient number of qualified persons to supervise and be in constant attendance at such first-aid stations, accommodation or posts when persons are at work.

(2) Such qualified persons so appointed shall be readily available at all times whilst on duty.

45. First-aid and mining first-aid certificates

(1) Where a first-aid certificate or mining first-aid certificate becomes invalid the person holding such certificate may continue to be employed in any job for which such certificate is required for a period of not more than six months.

(2) At the end of such period if such person has not been successfully re-examined such person shall cease to be employed in such job forthwith.

(3) Every first-aid certificate or mining first-aid certificate shall be renewed at intervals of not more than three years.

(4) The provisions of this subregulation shall not apply to any person who is the holder of the Gold Medal Certificate of the Botswana Red Cross Society, or equivalent qualification, or to any registered medical, surgical or psychiatric nurse.

46. Antidotes for poisons

Where cyanide or other poisonous materials are used there shall be kept in a conspicuous place, convenient to every building or place at which such poisons are used, a sufficient supply of satisfactory and efficient antidotes for such poisons, and the vessels containing such antidotes shall be distinctly labelled and explicit directions for their use shall be attached to the vessels containing these antidotes.

47. Notices for treatment

One or more notices on which are legibly printed directions setting forth the approved

procedures for the immediate treatment of cases of gassing, heat stroke, heat exhaustion, drowning and electric shock shall be posted up in a conspicuous place in every change-house and in every first-aid station, accommodation or post.

48. Injured or sick persons to be treated without delay

Every manager shall take suitable precautions to ensure that any person employed who receives any injury or who becomes sick shall without undue delay receive the necessary first-aid treatment or medical attention.

49. Medical attendance and conveyance of injured persons

(1) A manager shall be responsible for arranging that any person employed who receives serious injury by reason of his employment shall be sent to the nearest qualified medical practitioner or, in the event of the injuries being too serious to permit of the injured person's removal, the nearest qualified medical practitioner shall be sent for.

(2) If any injured person is unable to proceed unaided to his home or to a hospital the manager shall immediately have such person conveyed to his home or to a hospital in the safest, best and quickest way at the expense of the company.

50. Offence to misuse or steal first-aid equipment

(1) No person shall misuse or steal any first-aid equipment provided in accordance with these Regulations.

(2) Any person who misuses or steals any first-aid equipment provided in accordance with these Regulations shall be guilty of an offence.

PART VII ***Mine Rescue (regs 51-64)***

51 Code of procedure

Every manager shall, having regard to the operations conducted at a mine or works, draw up and enforce a code of procedure for the summoning of assistance and for the guidance and instruction of persons who may be called upon to engage in rescue work at a mine or works in the event of an emergency.

52. Training to use breathing apparatus

No person who is engaged in rescue work at a mine or works shall wear, and no person shall cause or permit any other person engaged in rescue work at a mine or works to wear, breathing apparatus unless he or such other person has been trained in its use.

53. Mine rescue plan

(1) At every mine a tracing or copy of the plan required in terms of these Regulations and clearly labelled "Mine Rescue Plan" shall be kept in the office of the manager, or in an office designated by him, and on it shall be shown every first-aid room, main water valve, fire fighting

equipment site and any area sealed off for fire or spontaneous combustion.

(2) A square grid, the distance between the lines of which shall be one-tenth of the denomination of the scale of the plan, shall be drawn on the Mine Rescue Plan.

(3) Each square of the grid shall be lettered horizontally and numbered vertically.

54. Route to be taken to be marked

A copy of the plan made under regulation 53 on which any route to be taken by a rescue brigade is clearly marked, or a portion of such plan of the part of the mine encompassed by the rescue operations, shall be available in a metal canister for each brigade.

55. Captain not to proceed without plan

The captain of a brigade shall not proceed without the copy of the plan referred to in regulation 54.

56. Rescue brigades

At every underground mine there shall be organized and maintained one or more competent rescue brigades.

57. Brigadesmen to be certified medically fit

(1) A rescue brigade shall consist of not less than five persons in employment at the mine, carefully selected on account of their knowledge of underground work, coolness and powers of endurance.

(2) Every person serving as a brigadesman shall be examined by a registered medical practitioner at least once in every six months and shall not continue to serve unless he has been certified medically fit.

(3) The manager of a mine shall not be a member of the brigade.

58. Brigadesmen not to be employed underground simultaneously

The manager of every mine shall endeavour to ensure that at no time are—

- (a) in the case of a mine at which one rescue brigade is maintained, all the members of that brigade; or
- (b) in the case of a mine at which more than one rescue brigade is maintained, members of both or all the brigades,

employed below ground simultaneously, otherwise than in rescue work or practice.

59. Captain of brigade to be appointed

There shall be selected from the ranks of each rescue brigade one person who shall be

appointed as captain of the brigade.

60. Training

A brigade shall not be deemed competent unless—

- (a) each member has undergone a course of training approved by the Engineer;
- (b) after such course of training the brigade has undergone, at intervals of not more than three months, at least one exercise with breathing apparatus, such exercise having taken place at least twice a year in the workings of a mine, or at such other place approved by the Engineer; and
- (c) members have received instruction in the reading of mine plans, in the use and construction of breathing apparatus, in the properties and detection of poisonous and inflammable gases and deficiency of oxygen, and in the various appliances used in connection with mine rescue and recovery work.

61. Arrangements to summon brigadesmen

Arrangements shall be made for the summoning of rescue brigades immediately their services are required.

62. Breathing apparatus

(1) There shall be provided and maintained at every mine sets of portable breathing apparatus of a type approved by the Engineer in the proportion of at least two sets to each brigade required under regulation 56; such breathing apparatus shall be capable of enabling the wearer to work for at least two hours in irrespirable atmosphere and shall be kept ready for immediate use.

(2) The breathing apparatus shall be housed in suitable receptacles in a dry and cool room marked "Rescue Room" which shall not contain equipment other than rescue equipment.

63. Birds and apparatus for testing

There shall be provided and maintained on the surface of every mine which maintains a rescue brigade—

- (a) two or more small birds for testing for toxic gases and a deficiency of oxygen;
- (b) two or more portable electric lamps for each brigade, capable of giving light for at least four hours;
- (c) one oxygen reviving apparatus; and
- (d) at least one flame safety lamp for each rescue brigade.

64. Communication to surface

Within a distance of 1000 m of every working place underground, measured along the

travelling roads, efficient means shall be provided for communicating verbally to surface.

PART VIII
Safety and Protection in Working Places (regs 65-83)

65. Fencing of dangerous places underground

(1) All entrances to dangerous places underground shall be securely fenced or barricaded across the whole width of such entrance so as to prevent unintentional access to such places.

(2) No person shall enter or be permitted to enter any such place unless authorized to do so by a responsible official.

(3) Where any place underground has been abandoned all entrances shall be securely fenced or barricaded across the whole width of such entrance so as to prevent entry by any person and a notice in English and in Setswana forbidding entry shall be displayed at each entrance.

(4) Any authorization to enter such place shall be given by a responsible official.

66. Shaft collars to be raised

Every manager shall ensure that the collar of every shaft, or other similar opening from the surface, which is situated in low lying ground and is connected to underground workings, is raised so as to ensure efficient protection against flooding.

67. Advanced boreholes in dangerous ground

Wherever a working place underground is advancing through or approaching ground which contains or is likely to contain dangerous accumulations of water, gas or mud, the manager shall ensure that suitable boreholes are driven in advance of the face, sufficient in number, length and direction to give ample warning of the presence of such accumulations, and shall cause such additional precautions to be taken as circumstances may indicate to be necessary to ensure the safety of persons.

68. Protection at excavations

(1) Every entrance to a working place underground such as a shaft, raise, winze, sump or other dangerous excavation which is either vertical or steeply inclined shall be properly closed by an adequate fence, barrier, door or gate, or shall be kept adequately covered so as to prevent persons having unintentional access thereto or accidentally falling into such excavation:

Provided that, when such fence, barrier, door, gate or cover is temporarily removed or opened for the purpose of repairs or other operations, proper precautions shall be taken for the safety of persons, and on completion of such repairs or operations the fence, barrier, door, gate or cover shall forthwith be replaced.

(2) In the case of a working stope, the requirements of subregulation (1) shall be deemed to have been complied with if across every entrance to such stope there is placed and maintained

a barrier which is not more than 1,4 m or less than 1,0 m above the existing floor level and not more than 30 m from the edge of such stope.

(3) A person who may be required to work within 3 m from the edge of such stope shall do so only in accordance with the provisions of regulation 78.

(4) Only the person in charge, being the holder of a valid Botswana blasting licence, or a more senior official in the execution of his duties, or a person who has received definite instructions or permission to do so from the person in charge or such official, shall cross or open any fence, barrier, gate, door or cover provided for protection at any working place or workings, and then only for the purpose of conducting repairs or other necessary operations and subject to effective safety precautions being taken.

69. Protection at main ore and waste passes

Every main ore pass or waste pass, past which any person may walk, shall be provided with either—

- (a) an adequate cover which shall be closed at all times other than during tipping, blasting or repair operations; or
- (b) a walk-way on the opposite side to the pass and adequate gates or barriers which, with such walk-way, shall enclose the area around the pass:

Provided that such gates may be opened during tipping operations; during such operations such opened gates shall not permit room for any person to accidentally enter the tipping area.

70. Slyping of shafts, raises and winzes

At any time where any shaft, raise or winze is directly connected to any other mine working and where such shaft, raise or winze is being enlarged by slyping the following conditions shall apply—

- (a) there shall be provided at the lowest lashing point of such shaft, raise or winze an excavation of suitable size capable of accommodating the greatest amount of rock broken in any one blast during slyping operations so as to prevent any possibility of any closure of the bottom of such shaft, raise or winze;
- (b) no slyping hole shall be blasted until it has been established beyond doubt that the requirement of paragraph (a) has been complied with;
- (c) no slyping hole shall be blasted until it has been established beyond doubt that the unslyped portion of such shaft, raise or winze is free from any obstruction likely to cause any hang-up or build-up of rock;
- (d) in the event of any known or suspected hang-up or build-up of rock, work at the lowest lashing point of such shaft, raise or winze shall cease forthwith and every person at such point shall be withdrawn to a place of safety and no person shall re-enter the

danger area for any purpose whatsoever until it has been established beyond doubt that there is no progressive build-up of water above the blockage;

- (e) in the event of any build-up of water above the blockage immediate steps shall be taken to remove such water from above;
- (f) after the removal of such water from above the blockage, a competent person or persons may enter the lowest lashing point for the sole purpose of releasing such hang-up or build-up, and all reasonable precautions shall be taken to ensure his or their safety;
- (g) in the event of such known or suspected hang-up or build-up of rock, work at the slyping face within such shaft, raise or winze shall cease forthwith until such time as the hang-up or build-up has been released;
- (h) there shall be provided a suitable means of communication whereby the person in charge at the top of such shaft, raise or winze can communicate directly with the person in charge at the lowest lashing point of such shaft, raise or winze;
 - (i) precautions shall be taken to prevent the inflow of any water, other than drilling water, into such shaft, raise or winze from any source around the mouth of such shaft, raise or winze;
- (j) no operation shall take place at the lowest lashing point of such shaft, raise, or winze until all lashing has been completed at the slyping face of such shaft, raise or winze; and
- (k) precautions shall be taken to ensure that the inflow of any water, from any fissure within the slyped or unslyped portion of such shaft, raise or winze, causes no danger to any person.

71. Provisions for platforms

Every bearer, decking and anchorage in any shaft, raise, winze or other opening in or over which a platform is installed shall be—

- (a) of material sufficiently strong, and free from patent defect, to carry the load for which the platform is intended; and
- (b) adequately secured, and, where by virtue of the mining operations the decking is required to be frequently removed, the decking shall be so securely installed as to ensure the safety of any person passing over such a platform:

Provided that where the removal of any part thereof is necessary for the purpose of use or repair adequate precautions shall be taken to ensure the safety of persons working thereat.

72. Precautions as to broken material

- (1) Whenever a chute in a mine is to be pulled and the safety of a person may be

endangered by the settling of the broken material—

- (a) the area affected by the pulling shall be guard-railed or marked by a sign or signs so that no person can inadvertently enter the area; or
- (b) every person who is working in the affected area shall be notified.

(2) Proper precautions shall be taken during the pulling operation to ascertain whether or not the broken material is settling freely from the top.

(3) When there is any indication of a hang-up the location shall be adequately protected by suitable signs or barricades.

73. Hung up passes

Where a pass which has a dip greater than 35° has become obstructed or jammed with material hung up in it no person shall enter the pass beneath the material.

74. Men alone underground

(1) When a man is working alone underground at a point where he is not in frequent communication with, or within easy hearing of, another person, the manager shall direct that he shall be visited at intervals not longer than two hours, and more frequently if the manager considers it necessary, by some person directed to carry out that duty.

(2) No person shall remain alone in a dangerous place.

75. Pinch bars

There shall be provided and maintained in every mine an adequate supply of properly-dressed pinch bars and other equipment necessary for scaling.

76. Falling objects

No timber, rock, tools or other material shall be placed or allowed to remain where they can accidentally fall, or be caused to fall, thereby endangering the safety of any person.

77. Protective equipment

(1) Every manager shall make provision to supply an approved safety hat and approved safety footwear to every person who is employed—

- (a) underground;
- (b) in an opencast working or quarry;
- (c) where overhead construction work is proceeding; or
- (d) in any works or other place as required by an inspector.

(2) No person shall proceed to, or be in, a place referred to in subregulation (1) without

wearing such safety equipment.

(3) Every manager shall supply properly fitting eye protective equipment to every person who is employed in—

- (a) handling any material liable to injure or irritate the eyes;
- (b) any work in which there is an eye hazard from flying objects or light or heat rays; or
- (c) any place where, by reason of the nature of the operations carried on therein, there is a likelihood of persons suffering injuries to their eyes.

(4) No person shall engage in any employment specified in subregulation (3) without wearing eye protective equipment.

(5) Every manager shall maintain and replace any safety hat or eye protective equipment supplied by him under this regulation as may be necessary in the course of ordinary wear and tear.

(6) A person who wilfully damages or mislays any safety hat or eye protective equipment supplied to him under this regulation shall pay the cost of repair or replacement, as the case may require.

(7) A safety hat or eye protective equipment, whether supplied by the manager or replaced at the cost of an employee, remains the property of the mine, quarry or works.

78. Safety belts, chains or ropes

(1) Every person working where falling would be likely to entail injury shall wherever practicable be provided with and wear a safety belt, chain or rope which shall be maintained in good condition and be securely attached to the wearer and to a safe anchorage.

(2) No person shall order or permit a subordinate to work without wearing a safety belt, chain or rope in a place where subregulation (1) requires him to wear such safety belt, chain or rope.

79. Designated areas for protective equipment

The manager shall designate such other areas or occupations and circumstances where any or all of the following items shall be worn by every person employed therein—

- (a) approved safety hat;
- (b) approved safety footwear;
- (c) approved eye protective equipment;
- (d) approved hearing protective equipment;
- (e) approved breathing apparatus; or
- (f) any other approved personal protective equipment which the work in question may

require.

80. Prevention of flooding

The manager shall ensure that suitable precautions are taken to prevent or reduce to a minimum any danger to any part of any mine from flooding from any source whatsoever.

81. Protection against water

(1) In any place on surface or underground where there is water and where a person working adjacent to such place in the course of his employment is liable to fall into such water with the risk of drowning suitable rescue equipment shall be provided and kept in good order and ready for immediate use in the prompt rescue of any person in danger of so drowning.

(2) Where the elevation of the ground immediately adjacent to any place referred to in subregulation (1) is at least 1,0 m above the level of the water or where a floating stage is used on the water or there is a structure immediately adjacent to such water, adequate fencing or similar safeguards shall be provided and maintained to a height of not less than 1,4 m at all edges of the ground or structure immediately adjacent to the water.

(3) Any floating stage shall be so fenced around its full perimeter:

Provided that such fencing may be temporarily removed for the purposes of maintenance, repair or the movement of material.

82. Construction of dams and bulkheads underground

(1) A dam behind which more than 25 m³ of water is impounded or any bulkhead shall be constructed underground only with the written permission of the Engineer and in accordance with plans and specifications which have been approved by him.

(2) On the completion of the installation of a bulkhead in a mine the manager shall immediately notify the Engineer that it has been completed.

(3) Notwithstanding the requirements of this regulation, the construction of dams and bulkheads in the case of emergency is permitted provided that a report covering the emergency measures taken are reported to the Engineer forthwith.

83. Precautions against vessels, etc.

Reasonable precautions shall be taken to ensure the safety at all times of every person working or walking in close proximity to any vessel, sump or container associated with any scalding, corrosive or poisonous substance or any molten metal.

PART IX

Precautions in Cases of Danger (regs 84-90)

84. Withdrawal of employees in case of danger

(1) If at any time a manager is of the opinion that the mine, quarry or works is dangerous he

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shall—

- (a) forthwith secure the withdrawal of all persons from the mine, quarry or works;
- (b) as soon as practicable notify the Engineer thereof by telephone or telegram; and
- (c) make a report in writing stating the reasons for his opinion.

(2) Where a report is made in connection with the withdrawal of employees in case of danger, no person shall be admitted or re-admitted except for the purpose of saving life, investigating or removing any danger, ascertaining either the effectiveness of any measures taken to the removing of any danger or whether or not persons may lawfully be permitted to enter the affected area.

(3) Where a report is made under subregulation (1) the mine, quarry or works shall be inspected by a competent person appointed for this purpose by the manager.

(4) The competent person inspecting the mine, quarry or works in pursuance of subregulation (3) shall make a true report on the condition thereof and the measures which it is necessary to take for the purpose of rendering it safe.

(5) Every report made under this regulation shall be recorded in a "Danger record book".

(6) Except where a report made under subregulation (4) states that the mine, quarry or works is not dangerous, the manager shall forthwith send a copy thereof to the Engineer.

(7) In this regulation reference to a mine, quarry or works shall be construed as including references to a part of a mine, quarry or works.

85. Precautions against external danger to workings

(1) The manager shall be charged with the duty of taking such steps as may be necessary for—

- (a) securing that he is at all material times in possession of all information which indicates or tends to indicate the presence or absence, in the vicinity of any workings carried on or proposed to be carried on in the mine, of—
 - (i) any disused workings (whether mine workings or not);
 - (ii) any rock or stratum containing or likely to contain water (whether dispersed or in natural cavities); or
 - (iii) any sand, gravel, silt or other material which is likely to flow when wet; and
- (b) the purpose of substantiating any such information which comes into his possession (whether in consequence of the discharge of the duty imposed upon by the foregoing or not).

86. Thickness of strata

It shall be the duty of the manager at every mine to take, with regard to any workings carried on or proposed to be carried on in the mine in the vicinity of a river or any other body of surface water (whether accumulated naturally or artificially), such steps as may be necessary for ascertaining the total thickness of the strata lying between the workings and the surface water.

87. Emergency escape ways

There shall be marked in prominent places legible signs and arrows showing the way of exit in a manner to expedite escape, and all persons employed shall be instructed as to the location of emergency exits.

88. Inspection of escape ways

An examination of the exit routes shall be made at least once in each month, and a report of the examination and the conditions found shall be made by the person making such examinations.

89. Emergency warning system

(1) Where more than 100 metric tonnes of ore per day are produced underground, and at such other mines as may be designated by the Engineer, there shall be provided an approved system for warning all persons employed of an emergency necessitating their speedy evacuation of the workings.

(2) All persons employed shall be instructed as to the warning system and the escape procedure.

90. Test of warning system

A test of the effectiveness of the warning and a report as to the functioning of the system shall be made at least once in each year and a report of such test and functioning forwarded to the Engineer.

PART X ***Health and Labour (regs 91-103)***

91. Medical examination

(1) No person shall be employed at a mine unless such person has been medically examined by a registered medical practitioner and has been certified by that practitioner to be fit for employment.

(2) The examination shall include an X-ray of the chest.

92. Persons suffering from certain diseases not to enter underground workings

No person known to be suffering from tuberculosis of the respiratory organs, pneumoconiosis, silicosis, asbestosis or other fibrotic disease caused by mineral dust, ankylostomiasis, nystagmus or dermatitis shall enter the underground workings of a mine for the purpose of working therein, and no manager shall knowingly employ such person

underground in a mine.

93. Register of persons employed

A register shall be kept of—

- (a) the names of all persons employed; and
- (b) the dates of engagement, termination, desertion, or death;

in the case of the death of any such person the date, place and, as far as can be ascertained, the cause of death.

94. Restriction on doing of work by unskilled persons

No person shall be employed in any work except under the instruction and supervision of some person competent to give instruction in, and supervise, the doing of the work unless the first mentioned person has received adequate instruction in, and training for, the doing of that work and is competent to do it without supervision.

95. Intoxicated or drugged persons

(1) No person who is, or appears to be, under the influence of alcohol or narcotic drugs shall enter any mine.

(2) The manager or a person deputed by him may, if it is necessary to do so in the interests of the safety of other persons, arrest or cause to be arrested any person whom he, on reasonable grounds, suspects of having contravened subregulation (1), and shall hand him over to the nearest police officer or police station as soon as is practicable to be dealt with according to law.

96. Sleeping

No person shall sleep whilst in charge of any machine or boiler.

97. Pollution

No person shall pollute any place with faeces, and no person shall wantonly misuse or foul any sanitary accommodation.

98. Stagnant water

Stagnant water which is foul or putrid or which may become foul or putrid shall not be allowed to accumulate in any readily accessible place underground but shall be drained off.

99. Waste timber

The manager shall ensure that all decayed or decaying timber and any waste timber not in use in any readily accessible place underground shall, as soon as is reasonably practicable, be removed to the surface.

100. Drinking water

At every mine, quarry or works there shall be provided a supply of wholesome drinking water at points reasonably accessible to working places.

101. Change houses

(1) Every mine shall contain such number of change houses as an inspector may deem sufficient.

(2) Every change house shall be constructed to the satisfaction of an inspector in accordance with subregulation (3).

(3) For the purposes of subregulation (2) the requirements in respect of a change house are as follows—

- (a) facilities shall be provided separately for each sex;
- (b) the change house shall be located as near as practicable to every main travelling shaft, main travelling adit, reduction works and main workshops;
- (c) the change house shall have a clear floor space of not less than 1 m² for each person using the house at the same time;
- (d) shower baths having an ample supply of hot and cold water shall be installed at the rate of not less than one for every 15 persons using the change house at the same time;
- (e) showers shall be screened from observation, and properly drained;
- (f) the change house shall be well lighted, ventilated, and heated when necessary;
- (g) proper facilities shall be supplied in the change house for drying clothes and for keeping clean clothes and working clothes separate;
- (h) the change house shall be free from draughts and each doorway shall be screened to break the wind when the door is opened; and
- (i) adequate latrine accommodation shall be provided.

(4) An inspector may grant an exemption from, or vary any of the provisions of, subregulation (3) or may require the manager to make such other provisions as an inspector deems necessary.

(5) Each change house shall be cleaned out at least weekly and the floors thereof shall be cleaned daily with disinfectant or detergent.

(6) The Engineer may require that change house accommodation be provided for any persons employed on the surface if, in his opinion, this is warranted by the nature of their work.

102. Sanitary accommodation

The manager shall ensure that there is provided sufficient and suitable latrine accommodation and all such latrine accommodation shall be well ventilated, well lit and kept in a clean condition.

103. Provision of washing and eating facilities where toxic substances are handled

Where any toxic substance is handled, processed or stored the manager shall ensure that there are provided and used by all persons who may be endangered by such toxic substance—

- (a) adequate and sufficient washing facilities for the use of such persons prior to eating food or leaving work; and
- (b) where such persons may eat food at any time during their working hours, adequate accommodation for such purpose immediately adjacent to such washing facilities.

PART XI

Noise, Vibration and Radioactivity (regs 104-107)

104. Noise control

The manager shall ensure control of noise exposure which is hazardous to hearing and apply effective measures for hearing conservation in the manner approved by the Engineer.

105. Hearing conservation equipment

- (1) The manager shall supply properly fitting hearing conservation equipment to every person who is subjected to noise levels which may be hazardous to hearing.
- (2) The manager shall maintain and replace any hearing conservation equipment supplied by him under this regulation as may be necessary in the course of ordinary wear and tear.
- (3) No person shall knowingly or wilfully subject himself to a noise level which may be hazardous to hearing without wearing hearing conservation equipment.
- (4) A person who wilfully damages or mislays any hearing conservation equipment supplied to him under this regulation shall pay the cost of repair or replacement, as the case may require.
- (5) Any hearing conservation equipment, whether supplied by the manager or replaced at the cost of an employee, remains the property of the mine, quarry or works.

106. Protection against vibration

The manager shall ensure that no person shall be exposed to operations or processes producing vibration sufficient to contribute to bodily injury or damage or reduce the efficiency of the normal body functions.

107. Protection against radioactive substances

The manager shall ensure that where ionizing radiations are used or where radioactive substances are present he shall take adequate precautions necessary to protect any person from any danger or bodily harm.

PART XII

Ventilation, Dust and Toxic Gases (regs 108-148)

108. Provision of adequate ventilation

(1) The manager shall cause such steps to be taken as are necessary to ensure that adequate ventilation is supplied to all places in which persons are travelling or working.

(2) Ventilation shall be deemed to be adequate if it—

- (a) ensures that the amount of oxygen in the general body of the air shall be not less than 19 per cent by volume;
- (b) ensures that the amounts of carbon dioxide, carbon monoxide, oxides of nitrogen, sulphur dioxide, hydrogen sulphide and aldehydes in the general body of the air do not exceed the following quantities, namely, 5000 parts per million for carbon dioxide, 100 parts per million for carbon monoxide, 5 parts per million for oxides of nitrogen, 20 parts per million for sulphur dioxide, 20 parts per million for hydrogen sulphide and 5 parts per million for aldehydes;
- (c) dilutes or removes any toxic gas or fume so that the amount of such gas or fume in the general body of the air conforms to the requirements imposed from time to time by the Engineer;
- (d) dilutes or removes any harmful dust so that the amount of such dust in the general body of the air conforms to the requirements imposed by the Engineer;
- (e) maintains working conditions free from dangerous temperatures at high relative humidities in the general body of the air;
- (f) provides any diesel unit with not less than 0,05 m³ of air per second per kilowatt for the purpose of diluting or removing any toxic gas or fume in the general body of the air at places where such diesel unit operates; and
- (g) dilutes any inflammable gas so that no gas cap is discernible on the reduced flame of a safety lamp.

109. Engineer to impose maximums

The Engineer may impose the following—

- (a) the maximum permissible amount of any gas or fume content in the general body of the air (not already specified under regulation 108) of any gas or fume he may deem to be toxic; and

- (b) the maximum permissible amount of any harmful dust content in the general body of the air.

110. When ventilation ceases to be adequate manager to restore

Where for any reason the ventilation required by subregulation 108(1) ceases to be adequate the manager shall ensure—

- (a) that all necessary steps are taken to ensure the safety and health of any person who may be endangered by such conditions; and
- (b) that adequate ventilation is restored as soon as possible.

111. Persons unknowingly exposed to bad conditions

Where any person becomes aware of the fact that any other person is unknowingly exposed to conditions arising from excessive amounts of toxic gas or fumes, dust or harmful temperatures such person shall take such steps as shall be necessary to remove such other person from such exposure and shall ensure that the manager is informed without delay of the circumstances of such exposure; the manager shall then take all further steps necessary to ensure the safety and health of all persons who have been or may subsequently be exposed to such conditions and to rectify and prevent any recurrence of such conditions.

112. Persons not to enter where conditions are known to be bad

No person shall enter, travel, work or remain or cause or permit any other person to enter, travel, work or remain in any place where it is known that the requirements of regulation 108 are not being complied with and where any such person is likely to be exposed to conditions arising from excessive amounts of toxic gas or fumes, dust or excessive temperature unless adequate precautions are taken to ensure the safety and health of such person or such person is equipped with and has been trained in the use of approved breathing apparatus.

113. When respirators are to be worn

An effective respirator shall be provided to any person who during the course of his normal work is likely to be exposed to excessive amounts of toxic gas or fumes or dust, and shall be used by such person working under such conditions.

114. Determinations to be made underground

(1) At every underground mine the manager shall ensure that at intervals not exceeding three months a competent person shall make determinations of—

- (a) the quantity of air circulating;
- (b) the temperature of air circulating as indicated by wet and dry bulb thermometers; and
- (c) the amount of dust present in the general body of the air as determined by a method approved in writing by the Engineer.

- (2) The determinations required in subregulation (1) shall be made at the following places—
- (a) the collar of each downcast shaft;
 - (b) every main air intake underground;
 - (c) each main intake to every working section;
 - (d) each intake and face at every working place; and
 - (e) at or adjacent to every rock tipping and rock loading point.

115. Detection of harmful toxic gases

The manager shall ensure that at regular intervals not exceeding 30 days a competent person shall at such times as such person thinks proper take samples of the general body of the air at places underground where any diesel unit operates in order—

- (a) to detect all harmful toxic gases in any such place;
- (b) to determine the quantity of air circulating in every such place; and
- (c) to determine the temperature of air circulating in every such place as indicated by both wet and dry bulb thermometers.

116. Recording of determinations taken underground

(1) The results of the determinations and samples required by regulations 114, 115, 120 and 143 shall be recorded in a book kept for the purpose and such record shall be signed by the ventilation officer and by the mine captain and at least one other more senior official.

(2) A quarterly report of such results recorded in accordance with subregulation (1) shall be submitted to the Engineer in such form as he may require.

117. Notification of inflammable gas

(1) The manager shall immediately notify the Engineer of the presence of inflammable gas detectable by a flame safety lamp in any ventilating district of the mine if inflammable gas has not been detected therein within the previous three months.

(2) Such notification shall be confirmed in writing.

118. Operation areas of diesel units

Every diesel unit underground shall be operated only in haulage ways or working places where adequate ventilation is maintained by mechanical means.

119. Precautions where mechanical failure occurs

(1) In the event of the failure of the mechanical means mentioned in regulation 118 the engine of each and every diesel unit in the haulage or working places affected by the failure

shall be stopped forthwith.

(2) When a mechanical failure occurs as above no engine of any diesel unit shall be restarted until such time as the mechanical means have been restored to satisfactory working order and the conditions of the air corrected to within the limits specified in regulation 108.

120. Manager to ensure safety underground where diesel units run

The manager shall ensure by systematic sampling that no self-propelled diesel unit runs underground—

- (a) if the exhaust gases of the engine are found to contain more than 0,2 per cent by volume of carbon monoxide or 0,1 per cent by volume of oxides of nitrogen; or
- (b) if the engine has any defect which may cause danger to persons.

121. Provisions for doors, etc.

Every door, stopping, brattice or seal installed to maintain ventilation shall be of adequate strength and be properly maintained.

122. Ventilation doors

(1) No locking device fitted to any ventilation door shall be self-locking.

(2) No person shall enter any part of a return airway which is normally isolated except in the course of his duty and then only after he has taken precautions to ensure his safety.

123. Provision of mechanical means

Where the natural ventilation current is insufficient to provide adequate ventilation there shall be provided such mechanical means as may be necessary to produce adequate ventilation in all places in which and for such times as persons may be travelling or working therein:

Provided that, in any place where adequate ventilation is maintained by the discharge of compressed air only or by means of any device powered by compressed air, the pipe conveying the compressed air to the point of discharge or to such device shall be connected to the supply pipe independently of any valve installed to supply compressed air to any other machine or process, and where any such place is a raise or winze being developed any such pipe conveying the compressed air to the point of discharge shall be connected to the supply pipe independently of any other pipe or valve and only one valve shall be installed at the entrance to any such raise or winze.

124. Main fans to have automatic alarms

Every main fan installed in accordance with regulation 123 shall be equipped with automatic alarms which shall—

- (a) come into operation in the event of any stoppage of such main fan; and

- (b) be clearly audible or visible to a responsible person at all times during which persons are underground and such person shall report such stoppage forthwith in accordance with an established procedure which the manager shall cause to be laid down.

125. No harmful re-circulation of air permitted

No auxiliary fan shall be installed or operated underground at any place unless the quantity of air reaching it is at all times sufficient to ensure that any re-circulation of air shall not prejudice the supply of adequate ventilation.

126. Withdrawal of persons when ventilation is inadequate

(1) In the event of any stoppage or failure of any fan the person responsible for any section or part of the mine in which such stoppage or failure may prejudice the maintenance of adequate ventilation as specified in regulation 108 shall ensure that any person who may be endangered thereby is withdrawn to a safe place.

(2) No person shall enter such section or part of the mine until adequate ventilation has been restored therein unless any such person is equipped with and has been trained in the use of approved breathing apparatus.

127. Rock machines to be approved

Except with the written approval of the Engineer and subject to such conditions as he may impose, no rock-drilling, rock-boring or portable mechanical rock-breaking machine which is not an approved machine shall be used.

128. Water pressure for rock drills and rock borers

Except with the written approval of the Engineer and subject to such conditions as he may impose, no person shall use or order any other person to use any rock drill or rock borer unless—

- (a) the water pressure supplied to the machine is not less than 200 kPa; and
- (b) an adequate flow of water is maintained at the bit or bits to suppress the dust effectively.

129. Suitable water for dust suppression

Where drilling, blasting or other operations produce dust in dangerous quantities every place shall be adequately provided at all times with clean water at a pressure of not less than 150 kPa or other approved appliance for laying, removing or controlling dust.

130. Installation of water supply at stope grizzlies

A sufficient supply of water shall be installed and used at every operating stope grizzly for the purpose of suppressing dust.

131. Dust on surfaces

Except at underground coal mines, every surface in places underground, where persons may travel or work and where dust may accumulate and be disturbed by blasting, shall be regularly and frequently washed down with water.

132. Rock to be wetted when lashing

No lashing operations shall be permitted unless the rock to be lashed is adequately wetted and maintained in such condition during the time lashing continues.

133. Use of compressed air

(1) No person underground or within 15 m of the surface inlet to any airway shall use or be required to use only compressed air for any of the following purposes—

- (a) to clean any truck, skip or other conveyance unless the contents of such truck, skip or other conveyance are thoroughly wet;
- (b) to blow out any drill hole or to blow over any rock surface unless such hole or surface is thoroughly wet:

Provided that a mixture of compressed air and water may be used for such purposes.

(2) No person shall use compressed air for the purpose of cleaning his body or his clothing or the body or clothing of any other person.

134. Ventilation of dead ends

Every development end, such as a tunnel, drive, cross-cut, raise, box-hole, winze or shaft, and every working connected only with such development end and not with a second outlet, shall be so ventilated by means which will ensure that harmful dust, smoke and fumes from blasting are effectively expelled.

135. Water blasts

(1) Every development end such as a tunnel, drive, cross-cut, raise, box-hole, winze or incline shaft which has advanced 10 m or more shall be furnished with a waterblast of a design and construction approved in writing by the Engineer.

(2) Such waterblast shall discharge at a distance of not more than 15 m from the face being advanced and shall be applied so as to wet the face and broken rock effectively for at least 15 minutes immediately after blasting and again for a further period of 15 minutes immediately prior to entry by any person, provided that in special circumstances the Engineer may give written permission to the manager to vary these periods.

136. Primary blasting schedule and re-entry times to be specified

(1) Except at underground coal mines, the manager shall cause a schedule of times to be arranged during which all primary blasting in any part of any mine or quarry shall take place and

he shall ensure that any blasting in one part shall not expose any person to danger in any other part.

(2) No alteration or amendment to such schedule shall be made less than one hour or more than 24 hours before the commencement of the first shift to which such alteration or amendment applies:

Provided that in cases of emergency in order to prevent danger to life or property the manager may temporarily alter or amend such schedule and he shall ensure that every official and person in charge concerned is notified of such temporary alteration.

(3) The mine captain, more senior official or quarry manager in charge of any section of the mine or quarry shall arrange within the period scheduled for his section the specific times at which primary blasting shall take place in each working place, or group of working places, in his section, and no person shall carry out any primary blasting except at such times:

Provided that in case of emergency such mine captain, more senior official or quarry manager may alter or amend those specific times within the period scheduled for his section in which case he shall ensure that every person concerned is notified of any such alteration or amendment.

(4) The schedules required under subregulations (1) and (2) shall be so arranged that no person shall avoidably be exposed to fumes, dust or flying debris originating from the blast, and shall be posted on the surface where they can conveniently be seen before the commencement of the shift by any official and the person in charge concerned.

(5) The blasting of misfired holes or hitches, or any blasting to make a place safe, may be carried out at any time, but only with the express permission of the shift boss, other more senior official or quarry manager, if such shift boss, more senior official or quarry manager is satisfied that no person shall be exposed to any danger from such blast.

(6) After primary blasting has taken place no person shall enter, or cause or permit any subordinate to enter, any place in which the air may have become contaminated by dust or fumes resulting from such blasting until the expiry of the re-entry period:

Provided that in case of emergency any person may enter such a place before the expiry of the re-entry period if authorized to do so by the senior official in charge of the section, or if such person is equipped with a reliable mask or breathing apparatus.

(7) If, in the opinion of the Engineer, any re-entry period is insufficient for the removal of dust or fumes which might occur, there shall be substituted such longer period as he may in writing require.

(8) A schedule showing the re-entry periods for the different places shall be posted on the surface where it can conveniently be seen at any time by any official and the person in charge concerned.

(9) The manager shall ensure that a clock is placed adjacent to the schedule required by this

regulation which shall show the official standard time to be observed.

137. Secondary blasting and re-entry schedule

No person shall enter, or cause or permit a subordinate to enter, a grizzly excavation or other place after secondary blasting has taken place there until the expiry of the re-entry period, and a schedule showing the re-entry periods shall be posted on the surface where it can conveniently be seen at any time by any official and the person in charge concerned.

138. Removal, control or disposal of dust

Effective means for the control, within the limits permitted under regulation 108, removal or disposal of gas, fumes and dust shall be provided and used at—

- (a) main tipping stations underground;
- (b) shaft loading boxes underground;
- (c) the loading and discharging points in any conveyor or system of conveyors;
- (d) any vibratory or mechanical rock feeder;
- (e) any rock crushing machine, screen or plant; and
- (f) any fixed machine used for the high speed milling, grinding or sand-blasting of rock drill bits or rock drill steel.

139. Collection and disposal of dust at filtration unit or plant

Where a filtration unit or plant has been installed for the collection of dust the manager shall ensure the safety and health of persons in the vicinity during the clearing of such unit or plant, and during the removal, transport and disposal of any dust collected.

140. Surface plant or buildings to be ventilated

Adequate ventilation shall be provided in any surface plant or building or any part thereof in which any person may travel or work and where any dust containing coal, asbestos, siliceous matter or other harmful dust is released, or is liable to be released, or where any toxic gas or fumes is evolved or is liable to be evolved.

141. Plant and buildings in which toxic substances and dust are removed or evolved

Any harmful dust or toxic gas or fumes removed or evolved from any process shall, if not otherwise recovered, collected or disposed of, be discharged into the atmosphere at an adequate height and distance so that the amount of any harmful dust or toxic gas or fumes in the general body of the atmosphere in or entering any building, plant or surface inlet to underground working shall be in accordance with the requirements of regulation 108:

Provided that such point of discharge into the atmosphere shall not be less than 75 m measured horizontally from the nearest point of any surface inlet to the underground workings.

142. Removal of toxic substances at or near source

(1) Adequate means shall be provided and used for the positive removal at source, or as near thereto as practicable, of any toxic substance (other than dust) which may escape or be released from any surface plant or building in which such substance is handled, processed, stored or evolved.

(2) Any such substance removed in compliance with subregulation (1) shall be disposed of in a safe manner.

143. Determinations to be made on surface

Where required by the Engineer, determinations shall be made at intervals not exceeding three months by a competent person of the amount of dust present in the air at every working place in every surface plant or building referred to in regulations 140 and 142 and of the amount of any other toxic gas or fumes which is known, suspected or liable to be present in the air at every working place so as to ensure that the air conforms to the requirements of regulation 108(2).

144. Recording of determinations on surface

(1) The results of the determinations required by regulation 143 shall be recorded in a book kept for the purpose and such record shall be signed by the ventilation officer and by the senior official of the plant, building or process concerned.

(2) A quarterly report of such results recorded in accordance with subregulation (1) shall be submitted to the Engineer in such form as he may require.

145. Pits, tanks, etc.

Before any person enters or causes or permits any other person to enter any pit, tank, vessel or chamber likely to contain noxious or inflammable fumes or gases or an atmosphere deficient in oxygen, such pit, tank, vessel or chamber shall be examined by a competent person, and no person shall enter or remain or cause or permit any other person to enter or remain in any such pit, tank, vessel or chamber unless it is safe to work therein.

146. Use of ventilating equipment

No person shall fail or neglect to use any ventilating equipment that is provided pursuant to these Regulations or shall wilfully or negligently damage or injure that ventilating equipment.

147. Determinations and evaluations to be approved by Engineer

Every determination of the amount of toxic gas, fumes or harmful dust made in pursuance of these Regulations shall be made by, and the results evaluated by, such means as the Engineer shall approve.

148. Ventilation plans for underground mine

(1) The manager shall keep plans and sections of an underground mine showing the

ventilating districts, direction of air currents, the quantity of air circulating in each ventilating district, and the position of every permanent fan, door, regulator, crossing, stopping and telephone, and shall supply the Engineer with a copy of those plans and sections when called upon to do so.

(2) Such plans and sections shall be at all times correct to within at most three months.

PART XIII ***Fire Precautions (regs 149-162)***

149. Manager to ensure adequate precautions

The manager shall ensure that adequate precautions are taken to prevent the outbreak of fire and shall enforce a code of safety practice for the installation, operation and maintenance of plant, machinery and equipment so as to avoid dangerous heating and other fire hazards.

150. Provision of fire-fighting equipment

The manager shall ensure that adequate fire-fighting equipment is available on the surface and underground.

151. Inspection and maintenance of fire-fighting equipment

(1) The manager shall ensure that all fire-fighting equipment provided in accordance with regulation 150 is inspected and properly maintained in a satisfactory condition at intervals not exceeding 90 days by a competent person appointed in writing who shall arrange for the regular discharge and refilling of each fire extinguisher or for any other suitable means necessary to maintain fire extinguishers in good working order.

(2) The person appointed under subregulation (1) shall record in a register provided for the purpose the date and results of all inspections and maintenance work carried out.

(3) On each fire extinguisher shall be clearly stated the date of the last inspection.

152. Fire-fighting equipment

(1) Suitable fire-fighting equipment shall be provided and maintained in or about every headframe, portal and plant building and at every shaft or winze station underground.

(2) Suitable fire-fighting equipment shall be provided and maintained at all underground crushers, pump stations, workshops, stores, fuel stations, underground electrical installations or where oxy-acetylene or electric welding or cutting is taking place.

153. Arrangements for fighting fires

The manager shall ensure that adequate arrangements are made to establish and maintain a proper organization of persons for fighting any outbreak of fire and such arrangements shall include regular fire drills which shall be held at intervals not exceeding one month.

154. Fire hazard areas

(1) If in the opinion of the Engineer a fire hazard may be created in any particular area he may designate such area to be a "fire hazard area".

(2) No person shall smoke or be allowed to smoke, use open-flame lamps, matches or other means of producing heat or fire in a fire hazard area, except with the permission in writing of the Engineer.

(3) A fire hazard area shall be properly identified by means of suitable warning signs, and the manager shall ensure that such signs are installed and maintained as long as the area is so designated.

(4) When an inflammable gas in dangerous concentrations has been found to exist in a mine working such working or parts of such working concerned shall immediately be considered a fire hazard area, and every precaution shall be taken while clearing the area or doing any work therein to prevent ignition of the gas and these precautions shall be continued so long as the hazard exists.

155. Detection of fires

At every mine or part of a mine not exempted in writing by the Engineer where there is a longer interval between shifts than six hours, the manager shall provide for the early detection of any fire or spontaneous heating which may be taking place in the underground working.

156. Withdrawal of persons

(1) In the case of a fire occurring in any coal mine or of a fire due to or resulting in the ignition of inflammable gas in any mine all persons, except those dealing with the fire or in services in connection therewith, shall be withdrawn from the whole of the underground workings affected and shall only be allowed to return when safe conditions have been restored.

(2) Whenever in any mine other than a coal mine fire occurs in the underground workings which cannot be brought under immediate control, the mine captain or shift bosses shall withdraw all persons from the ventilating districts or districts affected by the fire unless the manager directs to the contrary.

(3) The manager shall not permit or direct any person to remain in or proceed to a ventilating district where there is a fire which cannot be brought under immediate control unless he has satisfied himself that the safety of such person will not be endangered thereby:

Provided that this prohibition shall not apply to any person required to bring the fire under control, to conduct investigations or to do work incidental thereto.

157. Auxiliary exits for plant buildings

All plant buildings where persons are regularly employed, except those used for explosives and blasting agents, shall be provided with suitable and adequate auxiliary exits in addition to

main entrances; and such exits shall always be maintained and available for use in case of fire.

158. Fire doors

(1) Where practicable there shall be a sufficient number of fire doors installed underground in every mine to cut off the shaft or the mine openings directly associated with it from the other workings of the mine.

(2) Fire doors shall be maintained in proper order and kept clear of all obstructions so as to be readily available at all times.

159. Transfer of liquid fuels

(1) The fuel tanks of an internal combustion engine installed in a building shall be so arranged that the actual transfer of fuel to the fuel tanks takes place at a point outside the building and the fuel is conducted to the tank in a tightly-joined pipe or conduit.

(2) Similar provisions for the escape of displaced air from the fuel tank shall be made whereby the displaced air will be conducted to a safe point outside the building before being discharged into the atmosphere.

160. Storage of liquid fuels

(1) Except for the actual fuel tanks of operating equipment, no storage of petrol or liquid fuel shall be permitted within 30 m of the collar of a shaft or other entrance of a mine.

(2) The natural drainage from such a location shall be such that the flow is in a direction opposite to the location of any such shaft or mine entrance.

161. Oils and grease underground

(1) Oil, grease or diesel fuel oil while underground shall be contained in suitable metal receptacles.

(2) The amount of oil or grease kept underground shall not exceed the requirements for seven days' work.

(3) The amount of diesel fuel oil kept underground shall not exceed the requirements for three days' work and shall be transported underground only in approved types of containers.

162. Fire prevention

At any mine, quarry or works—

- (a) no person shall place, throw or leave, or cause or permit to be placed, thrown or left, any naked light or flame or any burning lighting torch, match, cigarette, tobacco, paper or other burning material on or near combustible material or inflammable substances where this may cause danger from fire or explosion;
- (b) no waste material of a combustible nature shall be stored anywhere in quantity

sufficient to create a fire hazard;

- (c) no inflammable or explosive material shall be stored or kept in the immediate vicinity of a place where any electric cable, transformer, switchgear or other electrical or heating apparatus is installed;
- (d) no welding, flame-cutting or flame-heating shall take place unless adequate means are immediately available for extinguishing any fire which may result from such operation;
- (e) on completion of any welding, flame-cutting or flame-heating an examination shall be carried out by a competent person to ensure that no fire will result from such operation;
- (f) no person shall smoke or carry an open light in any cage, skip or other conveyance in any shaft or winze or in any elevator car in a hatchway.

PART XIV

Lighting and Electricity (regs 163-205)

163. Persons to have lighted lamps at all times underground

(1) No person shall proceed underground unless he has in his immediate possession an operable lamp of a type approved by the manager, and such lamp shall be kept alight and shall be within safe and easy reach at all times.

(2) Every person in any unilluminated place shall carry a lighted lamp.

164. Only approved carbide lamps

No person shall carry or cause or permit to be carried underground any calcium carbide unless it is in lamps provided or approved by the manager or in watertight receptacles of a type approved by an inspector and provided by the manager, and no person shall store or leave calcium carbide underground on coming off shift.

165. Provisions for permanent lighting: underground

Suitable and sufficient permanent lighting shall be provided and properly maintained at the following places underground in regular use—

- (a) every established station, landing or loading place and other similar place in vertical and inclined shafts, winzes and places where man winding is being carried on;
- (b) every main tip at which any locomotive or trackless vehicle operates and every place where any locomotive or trackless vehicle operates and every place where any locomotive or trackless vehicle is maintained;
- (c) every main substation and every substation in which there is inherent danger due to bare conductors or otherwise;
- (d) every room or place made to house winding and main pumping machinery in the

proximity of which any person is working or moving about; and

- (e) every main crusher station and every main conveyor drive unit and transfer point.

166. Provisions for permanent lighting: surface

(1) Suitable and sufficient permanent lighting shall be provided and maintained at all places on the surface where work is regularly carried out during the hours of darkness or where normal daylight is inadequate for safe working.

(2) All places where machinery is working, in the proximity of which persons are working or moving about, shall be so lighted that the external moving parts of such machinery whilst in operation are clearly visible.

167. Lighting by electricity

Electricity at a voltage exceeding 240 volts shall not be supplied to any lighting system required by regulation 165 and if the system is polyphase the neutral point shall be connected to earth or if it is not polyphase the mid-voltage point shall be connected to earth, but this need not apply in the use of discharge lamps.

168. Individual circuits

Where electricity is supplied individual circuits shall be used for—

- (a) lighting fittings;
- (b) blasting boxes and blasting circuits;
- (c) power points; and
- (d) any other electrical apparatus:

Provided that such electrical circuits may be supplied from a common distribution board, but whatever system of distribution is used every such circuit shall be protected by individual fuses or other such similar devices.

169. Stand-by lighting

There shall be provided in every power plant and man winding engine house and elsewhere as may be necessary to safeguard any person suitable stand-by lighting which shall automatically light immediately following the failure of the permanent lighting in such place.

170. Portable electric lights

- (1) No portable electric light shall be used unless—
 - (a) it is fitted with a robust handle made of non-hygroscopic and non-conducting material;
 - (b) such metal parts as may, due to a fault, become live are completely protected against

accidental contact;

- (c) the lamp is protected by a substantial guard firmly attached to the insulating handle; and
 - (d) the cable and lead-in can, without failure or damage to the insulation, withstand rough usage.
- (2) In addition to the requirement of subregulations (1), no portable light shall be used—
- (a) in wet or damp situations;
 - (b) in closely confined spaces;
 - (c) inside metal vessels; or
 - (d) in general contact with masses of metal, unless the operating voltage does not exceed 32 volts alternating current nominal or is otherwise approved by an inspector.

171. Provisions for lamp room

(1) There shall be at the surface of every mine where underground work is carried out a separate room to be used as a lamp room.

(2) The manager shall ensure that there is appointed a competent person to be in charge of such lamp room.

(3) The manager shall ensure that there is in such lamp room a lamp for every person proceeding underground; and the competent person shall ensure that every lamp issued is issued in proper working order.

172. Notice of introduction of electricity

(1) Electrical apparatus shall not be installed underground in any place where electrical apparatus is not already installed unless the manager of the mine has served on the Engineer notice of the intention to do so in such form as may be specified by the Engineer and has received from the Engineer written authorization for such installation.

(2) Nothing in this regulation shall apply—

- (a) to the installation of electrical apparatus in any place where the installation of such apparatus was lawful before these Regulations came into operation; and
- (b) to the installation of telephone and signalling apparatus, or blasting cables.

173. Installation

Without prejudice to the generality of these Regulations, the installation of any electric cable, switchgear, transformer and electrical apparatus of any kind shall conform to the Electricity (Supply) Regulations except where it may conflict with the regulations herein set forth.

174. Installation of electrical equipment containing inflammable liquid

No electrical equipment or group of electrical equipment containing more than 500l of inflammable liquid shall be installed—

- (a) within 25 m of any shaft or opening leading to a shaft; or
- (b) without the provision of a sump sufficiently large to collect and contain all the liquid which may escape therefrom.

175. Standard of apparatus

The manager shall ensure that any electrical, blasting and signalling apparatus shall be of good construction, suitable material, adequate strength and free from patent defect.

176. Maintenance and fire precautions

(1) Any electrical installation, wiring and equipment shall be kept in good order and condition and properly maintained to the satisfaction of an inspector.

(2) Fire buckets containing clean, dry sand, or approved fire extinguishers, ready for immediate use, shall be kept in every underground place containing electrical equipment, other than telephone and signalling apparatus.

177. Plans and diagrams required to be kept

(1) Where there is installed electrical apparatus operating at a voltage in excess of medium voltage there shall be kept—

- (a) at the office concerned at the mine, quarry or works, plans or distribution diagrams showing the general electrical arrangement of all such apparatus as far as is reasonably possible; and
- (b) at each main substation, accurate distribution diagrams showing the electrical arrangement of each main circuit immediately associated with the substation's switchgear:

Provided that in a main substation having no more than three main circuits, adequate labelling of the switchgear shall suffice.

(2) Plans and diagrams required under subregulation (1) shall be kept up-to-date.

178. Main switchgear for controlling supply of electricity underground

(1) There shall be provided on the surface, where there is installed underground electrical apparatus, other than telephone or signalling apparatus, suitable switchgear for controlling the supply of electricity thereto.

(2) Efficient arrangements shall be maintained whereby a competent person is in attendance or readily available on call for the purpose of operating such switchgear whenever any cable

underground is live and any person is at work underground.

(3) There shall be provided an effective means of communication between the place at which such switchgear is situated and—

- (a) each established shaft station; and
- (b) a place at or near each main substation immediately controlled by such switchgear.

179. Other means for cutting off electricity

(1) There shall be provided in relation to every electrical circuit effective means suitably placed for cutting off the supply of electricity from that circuit, as may be necessary to prevent danger, and, without prejudice to the generality of the foregoing, for cutting off the supply from any flexible cable at the apparatus by which it is connected to a fixed cable.

(2) There shall be provided in relation to every electrical circuit effective means for cutting off the supply of electricity automatically from such circuit in the event of any fault occurring in any part of such circuit.

(3) There shall be provided such effective means of preventing the automatic making live of any electrical circuit or electrical apparatus as may be necessary to prevent danger; and this shall not preclude the use of auto-reclosers on overhead lines.

(4) There shall be provided in relation to every electrical motor an efficient means whereby the supply of electricity can be entirely cut off from such motor, such means being located so as to be readily available to the operator.

180. Remote control by electricity

(1) Where an electric motor is operated by remote control the circuit shall be so arranged that, after having been stopped, the electric motor cannot be restarted until the remote control circuit has been restored.

(2) A haulage or conveyor system shall be provided at every point along the system with a means of stoppage, where directed and approved by an inspector.

(3) Equipment operated by remote control shall be designed so that any failure of the equipment or the control circuits is to safety.

(4) Provisions shall be made for alternative means of stopping equipment operated by remote control, in the event of a failure, allowing it to operate against the normal control.

181. Housing of apparatus

(1) Electrical apparatus at the surface of any mine, quarry or works shall be installed in a room, compartment or box so constructed or treated as to be fire resisting.

(2) Any transformer or switchgear below ground in any mine shall be installed in a room,

compartment or box which shall be of substantial construction and kept dry.

(3) No inflammable material shall be used in the construction of any such room, compartment or box or of any of the fittings therein.

(4) No inflammable or explosive material shall be placed in dangerous proximity to any electrical apparatus on the surface or below ground.

(5) Any parts of electrical apparatus which require attention and any device for the operation of such electrical apparatus shall be so placed that there is a safe means of access thereto.

(6) Any such device shall be kept free of obstruction and conveniently placed for operation.

(7) Where, owing to the nature of any machinery or apparatus installed, there is a risk of fire at least two means of egress shall be provided to minimize the risk of persons being trapped therein.

182. Fencing off to prohibit unauthorized persons

(1) Every electricity generating plant and all main substation equipment shall be adequately fenced off or enclosed, and notices prohibiting unauthorized persons from entering shall be placed at all designed places of ingress.

(2) When such plant or equipment is unattended by an authorized person all designed places of ingress shall be kept closed and locked to prevent unlawful access.

183. Only apparatus of sufficient power to be used

No electrical apparatus shall be used unless it is of sufficient power or capacity to avoid dangerous over-loading and is protected against any danger arising out of such use.

184. Risk of ignition

Wherever there may exist any risk of ignition by electrical sparking, gas, coal dust or other inflammable or explosive substance the design, construction and method of installation of any electrical apparatus shall be approved by the Engineer

185. Protection of persons and apparatus

(1) All electrical apparatus and every conductor shall be so selected, arranged, installed, protected, maintained and worked as to prevent danger so far as is reasonably practicable.

(2) Any person doing any work which may result in damage to any electrical apparatus shall take such action as may be appropriate to protect such electrical apparatus from damage.

186. Inspection, examination and testing of apparatus

(1) The manager shall ensure that there is in force a scheme for the systematic inspection, examination and testing of all electrical apparatus.

(2) Such inspection, examination and testing shall ensure, as far as is practicable, the safety

of persons.

- (3) Wherever necessary to prevent danger electrical apparatus shall—
 - (a) be kept clean, dry and clear of obstruction; and
 - (b) carry an effective means of identification.

187. Examination and testing

(1) It shall be the duty of the manager to make and ensure the efficient carrying out of arrangements for—

- (a) the external examination of all electrical apparatus at intervals not exceeding seven days by a competent person appointed by him;
- (b) the examination and testing of all electrical apparatus by such a person before it is put into use after installation, reinstallation or repair, in particular as regards the insulation resistance and the conductivity of any earthing conductor comprised therein or associated therewith; and
- (c) the testing of all parts of every circuit by such a person at intervals not exceeding six months, or such other intervals as an inspector may by notice served on the manager permit, as regards the insulation resistance thereof and the conductivity of the earthing conductor and earth plates.

(2) Every person who has made a test in pursuance of this regulation shall forthwith record and sign a report thereon in a log book provided by the manager for the purpose.

188. No person to wilfully damage apparatus

No person shall wilfully damage any electrical apparatus or without proper authority operate, interfere with, remove or render useless any electrical apparatus, but in an emergency any person may operate electrical apparatus in order to cut off the supply.

189. Insulation

(1) All material used for the purpose of insulating any conductor shall be suitable, having regard to the degree of insulation and mechanical strength required and the conditions of temperature and moisture to which it is likely to be subjected, and to any means provided for its protection.

(2) Every conductor, forming part of any electrical system, shall be kept efficiently insulated from earth:

Provided that—

- (i) in the case of a system with polyphase supply, the neutral point thereof may be connected at one place but no more to earth at the surface; and

- (ii) in the case of a system with single phase or direct current supply, the mid-voltage point may be connected at one place but no more to earth at the surface.

(3) In relation to every electrical system efficient means shall be provided to ensure that, as far as is practicable, wherever any dangerous defect arises in the insulation of the system the supply of electricity to this fault is automatically cut off.

190. Earthing

(1) There shall be connected to earth at the surface in such manner as will ensure immediate electrical discharge without danger—

- (a) every metallic covering of any cable;
- (b) the outer conductor of every concentric cable;
- (c) every metallic part of any covering or container of, or mounting for, any other electrical apparatus; and
- (d) any handle for the operation of any electrical apparatus:

Provided that this subregulation shall not apply to a lamp-holder efficiently protected by a covering made of fire-resisting material which is either insulated or earthed.

(2) Without prejudice to the generality of subregulation (1), every earthing conductor installed for the purposes thereof shall have a conductivity throughout (including any point) not less than half that of the conductor having the greatest current carrying capacity in relation to which it is provided and shall have a cross-sectional area not less than 14 mm²:

Provided that—

- (i) in relation to a flexible cable by which electricity is supplied at a voltage not exceeding 125 to portable apparatus, nothing in this subregulation shall require the earthing conductor to have a cross-sectional area greater than 6,5 mm²; and
- (ii) in relation to a flexible cable by which electricity is supplied to portable apparatus of capacity not exceeding 3 kW at the surface, being a cable comprising an earthing conductor, nothing in this subregulation shall require the earthing conductor to have a cross-sectional area greater than that of any one of the other conductors in that cable.

(3) Subject to this regulation and to regulation 194 the metallic covering of any cable may be used as an earthing conductor.

(4) No switch, fuse or circuit breaker shall be placed in any earthing conductor.

(5) Nothing in this regulation shall apply to any apparatus in any circuit in which the voltage does not exceed 250 direct current or 125 alternating current, other than portable apparatus.

(6) Where two or more earth plates are used for the purposes of this regulation, adequate precautions shall be taken to ensure that no dangerous potential exists between such earth

plates.

191. Provisions relating to conductors

(1) Every electrical conductor shall be efficiently protected from mechanical damage and supported at such intervals and in such manner as to prevent damage thereto or danger.

(2) A high voltage aerial conductor shall be fitted with lightning arrestors to the satisfaction of an inspector.

(3) A conductor in a shaft or other travelling way shall be thoroughly insulated and properly supported and protected to the satisfaction of an inspector.

(4) A conductor in a haulage way shall—

- (a) have a clearance of at least 0,5 m; or
- (b) be specially protected,

from a conveyance.

192. Electric cables

(1) This regulation shall apply to all electric cables other than—

- (a) flexible cable for portable apparatus;
- (b) telephone and signalling apparatus; and
- (c) blasting cables.

(2) Every conductor in any cable to which this regulation applies, except an earthed outer conductor of a concentric cable or a metallic covering of a cable used as an earthing conductor in accordance with regulation 190(3), shall be covered with insulation material.

(3) Every cable to which this regulation applies shall be protected from mechanical damage and supported at such intervals and in such manner as to prevent damage thereto or danger therefrom.

(4) Every cable to which this regulation applies and which is used—

- (a) for transmitting electricity at a voltage exceeding 250 at the surface or in open cast workings, or exceeding 125 below ground; or
- (b) in any length of underground road on which vehicles are moved otherwise than by hand or where conveyors are installed,

shall be a cable protected by a metallic covering containing all the conductors forming part of that electrical system at that place:

Provided that this subregulation shall not apply to phase cables which are otherwise

adequately protected.

(5) In the case of every cable to which this regulation applies and which is protected by a metallic covering, that covering shall be electrically continuous throughout, and, where necessary, having regard to its position, protected against corrosion.

(6) Every single-core cable and every core of a twin or multi-core cable of flexible cord shall have an indelible means of identification.

193. Trailing cables

(1) All electrically powered mobile equipment shall be supplied by ground conductor monitoring type trailing cable in a manner which will disconnect the power conductors in the cable in the event that the ground conductor becomes discontinuous.

(2) A trailing cable shall be heavily insulated and protected from mechanical injury in a manner approved by an inspector.

(3) A competent person, who shall be an electrician, appointed by the manager shall—

- (a) examine every trailing cable weekly for abrasions and other defects; and
- (b) report his finding in a Trailing Cable Inspection Book:

Provided that all persons in charge and drivers shall examine visually trailing cable daily and report any defects.

194. Flexible cables

(1) All flexible cable shall be adequately protected against mechanical damage and shall be of an approved specification.

(2) No single-core flexible cable shall be used for supplying portable or mobile apparatus other than trolley-wire locomotives or welding electrode holders.

(3) Each conductor in a flexible cable shall be covered with insulating material and such conductor and insulating material shall be adequately protected from damage.

(4) A metallic covering provided to protect a flexible cable from damage shall not be used as the sole earthing conductor in respect of such cable or any apparatus connected thereto unless such cable is of an approved specification.

(5) No flexible cable by which electricity is supplied at a voltage exceeding 32 shall be connected to any electrical apparatus except by means of a properly constructed connector.

(6) All flexible cable in use shall be examined by a competent person at least once in each week, and any cable used with portable apparatus shall be examined immediately before use by the person authorized to use the apparatus.

(7) If any such cable is found damaged or defective it shall be repaired forthwith or taken out

of service and such cable shall not be further used until it has been effectively repaired.

195. Blasting cables

(1) Every blasting cable used shall be readily identifiable as follows—

- (a) twin twisted flex shall have one yellow sheath and one green sheath;
- (b) a multi-core sheath shall be coloured yellow throughout its length.

(2) Blasting cables shall not be used for any other purpose than blasting.

(3) Current from telephone, signalling or lighting circuits or from any source other than a blasting box or other blasting device approved for blasting shall not be used in blasting circuits.

(4) Adequate precautions shall be taken to prevent cables or conductors used in blasting circuits from coming into contact with other cables or electrical apparatus other than an approved blasting box, or other device approved for blasting.

196. Switchgear and electrical joints and connections

(1) All parts of switchgear and of electrical connections shall be of sufficient mechanical strength and current carrying capacity to prevent danger.

(2) All live parts of such switchgear and connections shall be so enclosed or otherwise protected as to prevent danger to persons accidentally coming into contact therewith, or danger from a deposit thereon of dust, water or other matter.

(3) The material insulating any conductor in any cable shall be efficiently protected at any point at which that conductor is connected to other apparatus where its insulating property might be diminished.

(4) Wherever any cable protected by a metallic covering is connected to other apparatus such metallic covering shall be securely attached to that apparatus.

(5) Every joint in any cable shall be—

- (a) made in such a manner as to be mechanically and electrically sound;
- (b) such that the resistance of the jointed conductor shall not exceed that of a similar continuous and unjointed conductor; and
- (c) such that the insulation thereof is not less effective than the insulation of the cable core and shall be protected against moisture.

197. Portable hand tools

Portable hand tools may be operated at a pressure not in excess of 250 volts provided an effective earth leakage device is included in the circuit:

Provided that a pressure not in excess of 32 volts shall be used when working inside metal

containers.

198. Telephone and signalling apparatus underground

(1) Where more than 30 persons are employed underground there shall be provided and maintained an effective means of telephonic communication, or other equivalent means of transmitting speech, between a point on the surface and such points underground as may be necessary for safety and within reasonable and easy access from any place at which work is being carried out.

(2) All signalling and telephone apparatus used underground shall be of an approved type.

(3) In particular, the voltage in any signalling circuit below ground shall not exceed 25 and contact makers shall be so constructed as to prevent the accidental closing of the circuit.

(4) In any electrical signalling system where any failure or disconnection would be likely to cause a dangerous situation due to loss of signalling facilities an alternative means of signalling shall be provided.

(5) Adequate precautions shall be taken to prevent any telephone wire or signalling conducting wire coming into contact with any cable or other electrical apparatus in which the voltage exceeds 32.

199. Notices to be exhibited

The following notices shall be exhibited at suitable places within electrical generating stations, winding engine rooms, main substations and pump stations, and elsewhere as may be necessary to minimize danger, a notice—

- (a) prohibiting unauthorized entry;
- (b) prohibiting unauthorized persons from operating or interfering with installed electrical apparatus;
- (c) containing directions upon the procedure in case of fire; and
- (d) containing directions for the treatment of persons suffering from electric shock.

200. Locomotive systems and trolley lines

(1) Suitable safeguards, so arranged that persons cannot inadvertently come into contact with the current carrying parts, shall be provided and properly maintained throughout the length of any trolley line conductor:

Provided that where the trolley line conductor is installed at a height in excess of 2,4 m above the rail such safeguards need only be provided and maintained at any place where—

- (i) loading or unloading of vehicles is regularly carried out; or
- (ii) maintenance or repair of locomotives or other rolling stock is regularly effected.

(2) Effective means shall be provided for cutting off the supply of electricity of the trolley line conductor system to any section on the same level, and such section being so controlled shall not exceed an installed length of 1 000 m.

(3) Effective means shall be provided, by bonding or otherwise, to ensure that the track system overrun by locomotives operating from trolley line conductors is continuous throughout, and that the resistance of any joint shall not be greater than the resistance of 10 m of the track rail.

(4) Reasonable precautions shall be taken to ensure—

- (a) that no metallic structure or article in the vicinity of a trolley line conductor shall attain a potential above that of earth; and
- (b) the safety at all times of any persons working or walking in close proximity to trolley line conductors.

(5) The supply of electricity shall be cut off from any trolley wire system which is not in use.

(6) There shall be provided on any locomotive exceeding 8 metric tonnes weight, and on any other electrically propelled apparatus whether supplied with electricity from trolley line conductors or storage batteries, a device actuated by the driver such that its release in an emergency will automatically disconnect the supply of electricity to the driving motors.

(7) Control levers of electrically propelled apparatus shall be so arranged that such levers cannot accidentally be removed whilst there is a supply of electricity to the driving motors.

201. Charging stations

(1) No person shall charge or change any battery of any storage battery locomotive or storage battery vehicle except at a place recognized for that purpose, which for the purposes of this regulation shall be called a "charging station":

Provided that this regulation shall not apply to any combined battery and trolley line locomotive which is designed for battery charging whilst in use.

(2) Every charging station and all battery chargers shall be so arranged that the gases evolved on charging are adequately dispersed.

(3) Every charging station shall be—

- (a) adequately ventilated with fresh air;
- (b) constructed of non-flammable material;
- (c) provided with suitable and sufficient apparatus for fighting outbreaks of fire;
- (d) under the control of a competent person; and
- (e) kept locked when not in use.

(4) Any person spilling any water or electrolyte on any battery, or any electrolyte on the floor of any charging station, shall forthwith remove it or cause it to be removed.

(5) No unauthorized person shall interfere with any battery charging equipment at any charging station.

(6) No person shall smoke or use any light, other than an adequately protected electric lamp, in or within 10 m of any charging station, and a suitable notice to this effect shall be displayed.

202. Precautions and offences

(1) Before any work is undertaken on any machinery the motive power to such machinery shall be switched off and individually kept locked in the switched off position by each person doing any of such work until his work has been completed.

(2) Any person doing any work with or on any electrical apparatus which may make such apparatus a source of danger to persons shall take adequate precautions to ensure the safety of such persons.

(3) Any person neglecting to maintain or inspect or carry out work on electrical apparatus as instructed by a competent and more senior official shall be guilty of an offence.

(4) No person shall be instructed to carry out any duty on any electrical apparatus, for which technical knowledge and experience are necessary to avoid danger, except under such a degree of supervision as may be appropriate having regard to the nature of the work and the knowledge and experience of the person concerned.

(5) No person shall commence any work upon any conductor, or in proximity to any exposed conductor, being in either case a conductor in a circuit in which the voltage exceeds 32 A.C. or 50 D.C., until he has ensured that such conductor has been made dead, and has taken steps by earthing or other adequate means to ensure that it will remain dead until he is satisfied that it is safe to restore the current:

Provided that this subregulation shall not apply to—

- (i) the cleaning of commutators and slip rings in a circuit in which the voltage does not exceed 650;
- (ii) welding equipment of an approved type;
- (iii) the replacement of incandescent lamps or fluorescent tubes in light fittings or elsewhere, in conditions such that this replacement may be effected without danger;
- (iv) any work on electrical apparatus which due to the location of such apparatus cannot be made dead, in which case, whilst this work is being performed, at least two competent persons shall be present throughout the operation;
- (v) the live testing of electrical apparatus, in which case suitable equipment shall be used.

(6) No person, whose duties include the operation of any mobile apparatus or portable

apparatus supplied with electricity by means of a flexible cable, shall at any time either leave that apparatus while it is working or leave the working place, except for the purpose of cutting off the supply of electricity to the cable, without ensuring that the cable has been made dead, unless his instructions expressly authorize him to do so.

(7) A person whose duties include the operation during his shift of any electrical apparatus supplied with electricity by means of a flexible cable shall ensure, before using that cable during that shift, that so much of it as is accessible is examined, and that any further parts which subsequently become accessible are also then examined, and he shall not use any cable which is found to be damaged or defective.

203. Competent person to be available

Whenever any electrical apparatus is in use there shall be a competent person to operate such apparatus available at the mine, quarry or works or readily available on call.

204. Conditions for overhead lines

The requirements of Part V of the Electricity (Supply) Regulations, shall be complied with.

205. Anti-climbing device

In order to prevent, as far as is reasonably practicable, climbing which has not been authorized by the manager, an anti-climbing device shall be fitted—

- (a) at every support for a pole-mountain substation;
- (b) at every support which has broken surfaces within 3 m of the ground.

PART XV

Surface Protection: Abandoned Shafts (regs 206-215)

206. Fencing of shafts

The top of every working shaft shall be securely fenced or protected by an adequate gate or guard-rail.

207. Protection of surface excavation

(1) Any person who digs, or causes to be dug, any excavation for prospecting purposes shall throw or cause to be thrown the earth excavated therefrom in such a manner as to form, as far as is possible, regular ridges around the boundaries of such excavation; or other safe means shall be taken either by filling, fencing or covering so as to prevent any person from inadvertently falling into such excavation.

(2) Any person who digs, or causes to be dug, any excavation other than a prospecting excavation shall throw or cause to be thrown the earth excavated therefrom in such a manner as to form, as far as is possible, regular ridges around the boundaries of such excavation; or other safe means shall be taken either by filling, fencing or covering so as to prevent any

person from inadvertently falling into such excavation:

Provided that this subregulation shall not apply to mining in any open cast working or quarry where the manager has taken such steps he may have deemed necessary to ensure that no person is liable inadvertently to fall into such working.

208. Protection of mine, quarry, works and surface

(1) No holder or manager shall mine or quarry, or permit mining or quarrying, on or under any land lying within a horizontal distance of 100 m from any building, road, railway, river, water right, tailings dam, lake or any other object or surface feature requiring protection except with the written permission of the Engineer and subject to such conditions as he may impose:

Provided that this subregulation shall not apply to any building, road, or railway constructed by or on behalf of the holder or manager and intended for use by the mine or quarry.

(2) Whenever, in the opinion of the Engineer, it is necessary to protect the surface of any ground or to protect any building, road, railway, river, lake, tailings dam, or any object adjacent to a mine, quarry or works, he may, by notice in writing, prohibit the holder or manager from mining or quarrying in any part of such mine or quarry except under such conditions as he may impose.

209. Surface subsidence

(1) When any cracks or subsidences have taken place or are likely to take place as a result of mining or quarrying operations the places where such cracks or subsidences have occurred or are likely to occur shall be fenced in and kept so fenced in and sufficient notices of warning in English and in Setswana shall be prominently displayed at all times in suitable positions along such fences:

Provided that where the manager can prove that it is impossible or unduly onerous for him to keep such fence in the condition required by this subregulation, he may submit to the Engineer in writing an alternative scheme for affording protection against any danger arising from such cracks or subsidences, and the Engineer may, after due consideration, allow or disallow any such scheme, or he may, if he considers it to be inadequate, specify such conditions as he may deem necessary to improve such scheme, and he may at any time require it to be altered.

(2) No person shall enter any place fenced in accordance with this regulation except with the permission of the manager.

210. Underground boundary pillars

(1) On the inside of the boundary lines of every mine, safety pillars shall be left standing, the width of which, in coal mines, shall not be less than 15 m and, in metalliferous mines, not less than 6 m.

(2) On the joint application of the owners of adjoining mines the Engineer may give permission to either party to weaken, cut through or work from the respective pillars between

such mines.

(3) In the absence of such joint application the Engineer may give written permission for the partial working, weakening or cutting through of such pillars.

211. Slimes dams and slimes stores

Any tailings dam or any other place where slimes are stored shall be constructed in such a manner as to prevent, as far as is reasonably practicable, any possible collapse or partial collapse of such dam or place which may cause danger to any person or property.

212. Danger from carbonaceous materials

Any dump containing carbonaceous material or any other dump containing material liable to spontaneous combustion shall be situated at a safe distance from any shaft, open cast working, roadway or building so as to ensure, as far as is reasonably practicable, that any outbreak of fire or spontaneous combustion of such dump shall not cause danger to any person or property.

213. Protection of abandoned excavations and shafts

(1) Where any excavation or shaft ceases to be used—

- (a) the excavation or shaft shall be kept safely and securely fenced, covered over, or filled in; and
- (b) there shall be provided and maintained on the surface of the ground such indication of its existence (whether by a post concreted into the ground with a notice in English and in Setswana affixed thereto, or otherwise) as an inspector may consider sufficient.

(2) Subregulation (1) shall not apply to excavations (other than a shaft) which in the opinion of an inspector are not likely to be dangerous.

(3) Where there is no manager or owner of the mine, quarry or works in or about which there is an excavation to which this regulation applies the person who was the last manager or owner shall for the purposes of this regulation be deemed to continue to be the owner until an inspector grants a certificate stating that the requirements of this regulation have properly been carried out.

(4) Subregulation (3) shall not apply prior to the date of these Regulations coming into force.

214. Damage to abandoned excavations and shafts

(1) Where an excavation or shaft referred to in regulation 213 is no longer used, no person shall, without the consent of the Engineer—

- (a) damage or render it useless or dangerous by the removal of any timber, fencing, casing, lining, ladder, platform, or other appliance provided in or about the same; or
- (b) remove any part of any mound or dump so as to lessen or destroy its usefulness in

protecting persons and animals from falling into the excavation or shaft.

(2) The court by which a person is convicted of an offence under this regulation may order him to make good any damage done, or replace any material or other thing removed and, in default of so doing, pay the Government such damages as the court may determine.

(3) The property in all timber, fencing, casing, lining, ladders, platforms and other appliances in or connected with any excavation or shaft in or at any abandoned mine, quarry or works is vested in the State until the Engineer consents to its removal.

215. Duties on lapse of mineral concession

(1) Any person whose mineral concession lapses shall, forthwith upon such lapse, fill up, fence, or secure to the satisfaction of the Engineer all shafts, pits, holes and excavations, in such manner as to prevent persons or stock inadvertently entering them, but shall not remove beacons, pegs or boundary posts thereon.

(2) If any person fails to comply with subregulation (1), the Engineer may fill up, fence, or secure shafts, pits, holes and excavations and, in such event, the Engineer may recover the expenses of such filling up, fencing or securing from the defaulter and, in the event of any legal proceedings, a certificate by the Engineer as to the amount owing shall be *prima facie* proof of such amount.

(3) Any person who fails to comply with subregulation (1) shall be guilty of an offence.

PART XVI

Outlets, Ladderways and Travelling Ways Underground (regs 216-228)

216. Two separate and independent shafts or outlets to be provided

(1) Every person employed underground shall have available to him not less than two separate and independent shafts or outlets affording means of ingress to and egress from underground:

Provided that this regulation shall not apply to a sinking shaft or winze.

(2) Such shafts or outlets shall—

- (a) not at any point be nearer to each other than 10 m;
- (b) be provided with proper arrangements, which shall be kept constantly available for use, to enable all persons to have a ready means of ingress and egress at all times;
- (c) be maintained in a safe condition and of sufficient cross-sectional area throughout to allow the free passage of all persons; and
- (d) be connected to each other by a reasonably convenient route.

217. Two separate and independent means of ingress and egress to be provided

(1) Every working place in which more than 50 persons work underground at any one time shall be provided with not less than two separate and independent means of ingress and egress so that every person has available to him two such means of ingress and egress one to each of the two shafts outlets:

Provided that this regulation shall not apply to the mining of any adit or other development heading underground which is not more than 600 m from the last through connection to two such means of ingress and egress; where such adit or development is likely to exceed 600 m prior approval, with any such conditions as he shall impose, shall be obtained in writing from the Engineer before such adit or development exceeds 600 m.

(2) Such means of ingress and egress shall be so arranged that should either become unavailable at any point the other will afford egress from such working place to one shaft or outlet.

(3) The two means of ingress and egress required by subregulation (1) shall be—

- (a) provided with proper arrangements, which shall be kept constantly available for use, to enable every person to have a ready means of ingress and egress;
- (b) maintained in safe condition and of sufficient cross-sectional area throughout to allow the free passage of every person.

218. Responsibility when the shaft or outlet and means of ingress and egress are situated in another mine

(1) Where any shaft or outlet provided in accordance with regulation 216(1) and any means of ingress and egress provided in accordance with regulation 217(1) is situated in another mine the manager of such other mine shall be responsible for such shaft or outlet or such means of ingress or egress.

(2) If any obstruction arises in such mine to affect the safe use of such shaft or outlet or such means of ingress or egress the manager shall notify the manager of the other mine who will be affected by such obstruction.

(3) If any of the connections are situated in an abandoned mine, the manager of the mine for the workings of which such connections are required shall be responsible for such part.

219. Ingress and egress only by authorized ways

No person shall enter or leave any underground working except by means of the ingress and egress specially provided or set apart for this purpose unless such person is authorized by the manager to enter or leave by any other means.

220. Ladderways and travelling ways for leaving parts of the mine

There shall be provided a sufficient number of ladderways and travelling ways permanently maintained and kept free from obstruction to enable every person to leave every part of a mine:

Provided that this regulation shall not apply to a ladderway which is temporarily out of use for the purpose of repair and where proper precautions are taken for the safety of every person underground at that time.

221. When separate ladderway compartment is required

Every shaft or raise at an inclination of more than 15° above the horizontal or any winze at an inclination of more than 15° below the horizontal through which persons travel, or any shaft, winze or raise having mechanical haulage and through which persons travel, shall have a separate ladderway compartment:

Provided that this regulation shall not apply to the travelling ways in which vehicles which are employed on trackless mining travel.

222. Requirements for ladderways

(1) Every ladder used in ladderways shall—

- (a) be securely fastened in position;
- (b) be of good construction, free from patent defect and of adequate strength for the purpose for which it is used;
- (c) be maintained in good repair;
- (d) not be fixed in an overhanging position;
- (e) project at least 1 m above the mouth of every shaft, winze, raise or other excavation and above every landing place in which it is installed except when strong hand rails are fixed at such mouth or landing place; and
- (f) have a level and firm footing.

(2) Subject to the provisions of regulation 224, no ladder used in a ladderway shall be at an inclination of over 80° to horizontal and when a ladder is—

- (a) at an inclination to the horizontal of 70° or over, adequate landing places shall be provided at distances of not more than 10 m apart, and each ladder shall be so arranged as to cover the manhole of the landing place on which it rests, or penthouses shall be provided, and shall be adequately partitioned off from any winding compartment;
- (b) at an inclination to the horizontal of more than 35° and less than 70°, it shall be broken every 20 m by adequate landing places, and the ladderway shall be adequately partitioned off from any winding compartment, and handrails be provided where necessary; or
- (c) at an inclination to the horizontal of 35° or less, steps, ladderways or walkways so designed to minimize the danger from falling or slipping shall be adequately partitioned

off from any winding compartment.

223. Other ladders

Every ladder, other than ladders in ladderways referred to in regulation 220, shall—

- (a) be of good construction, and of adequate strength for the purpose for which it is used and be free from patent defect;
- (b) be maintained in good repair;
- (c) not be fixed in an overhanging position;
- (d) be securely fastened, where used in a permanent position, or in the case of a portable ladder be placed in a stable position; and
- (e) have a level and firm footing.

224. Vertical ladders

Where vertical ladders are used they shall be subject to the following additional conditions—

- (a) they shall have adequate safety hoops or shall be so positioned with regard to the wall of the ladderway that the person using the ladder can lean back against the wall of the ladderway to rest;
- (b) landing places shall be provided at distances of not more than 10 m apart; and
- (c) the provisions of subregulation 222(1) shall apply.

225. Sinking operations

During sinking operations there shall be provided from the end of the permanent ladderway, or stage, to the bottom of the shaft or winze chains, chain ladders or wire rope ladders.

226. Objects carried on ladderways

(1) No person shall carry or cause another person to carry any drill tool or any loose material on any ladderway which may interfere with his safe passage, except so far as may be necessary in executing repairs.

(2) Any person carrying an object in a ladderway shall ensure that it cannot be reasonably expected to drop down the ladderway.

227. Shaft inspection

The manager of a mine where a hoist is in use shall depute some competent person or persons whose duty it is to make an inspection of the shaft at least once each week, and in addition a thorough examination shall be made at least once each month of the guides, timber, walls and hoisting compartments generally of the shaft, and a record of such inspection and

examination shall be made in the shaft log book by the person making the examination.

228. Shaft log book

(1) Every such manager shall keep or cause to be kept at the mine a book for each shaft termed the "shaft log book" in which shall be recorded a report of every such examination, as is referred to in regulation 227, signed by the persons making the examination.

(2) Such entries of examinations shall be read and initialled every week by the person in charge of the maintenance of the shaft.

(3) A notation shall be made of any dangerous condition reported and the action taken regarding it over the signature of the person in charge of the maintenance of the shaft.

(4) The shaft log book shall be made available to an engineer at all times.

PART XVII

Dumps (regs 229-248)

229. Drainage of dumps

(1) Dumping operations shall not be carried out in a manner so that such operations cause an accumulation of water in, under or near the dump which may make the dump insecure or dangerous.

(2) Every dump shall be kept properly drained.

(3) Drainage from dumping operations shall be diverted away from and prevented from entering any mine openings or subsiding ground over any mine workings whether abandoned or not.

230. Dumping over mine areas

Dumping of material which is wholly or mainly in solution or suspension or of material which under any circumstances can act as a fluid in an area vertically above any mine workings (whether abandoned or not) or within a horizontal distance of 100 m of such area or where the line of break from the mine workings will intersect the surface is prohibited.

231. Appointment of competent person to supervise

(1) For every classified dump there shall be appointed by the manager a competent person or persons to supervise—

- (a) any provision of a system of drainage for the dump;
- (b) the maintenance in proper order of the drainage;
- (c) the regular inspection of the dump and where practicable its drainage;
- (d) the making and keeping of the dump secure;

- (e) any provision for the prevention of pollution of the surroundings or abatement of any nuisance;
- (f) the carrying out of the dumping operations in the case of an active dump; and
- (g) the programme of rehabilitation in the case of a closed dump.

(2) Every competent person so appointed under this regulation shall record in a book provided for that purpose a report of every defect revealed by any inspection of the dump and its drainage and record the action taken to remedy such defect.

232. Abnormalities

It shall be the duty of the manager to ensure that any matter disclosed by any report, record or other kind of information on or relating to the dump which is of an abnormal or unusual nature as regards the dump or is of a kind which will or may necessitate the taking of steps by the manager or any other person is promptly brought to his notice or to the notice of any person to whom written instructions have been given by the manager charging him with the safety of the dump or its surroundings.

233. Dumping rules

In the case of an active classified dump—

- (a) the manager shall make dumping rules with respect to the dumping operations on that dump and such rules shall in particular specify—
 - (i) the manner in which dumping operations are to be carried out; and
 - (ii) the nature and extent of supervision of the dumping operations and the precautions to be taken to avoid dangerous occurrences, or any matter which may give rise to pollution or nuisance and keeping the dump secure; and
- (b) where dumping operations are resumed at a dump which was previously a closed classified dump, new dumping rules shall be made upon the resumption of the operations, and for all purposes the dump shall be deemed to be an active classified dump.

234. Notification of dumps

(1) Within 30 days after the coming into operation of these Regulations the manager shall give written notice to the Engineer of any active dump and of the fact as to whether or not it is a classified dump.

(2) The manager shall not less than 30 days prior to the commencement or resumption of dumping operations give written notice to the Engineer stating where it is intended that the resulting dump or dumps are or are not to be a classified dump.

(3) The written notice required under subregulations (1) and (2) shall be accompanied by a

description of the site and of the material dumped or to be dumped.

235. Engineer may deem dump to be a classified dump

Where the manager has given written notice under regulation 234 that the dump is not or is not to be a classified dump the Engineer may, for the purpose of ensuring the security of the dump, proposed dump or land, serve written notice on the manager that the resulting dump shall be deemed for the purposes of these Regulations to be a classified dump.

236. Plans and report

(1) Where the manager gives notice under regulation 234 of the operation of or intention to commence or resume a classified dump, or receives notice under regulation 235 he shall, in the case of an active classified dump, within three months, or before commencing or resuming dumping operations not less than 30 days, forward to the Engineer—

- (a) an accurate plan on which is delineated the area on which the dump is or is to be situated and the neighbouring land within 500 m of the boundaries thereof, and such plan shall—
 - (i) be to a scale of not less than 1/5000 contoured and orientated to and correlated with the mine surface plan;
 - (ii) show all mine workings (whether abandoned or not), previous land movements, springs, wells, water-courses and other natural, geological or topographical features which might affect the security of the dump or might be relevant for determining whether the land on which the dumping operations are being carried out is satisfactory for the purpose; and
 - (iii) show all surface installations:

Provided that the provisions of this paragraph shall not apply if the maps, sections and plans have already been submitted within two years prior to resumption of dumping operations and no changes have since occurred which render those maps, sections and plans incorrect in any material particular at the time of resumption of dumping; but in any event the manager shall give full details of any mine workings which have advanced to a horizontal distance of less than 500 m from the boundaries of the dump;

- (b) a report, from a person competent to make such report, on the method of carrying out the dumping operations and on every other matter which might affect the security of the dump or dumping area, containing in particular—
 - (i) the intended total amount of material to be dumped and the average amount per month;
 - (ii) the dumping method;
 - (iii) details of the site preparation, drainage and foundations;

- (iv) plans to a scale of not less than 1/5000 and sections to scale not less than 1/1250 or to such larger scale as the Engineer may direct recording the design of the dump, its intended area, height and contours of the boundaries of the dump, the position and nature of construction of any wall or other retaining structure, the design and capacity of any spill-ways and the type of material being deposited;
- (v) the nature and extent of inspection, supervision and safety measures which in the opinion of the person making the report are necessary during the dumping operations to ensure the safety of the dump; and
- (vi) details of the measures intended to be taken to prevent pollution or abate nuisance.

(2) Where the Engineer is of the opinion that additional surveys, tests, boreholes or ground water measurements ought to be made or that provision ought to have been made in the report for any matter for which provision was not made he may give to the manager written notice specifying the additional surveys, tests, boreholes or ground water measurements which ought to be made and requiring the manager to obtain a supplementary report from the person who made the previous report or from some other person competent to make the report as may be required in such notice.

237. Reporting on security

(1) In the case of an active classified dump, the manager shall obtain a report from a person competent to make a report on the dump and the ground between the dump and the surface intersections of vertical planes drawn from the boundaries of any mine workings within 500 m from the nearest edge of the dump and on every matter which might affect the security of the dump and the mine workings at intervals of not more than two years and as soon as practicable after a dangerous occurrence in relation to the dump and the ground between the dump and the surface intersections of vertical planes drawn from the boundaries of any mine workings within 500 m from the nearest edge of the dump or after such a change in the specifications or design of the dump or nature of material to be dumped, as might affect its security, has been made.

(2) One copy of such report shall be kept at the office and shall be open to inspection by any inspector, and one copy thereof shall be sent to the Engineer.

(3) In the case of an active classified dump or a dump deemed under regulation 235 to be a classified dump such report shall be sent to the Engineer within two years after the coming into operation of these Regulations.

(4) Where dumping operations are begun on an area which was not previously the site of a dump, the first report shall be sent to the Engineer not more than two years after the date on which dumping operations began.

(5) Dumping operations shall not be resumed at a closed dump until the conditions laid down in subregulations (1) and (2) are satisfied:

Provided that the provisions of this regulation shall not require the manager to obtain a report within two years of any report already obtained in respect of the dump under the provisions of regulations 236 and 237 unless such a change in the design of the dump or such a variation to or departure from its specification, as might affect its security, has been made or mine workings have advanced to a horizontal distance of less than 500 m from the boundaries of the dump.

- (6) Every report obtained for the purposes of this regulation shall contain in particular—
- (a) an opinion whether the dump is secure;
 - (b) an opinion whether, so far as the person making the report can ascertain, there have been any changes in the design of the dump or in the nature or type of material deposited or departure from the original design (other than those noted in previous reports under these Regulations) with details of them;
 - (c) an opinion whether, so far as the person making the report can ascertain, there has occurred or is likely to occur any subsidence or other surface movement which may affect the security of the dump with details of the subsidence or other surface movement and its effect or probable effect on the security of the dump, or any mine workings (whether abandoned or not);
 - (d) an account of any surveys, tests, boreholes and ground water measurements made for the purposes of the report and the results thereof; and
 - (e) the nature and extent of inspection and supervision which in the opinion of the person making the report are necessary to be carried out and the measures which in his opinion are necessary to be taken during dumping operations for the purpose of ensuring the security of the dump and its surroundings and avoidance of pollution and prevention of nuisance.

238. Notification of cessation of dumping

(1) In the case of an active classified dump the manager shall inform the Engineer within 30 days of the permanent cessation of dumping operations on the dump, and apply for the dump to be recorded as a closed classified dump.

(2) Where an active classified dump has been declared a closed classified dump under this regulation the manager shall, within 12 months of the date of such declaration, forward to the Engineer a plan and proposals for the rehabilitation of the dump and the surrounding area which has been affected by dumping operations.

(3) The Engineer shall, after receipt of the rehabilitation plan, inform the manager of any alterations to the plan which in his opinion are necessary and, if no such request is received by the manager within 30 days, the manager shall put the plan into operation.

(4) Where mine workings approach to within a horizontal distance of 500 m from the boundaries of a closed classified dump the manager shall within seven days inform the Engineer who may require the manager to obtain and forward to him a report from a person

competent to make such report, on the effect of such mine workings on the security of such dump.

239. Inspection of active classified dumps

(1) The manager shall ensure the proper carrying out of arrangements whereby a competent person appointed for that purpose by him shall inspect weekly every active classified dump and its surroundings and the drainage and the ground between the dump and the surface intersections of vertical planes drawn from the boundaries of any mine workings within 500 m from the nearest edge of the dump and shall carry out such inspection as required to ensure that the dumping rules are being observed.

(2) A person who has carried out an inspection in pursuance of this regulation shall forthwith make and sign a full and accurate report of every defect revealed by the inspection and such report shall be kept in a book at the office and shall be open to inspection by an inspector.

(3) The person responsible for the supervision of the dump shall record in the book aforesaid the action taken to remedy any defect revealed by any inspection of the dump and its drainage.

240. Inspection of closed classified dumps

(1) In the case of a closed classified dump the manager shall ensure that satisfactory arrangements are made whereby a competent person appointed for that purpose by the manager shall inspect every such dump and the land on which it is situated to a distance of at least 500 m from the boundaries of the dump and to the best of his ability inspect the drainage of the dump and the operation of the rehabilitation plan and steps taken for the abatement of nuisance and prevention of pollution:

Provided, however, that—

- (i) where the dump consists of material accumulated or deposited wholly or mainly in solution or suspension, the inspection shall be carried out at intervals not exceeding six months;
- (ii) where the dump consists of material accumulated or deposited wholly or mainly in a solid state and not in solution or suspension, the inspection shall be carried out at intervals not exceeding 12 months.

(2) A person who has carried out an inspection under subregulation (1) shall forthwith make and sign a full and accurate report of the inspection, and every such report, or a copy thereof, shall, until the expiration of five years after such inspection, be kept at the office and shall be open to inspection by any person employed at that mine, quarry or works.

(3) A person who has carried out an inspection under subregulation (1) shall forthwith record in a book provided for that purpose by the manager a report of every defect revealed by the inspection.

(4) A person having responsibility for a dump shall record in a book provided for that purpose by the manager the action taken to remedy any defect revealed by any inspection of the dump

and its drainage carried out under subregulation (1).

- (5) Every entry made in any such book, or a copy of that entry, shall be preserved—
 - (a) where the dump consists of material accumulated or deposited wholly or mainly in solution or suspension, until the expiration of five years after the date on which it is made or until a report has been obtained under regulation 242 whichever is the earlier; and
 - (b) where the dump consists of material accumulated or deposited wholly or mainly in a solid state and not in solution or suspension, until the expiration of 10 years after the date on which it was made or until a report has been obtained under regulation 242, whichever is the earlier.

241. Reports on active classified dumps

In the case of an active classified dump it shall be the duty of the manager to keep at the office—

- (a) any reports on or relating to every dump obtained under regulation 236(1)(b);
- (b) any directions relating to such dump made by an inspector;
- (c) accurate plans and sections of the dump and the dumping area showing clearly and accurately the extent of the dump up to a date not exceeding 15 months past or such other date as the Engineer may require in any particular case, accurate plans of neighbouring land within 500 m of the boundaries of the said dump and accurate sections showing surface installations and any mine workings (whether abandoned or not) and any geological features and anything else which may affect the security of the dump; and
- (d) a record completed at the end of each calendar month showing the nature, quantity and location of the material deposited.

242. Reports on closed classified dumps

(1) In the case of a closed classified dump the manager shall obtain and forward to the Engineer—

- (a) a report from a person competent to make such report on the dump and on every matter which might affect the security of the dump—
 - (i) where the dump consists of material accumulated or deposited wholly or mainly in solution or suspension, at intervals not exceeding five years; and
 - (ii) where the dump consists of material accumulated or deposited wholly or mainly in a solid state and not in solution or suspension, at intervals not exceeding 10 years;
- (b) a special supplementary report as soon as practicable after a dangerous occurrence in

relation to the dump.

- (2) Every report obtained under subregulation (1) shall contain *inter alia*—
- (a) an opinion whether the dump is secure;
 - (b) details of any subsidence or other surface movement which has taken place which may affect the security of the dump or indicate a danger to mine workings;
 - (c) an account of any surveys, tests, boreholes and ground water measurements made for the purposes of the report and the results thereof; and
 - (d) the nature and extent of inspection and supervision and the measures which in the opinion of the person making the report are necessary for the purpose of ensuring the security of the dump and surrounding area and to prevent pollution and abate nuisance.
- (3) The manager shall forward to the Engineer a report under subparagraph (1)—
- (a) in the case of a classified dump where dumping operations have not been carried out at that dump since the date of coming into operation of these Regulations, within two years after that date;
 - (b) when a report required under subregulation (1) in respect of a dump consisting of material accumulated or deposited wholly or mainly in solution or suspension, within five years after the report has been obtained;
 - (c) where a report required under subregulation (1) in respect of a dump consisting of material accumulated or deposited wholly or mainly in a solid state (and not in solution or suspension), within 10 years after the report has been obtained.

243. Record to be kept

(1) In the case of a closed classified dump it shall be the duty of the manager to keep at the office a book and proper plans and sections, and he shall ensure that a record is kept, by a person competent to do so, of—

- (a) particulars of any operations carried out on the dump which might affect its security, including surveys and tests and building, mining or engineering operations;
- (b) any reports on or relating to every such dump obtained under these Regulations;
- (c) any direction relating to such dumps given by an inspector;
- (d) accurate plans and sections of every such dump and of the area on which the dump is situated showing clearly and accurately the extent of the dump up to the date on which it ceased to be used for the deposit of material, accurate plans of the neighbouring land within 500 m of the said premises and such accurate sections of the strata underlying the dump as may be necessary to show any variation in the thickness or

character of the strata which may affect the security of the dump; and

(e) a plan for the rehabilitation of the dump and surrounding area.

(2) All such books, plans, sections and records shall be available to an inspector for inspection.

244. Abandonment

In the event of the temporary or permanent closing down of any mine, quarry or works or abandonment or termination of any mineral concession with which an active or a closed classified dump is associated, all plans, sections, reports and records relating to dumps shall be disposed of as required under regulation 584.

245. Duties of manager

It shall be the duty of the manager to ensure that every person appointed under these Regulations to carry out supervision or inspection understands the nature and scope of any duties required to be performed under these Regulations.

246. Directions

The Engineer may at any time give notice in writing to the manager that a dump which is not a classified dump shall be treated as a classified dump.

247. Exemptions

The Engineer may, by giving notice in writing to the manager and upon such terms and conditions as he may think fit—

- (a) in the case of an active dump, exempt the mine, quarry or works or any part thereof including the dump or any part thereof; and
- (b) in the case of a closed dump, exempt the mine, quarry or works or any part thereof including the dump or any part thereof,

from the application of any of these Regulations if he is satisfied that the application of such registration is inappropriate in relation to the mine, quarry or works or any part thereof, of the active dump or any part thereof, or of the closed dump or any part thereof, or that the security of the dump will not be prejudiced in consequence of the granting of such exemption.

248. Appeals

If the manager objects to any direction or notice given under these Regulations by the Engineer or an inspector, he may, within 30 days after receipt thereof, submit his objection in writing to the Minister who shall thereupon determine the matter and give his decision in writing; and such decision shall be final.

PART XVIII

Excavations, Buildings, Construction and Demolition (regs 249-284)

249. Excavations

(1) The Manager shall cause every excavation which is accessible to the public or which is adjacent to public roads or paths and whereby the safety of any person may be endangered to be—

- (a) adequately protected by a barrier or fence at least 1,0 m high and as close to the excavation as practicable; and
- (b) provided with red warning lights at night.

(2) No manager shall, except for the purpose of erecting shoring or bracing, require or permit any person to, and no person shall, work in an excavation under unsupported overhanging material or in an excavation which is more than 1,5 m deep and which has not been adequately shored and braced:

Provided that shoring and bracing shall not be necessary where the sides of the excavation are sloped to at least the natural angle of repose of the earth measured relatively to the horizontal plane, or where such excavation is in solid rock.

250. Competent person in charge of building and construction

(1) The manager shall ensure that the erection of every structure shall be under the supervision of a responsible person who shall be a competent person and who shall be appointed by him in writing.

(2) The person who is appointed in terms of this regulation shall be in general charge of all the building and construction work and shall ensure that—

- (a) the provisions of these Regulations are complied with;
- (b) all plant and machinery is maintained in good condition and properly used; and
- (c) all work is carried out in a safe manner and in accordance with the design and specifications as approved by the appropriate authority.

251. Safety hats

No person shall enter or remain in a construction area where the danger of head injuries from falling, flying, or thrown objects exists unless he is wearing a hat of approved type specially designed and manufactured for the purpose of protecting the wearer from such head injuries.

252. Standard of construction

All material and equipment used in building and engineering construction shall be of good construction, suitable material, adequate strength, free from patent defect and shall be properly

maintained.

253. Scaffolds inspection and erection

(1) All material used for any scaffold shall be inspected and found satisfactory by a competent person on every occasion before being put or taken into use.

(2) No scaffold or suspended scaffold shall be erected, substantially added to, altered or dismantled otherwise than under the immediate supervision of a competent person and so far as possible by persons possessing adequate experience of such work.

254. Frequency of inspection

The manager shall ensure that every scaffold in use, together with all fittings and connections, shall be examined at least once a week by a competent person.

255. Skips, buckets, boatswain's chair, etc.

(1) No skip, bucket, boatswain's chair or similar equipment shall be used in place of a suspended scaffold, except in special circumstances where the work to be performed therefrom is of such short duration as to make the use of a suspended scaffold unreasonable or where the use of a suspended scaffold is not reasonably practicable; such equipment shall only then be used under the supervision of a competent person and suitable measures shall be taken to prevent spinning or tipping and to prevent any occupant from falling therefrom.

(2) No skip or bucket shall be used in place of any suspended scaffold unless it is at least 1,1 m deep.

256. Trestle scaffolds

(1) No trestle scaffold shall be used—

- (a) if it is constructed with more than three tiers; or
- (b) if it has a working platform more than 5,0 m above the ground, floor or other surface upon which it is erected.

(2) No trestle scaffold shall be erected on a scaffold platform unless—

- (a) the width of such platform is such as to leave sufficient clear space for the transport of material; and
- (b) the trestles or uprights are firmly attached to such platform and adequately braced to prevent displacement.

(3) No trestle scaffold shall be erected on a suspended scaffold.

257. Ladder scaffolds

(1) Every ladder scaffold shall be of adequate strength and used only for light work.

(2) No ladder scaffold shall be erected on any suspended scaffold.

258. No overloading of scaffolds

(1) No scaffold or suspended scaffold shall be overloaded, and no material shall be kept thereon unless needed within a reasonable time.

(2) No crane shall be installed on any scaffold unless a competent person has satisfied himself as to the strength and stability of such scaffold.

(3) Any material being transferred on or to a scaffold or suspended scaffold shall be moved or deposited without causing any violent shock.

259. Provisions for platforms

Any platform from which any person is liable to fall more than 2,0 m shall be—

- (a) closely boarded, planked or plated and firmly secured;
- (b) at least 460 mm wide if the platform is used as a footing only and not for the deposit of any material thereon;
- (c) at least 1,0 m wide if the platform is to be used for the deposit of material thereon; and
- (d) at least, 1,5 m wide if the platform is to be used for the support of any higher platform.

260. Planking, guard rails and toe boards on platforms

(1) Suitable measures, such as the provision of adequate bevelled pieces, shall be taken to reduce to a minimum the risk of tripping and to facilitate the movement of barrows where boards or planks which form part of a working platform, gangway or run overlap each other or are not of reasonably uniform thickness where they meet each other, or, owing to warping or for some other reasons, do not provide an even surface.

(2) Every side of any working platform or working place being a side from which a person is liable to fall a distance of more than 2,0 m shall be provided with—

- (a) two rails of adequate strength, firstly, a handrail at a height of not less than 1,0 m and not more than 1,1 m above such platform or place, and, secondly, a knee rail placed at the mid-point between the top rail and the walkway; and
- (b) toe-boards up to a sufficient height, being in no case less than 150 mm, so placed as to prevent so far as possible the fall of any person, material or tool from such platform or place.

(3) A clear passageway at least 460 mm wide shall be left between one side of any working platform and any fixed construction or deposited material.

261. Openings left in roofs or floors

Every accessible opening in any roof or in any floor of a building or structure, or in any

working platform for a lift, shaft or stairway, or for the hoisting of materials, or for access by workmen or for any other purpose during any construction work shall, until it becomes necessary to remove any fencing in order to complete the permanent structure or enclosure, be provided with a guard-rail and toe-board constructed in accordance with regulation 260(2) or with a covering to prevent the fall of any person, material or tool through the opening, except where and when access is required for any person or for the movement of any material, and then only if adequate precautions are taken for the safety of any person working in the immediate vicinity thereof.

262. Working on sloping surfaces

Where any person is employed in connection with any construction work on a sloping surface of any roof structure, ground or material from or down which, taking into account the inclination of the slope, the nature of the surface or material and the state of the weather, a person is liable to fall a vertical distance of more than 2,0 m, there shall be provided where practicable and appropriate—

- (a) sufficient and suitable ladders or crawling boards which shall be secured as soon as is practicable; and
- (b) a suitable working platform fitted with suitable guard-rails.

263. Protection for persons on roofs

Where any person has to pass over or work on any roof through which any person may fall, suitable and sufficient ladders, duck ladders, crawling boards or other means for facilitating his safe passage or safe working condition shall be provided and used.

264. Gangways and runs

(1) No gangway, run or working platform shall be used for the passage of material unless it affords a clear passageway which is adequate in width for the passage of any material without the removal of any guard-rail or the toe-board and in any case is not less than 700 mm wide.

(2) No gangway or run shall be used if its slope exceeds one vertical to three horizontal.

(3) Where the slope of any gangway or run renders additional foothold necessary, and in every case where the slope exceeds one vertical to four horizontal, there shall be provided proper stepping laths which shall be—

- (a) placed at suitable intervals; and
- (b) the full width of such gangway or run, except that they may be interrupted over a width of not more than 100 mm to facilitate the movement of barrows.

265. Guard-rails for gangways, etc.

Any gangway, staircase, working place or exit from any building from which a person is liable to fall a distance of more than 2,0 m shall be provided with a suitable guard-rail of adequate

strength and to a height of not less than 1,0 m and not more than 1,1 m above such gangway, staircase, working place or exit.

266. Platforms, etc. to be unobstructed

Every platform, gangway, staircase and working place shall be kept free from any unnecessary obstruction, projection or material, and from any rubbish, projecting nail or any substance likely to cause any person to slip.

267. When any working place becomes permanent, provisions for safety

When, in any construction work, a scaffold or working place remains as part of the completed structure, so as to become an established working place, it shall be—

- (a) provided with a safe means of access and egress; and
- (b) so constructed as to provide a safe working place for every person employed thereat.

268. Builder's hoist

(1) The tower of every builder's hoist shall be—

- (a) secured to the structure or braced by steel wire guy ropes and extend to such a distance above the highest landing as to allow a clear and unobstructed space at least 1,0 m for over-travel;
- (b) enclosed on all sides at the bottom, and at all floors where persons are liable to be struck by moving parts of the hoist, except on the side or sides giving access to the conveyance, with walls or other effective means, to a height of at least 2,2 m from the ground or floor level; and
- (c) provided with a door or gate at least 2,0 m high at each landing and such door or gate shall be kept closed except when the conveyance is at rest at that landing.

(2) The manager shall ensure that—

- (a) the conveyance and counterweight, if any, of every builder's hoist is guided throughout its travel by rigid guides;
- (b) no suspension rope is used unless it is constructed of steel wire of good quality and manufacture and has a factor of safety or not less than six based on the maximum load it is required to support;
- (c) each suspension rope is free of joints and secured to the conveyance by splicing or suitable rope clamps or other means approved by the inspector;
- (d) the suspension rope is securely attached to the drum and that at least three turns of rope remain on the drum at all times;
- (e) the winding drum is provided with flanges to prevent the rope from slipping off and that

the diameter of such drum, as well as any deflector pulley or sheave, is not less than 350 times the diameter of the largest outer wire in the rope;

- (f) the hoist is provided with—
 - (i) an efficient brake by means of which the load can be effectively controlled; and
 - (ii) an effective device on the operating lever so arranged as to prevent accidental movement of the lever;
- (g) effective arrangements are made for signals for the operation of the hoist to be given from each landing at which the hoist is being used; and
- (h) the conveyance is so constructed as to prevent material from falling out.

(3) No manager shall require or permit, and no person shall cause, trucks, barrows, or material to be conveyed on or in the conveyance unless such trucks, barrows or material are so secured or contained that displacement cannot take place during conveyance.

(4) No manager shall require or permit any person to, and no person shall, ride on a builder's hoist.

(5) The manager shall cause every builder's hoist to be inspected at least once every week by a person who has had at least one year's experience in the erection and maintenance of builder's hoists or similar work and who shall examine the entire hoist including guides, ropes and their connections, drums, sheaves or pulleys and all safety devices and who shall enter and sign the result of each such inspection in a record book which shall be kept for that purpose and be retained by the manager for inspection by an inspector at any time.

(6) If as a result of any examination any weakness or defect is discovered, such weakness or defect shall be reported immediately to the manager, and the hoist shall not be used until the weakness or defect has been rectified.

269. Safe procedure

Before commencing any demolition the manager shall make, or cause to be made, a thorough inspection in order to determine the dangers to be guarded against and the procedures to be taken to minimize these hazards and the demolition shall be done in such a way as not to expose workmen to unnecessary risks.

270. Competent person in charge of demolition

All demolition work and any operation incidental thereto shall be placed under the supervision of a competent person experienced in demolition operations, and such person shall have charge of such work during the whole time such work is being carried out.

271. Precautions to be taken during demolition work

Before any demolition work is commenced and also during the progress of such work—

- (a) no electric cable or apparatus (other than any cable or apparatus used for the operation) which is liable to be a source of danger shall remain electrically charged;
- (b) all practicable steps shall be taken to prevent danger to any person from the—
 - (i) risk of fire or explosion through accumulated gas or vapour; and
 - (ii) risk of flooding from water mains, sewers or culverts; and
- (c) precautions shall be taken to prevent, as far as is practicable, any accidental collapse of such demolition work or other operation which may endanger persons.

272. Glass and sash removal

Glass, window sash, metal cornices and other special hazard materials shall be removed before general demolition is started.

273. Walls

Walls, or parts thereof, shall not be left standing in a dangerous or unstable condition.

274. Overloading of floors

Masonry, plaster, roofing beams or any other material shall not be permitted to fall on, or to remain on, the floors of the structure being demolished in such masses as will exceed the safe carrying capacity of the floor.

275. Demolishing walls

Before demolishing any interior or exterior wall which is within 3,0 m of any opening in the floor immediately below, such opening shall be substantially planked over, unless all workmen are removed from all floors below and access to such floors is positively prevented.

276. Housekeeping

All old material and rubbish shall be removed as soon as practicable and shall not be allowed to accumulate on floors nor upon the ground immediately outside of the building.

277. Throwing material from upper floors

When a structure is being demolished and material is to be thrown from upper storeys to the ground, the space on which such material is directed to fall shall be barricaded to prevent entry.

278. Steel structures

Steel structures shall be demolished column length by column length and tier by tier.

279. Controlled lowering of structural members

(1) No structural member which is being dismantled shall be placed under any stress other than its own weight, and the member shall be chained or lashed in place to prevent any

uncontrolled swinging or dropping.

(2) Structural members shall not be thrown or dropped from the building, but shall be carefully lowered.

280. Provision of chutes

When a structure is being demolished and where dust or falling material is likely to create a hazard, chutes shall be provided for the removal of brick or other debris, and all such chutes shall be completely enclosed.

281. Elevation restrictions

Chutes shall not extend in an unbroken line for more than two storeys in elevation, and gates or stops shall be placed at the bottom of each chute.

282. Warning signs

Warning signs of adequate size shall be placed adjacent to chute outlets bearing the wording "DANGER—Sliding Material".

283. Scaffolds, lifelines, safety belts, nets

Whenever workmen are engaged in the removal of any part of a building or structure more than 2,5 m above a floor, platform, or grade, there shall be provided for the protection of workmen suitable scaffolds, lifelines, safety belts, or life nets.

284. Shed and toolboxes

Construction-sheds and toolboxes shall be so located that they will not expose workmen to the danger of falling walls and other falling objects.

PART XIX

Diesel Units and Fuel Storage Underground (regs 285-308)

285. Use of engines underground

(1) No internal combustion engine other than a diesel engine shall be used underground.

(2) Every engine used underground—

(a) shall be of an approved model; and

(b) shall conform in every respect with the model as approved.

(3) Before approving an engine which is to be used underground, the Engineer may direct that the engine be tested in a manner and place, and by a person, specified by him.

(4) The manager shall—

(a) ensure that a distinguishing number is affixed to every engine used underground in a

mine; and

- (b) keep a record containing all data relevant to the operating history of every engine so used.

286. Exhaust gas scrubbers or exhaust purifiers

(1) Every diesel engine used underground shall be fitted with an approved exhaust gas scrubber of the water type or an exhaust purifier.

(2) If an exhaust gas scrubber is used the water in a scrubber shall be changed at least twice a shift and every scrubber tank shall be cleaned at least once a day.

287. Provisions relating to diesel engines

(1) Every diesel engine used underground shall be fitted with—

- (a) approved means of preventing any unauthorized adjustment of the rate of fuel injection or the maximum governed speed; and
- (b) a plug for gas sampling, on the exhaust system between the engine and the scrubber.

(2) No diesel engine shall be used underground, if—

- (a) it has any defect which may affect its safe operation; or
- (b) its exhaust gas contains excessive smoke.

(3) The exhaust gas of a diesel engine shall be sampled when the engine is developing maximum power and when the engine is idling, and analysed by approved methods, at intervals not exceeding 30 days, or more frequently if required by an inspector.

(4) A person who makes an analysis for the purpose of subregulation (3) shall enter the results thereof in the diesel record book.

(5) Whenever or wherever insufficient ventilating air is being supplied underground, every engine shall be stopped forthwith until the supply of air is restored.

288. Control of gases in a diesel unit underground

The manager shall ensure that every diesel unit underground shall have effective provision to ensure that—

- (a) air entering the engine is cleaned;
- (b) no exhaust gases are expelled directly to the atmosphere; and
- (c) the emission of flames or sparks is prevented.

289. Portable fire extinguisher on a diesel unit

Every self-propelled diesel unit underground shall have a suitable portable fire extinguisher

readily accessible to the driver when the unit is in use.

290. Driver to ensure that fire extinguisher is affixed

It shall be the duty of the driver of any self-propelled diesel unit to ensure that the portable fire extinguisher required in accordance with regulation 289 is affixed, and in the event of it not being so affixed he shall notify forthwith the person in authority.

291. Diesel unit to have speed indicator

Where any self-propelled diesel unit travels on any road where the speed is limited, an operative speed indicator shall be provided and maintained except where the speed of such unit is governed mechanically in such a manner that the speed limit of such road cannot be exceeded.

292. Drivers to have unobstructed view

The drivers of every self-propelled diesel unit in motion underground, other than diesel locomotive drivers operating in conjunction with a whistler, shall, at all times, have an unobstructed view in the direction of travel:

Provided that during the immediate operations of loading and tipping this condition need not apply.

293. Examination of diesel unit

Every self-propelled diesel unit underground which is required to be examined as specified by these Regulations shall be so examined in a suitable workshop, which workshop shall—

- (a) be constructed of non-flammable material;
- (b) be provided with not less than two means of egress;
- (c) be ventilated by a current of air sufficient to dilute and render harmless the exhaust gases emitted while the engine is being run therein;
- (d) have a concrete floor;
- (e) be equipped with suitable means for inspecting the diesel unit from below; and
- (f) be kept provided with suitable equipment, located in suitable positions, for extinguishing fires.

294. Diesel units to be replenished at filling stations only

No person shall replenish any self-propelled diesel unit with fuel oil underground otherwise than at a filling station approved by the manager:

Provided that in an emergency it shall be permissible for a small quantity of fuel, being sufficient to allow such unit to be moved to the filling station, to be brought to such unit in a

portable container.

295. Filling in initial stage of development

Where, in the initial stage of any development underground, it is impracticable for a filling station to be erected, filling directly from a mobile container shall be permitted for such period of time as an inspector may approve.

296. Manager to ensure safety of filling station

- (1) The manager shall ensure that every filling station underground—
 - (a) is constructed of non-flammable material;
 - (b) is provided with not less than two means of egress;
 - (c) is ventilated by a current of air sufficient to dilute and render harmless all gases emitted during filling operations;
 - (d) has a concrete floor; and
 - (e) is kept provided with suitable equipment, located in suitable positions, for extinguishing fires.

(2) No fuel oil shall at any time be stored underground in any filling station unless it is stored in a suitable container or tank which does not leak.

297. Removal of contaminated material

Where any oil is spilt in any place it shall be taken up by dry sand or removed forthwith by suitable means, and if in the process of removing such oil any material is contaminated such material shall be placed in suitable containers and removed from the mine.

298. Wiping oil off diesel engine

Every person spilling any oil on any diesel engine or diesel unit shall forthwith wipe it up or cause it to be wiped up.

299. No removal of oil from filling station while engine is running

No person underground shall take any fuel oil from a container at any filling station while any diesel engine is running therein.

300. No smoking or use of naked lights at filling stations

No person shall smoke or use any naked light in a filling station or oil storage compartment and suitable notices to this effect shall be posted and maintained at all entrances.

301. Adequate and suitable lighting to be provided

Every workshop and filling station underground shall be equipped with suitable electric

lighting and the bulbs or tubes used therein shall be adequately protected.

302. Oil to be conveyed only in suitable containers

Any container used for transporting fuel oil underground shall be of suitable construction, leakproof and provided with positive locking devices.

303. No delivery of oil in pipes

(1) No fuel oil shall be delivered underground in any pipe in any downcast shaft or be transported underground in any intake airway, except where such means of delivery or transportation does not constitute a hazard.

(2) The Engineer, subject to such conditions as he may impose, may give prior approval for such means of delivery or transportation:

Provided that underground oil may be transferred in such a pipe from an underground container to an oil storage compartment, from an oil storage compartment to a filling station and from a filling station to a diesel unit, if the length of any such pipe does not exceed 30 m.

304. Flash point and sulphur content of oil to be used underground

(1) At any mine underground any diesel fuel oil used for supplying motive power to diesel units shall have a flash point not less than 60°C and have a sulphur content not greater than 0,5 per cent by weight.

(2) Except with the written permission of the Engineer, fuel oil shall not contain any additive.

305. Manner of keeping suitable container or tank

(1) The suitable container or tank mentioned in regulation 296(2) shall be kept in or adjacent to the filling station in an enclosed storage compartment which—

- (a) if any point within such compartment is in excess of 10 m from the entrance, shall be provided with two means of egress;
- (b) shall be constructed of non-flammable materials;
- (c) shall be situated in a well ventilated place, the return air of which shall be satisfactorily diluted; and
- (d) shall have walls so constructed as to form a liquid-tight joint with the floor, and no openings through the walls shall be at a height less than that necessary to form a reservoir of greater capacity than the maximum volume of diesel fuel contained therein:

Provided that, where such container or tank is buried in concrete, or material having no cavities, within or adjacent to the filling station, it shall be provided with a breather pipe leading from the top of such tank or container to a through airway.

(2) Every fuel oil storage compartment shall be kept provided with suitable means for extinguishing fires and this equipment, being part or all of the equipment as required by these Regulations, shall be positioned immediately adjacent to the air inlet end of such enclosed storage compartment.

306. No transfer or filling to take place within 3 m of conductor

No transfer or filling operation of any fuel oil shall take place within 3,0 m of any live trolley line conductor.

307. No riding on units unless there is adequate accommodation

No person shall ride in or on any diesel unit unless suitable and adequate accommodation has been provided for this purpose on the unit.

308. Engine of diesel unit underground to be off when stationary

The engine of each and every self-propelled diesel unit underground at any mine shall not be kept running when the unit is stationary except—

- (a) during brief halts or when necessary for normal operation; or
- (b) while being tested.

PART XX

Haulage — Surface and Underground (regs 309-329)

309. Provisions relating to use of ropeways and vehicles running on rails

(1) No ropeway and no vehicle running on rails and using a ropeway system shall be used for the purpose of carrying persons employed thereat, to or from their working places, unless such system has been specifically designed for man riding.

(2) So long as vehicles running on rails are used there shall be provided, maintained and used, such safety devices as are necessary to prevent the occurrence of accidents likely to cause bodily injury to persons, being accidents caused by any such vehicles' running away.

310. Inspection of vehicular roads

A competent person appointed by the manager shall examine each vehicular road daily with respect to—

- (a) its clearance and freedom from obstruction;
- (b) the state of the track and its support or roadway;
- (c) ventilation; and
- (d) any other safety requirement.

311. Provisions relating to trains

(1) A locomotive shall be so designed that the controls cannot be operated unless the driver of the locomotive is in his cabin.

(2) The manager shall—

- (a) by notice, fix the maximum load to be hauled by every locomotive, or other haulage vehicle and the maximum speed of trains on every road;
- (b) cause to be posted cautionary notices or signals wherever special precautions are necessary to ensure the safe running of trains; and
- (c) cause to be posted in the driver's cabin notice of the maximum load and speed or any other condition for the safe working of every locomotive.

(3) Where rails laid across a public road or a railway are used for the purpose of a privately owned locomotive, train or truck running on rails, no person driving such a locomotive, or being in charge of such a train or truck, shall cause or permit the locomotive, train or truck to cross the public road or railway unless sufficient warning of the intention to move the locomotive, train or truck across the public road or railway has been given by—

- (a) a flagman, being a person employed for the purpose and carrying, by day, a red flag, and by night, a red lamp; or
- (b) an approved device fitted with colour light signals.

(4) No person driving a locomotive or being in charge of a train or truck shall permit it to proceed over a level crossing at a speed exceeding eight km per hour.

312. Clearance and refuge holes

The manager shall ensure that in any place underground in which a locomotive pulling or pushing a train of vehicles operates, the following conditions shall apply—

- (a) there shall be a horizontal clearance of at least 600 mm between the widest part of any vehicle of such train and the sides of such place, except that in any place constructed prior to the date of commencement of these Regulations such clearance shall be not less than 460 mm, or refuge holes shall be provided at intervals not exceeding 15 m; and
- (b) adequate clearance shall be provided for the safety of persons riding in or on any such vehicle.

313. Brakes, lighting and other requirements for locomotives

Every locomotive shall be provided with—

- (a) an efficient braking system having two means of operation, one of which can be

applied by direct mechanical action;

- (b) means for giving adequate audible warning;
- (c) a safe driving position for the driver; and
- (d) adequate lighting which shall be used when any such locomotive is operating underground or when it is operating on the surface between the hours of sunset and sunrise as prescribed hereunder—
 - (i) when pulling a train of vehicles, a white light capable of illuminating the way ahead for a distance of at least 30 m shall be affixed to the front of the locomotive and a red light shall be affixed to the last vehicle in such manner as to be clearly visible from the rear;
 - (ii) when pushing a train of vehicles, a white light capable of illuminating the way ahead for a distance of at least 30 m shall be affixed to the front of the leading vehicle of the train and a red light shall be affixed to the locomotive in such manner as to be clearly visible from the rear;
 - (iii) when moving without a train of vehicles, a white light capable of illuminating the way ahead for a distance of at least 30 m shall be affixed to the leading end of the locomotive and a red light shall be affixed to the other end of the locomotive in such a manner as to be clearly visible from the rear.

314. Clearance for trackless vehicles and provisions for refuge holes

(1) The manager shall ensure that no self-propelled trackless vehicle is permitted to move underground in any place unless there is provided adequate clearance for the safety of the driver of such vehicle and there are suitable refuge holes provided to afford protection for any person who may have to pass along such place whilst the vehicle is in motion therein.

(2) The clearance referred to in subregulation (1) shall be sufficient in width and height for the passage of the vehicle and the driver when he is operating the vehicle.

(3) The intervals between refuge holes referred to in subregulation (1) shall be as follows—

- (a) in any curve, the maximum distance between refuge holes shall not exceed 15 m;
- (b) in any straight ramp which is adjacent to a curve and within 60 m of the commencement of that curve, the maximum distance between refuge holes shall not exceed 15 m;
- (c) in any straight ramp other than the 60 m mentioned in paragraph (b), the maximum distance between refuge holes shall not exceed 23 m; or
- (d) in any road, the maximum distance between refuge holes shall not exceed 30 m.

(4) Where refuge holes are required to be provided in any length of any ramp or road they shall all be placed on the same side, and, in any curve so far as is practical, on the outside of

the curve.

315. Dimensions of refuge holes

- (1) The dimensions of refuge holes shall be as follows—
 - (a) in width, 1,0 m or as nearly as may be;
 - (b) in depth, not less than 1,5 m; and
 - (c) in height, the height of the road at that place or 2,0 m, whichever is the less.
- (2) Every refuge hole shall be clearly marked, kept clean and be free from any obstruction.
- (3) The entrance to every refuge hole shall be kept free from any obstruction.

316. When no movement of persons is permitted

Where the provisions of regulations 312 and 314 cannot be applied, then there shall be no movement of persons on foot whilst a vehicle is travelling therein.

317. Isolation of live trolley line

(1) No self-propelled trackless vehicle shall run in any place underground or at any place on the surface unless precautions are taken to ensure that any live trolley line conductor is isolated during the period in which such vehicle may have to pass or travel thereunder, or adequate precautions are taken to ensure that such conductor is suitably protected so that no person normally seated in the accommodation required to be provided in accordance with regulation 329 and any part of the vehicle can come into contact with the conductor.

(2) Any person carrying any material or tools when travelling in any vehicle or when walking under any live trolley line conductor shall take all reasonable precautions to ensure that such material or tools cannot inadvertently come into contact with such conductor.

318. Specifications for self-propelled trackless vehicles

Every self-propelled trackless vehicle shall be provided with—

- (a)
 - (i) an efficient braking system having two means of operation, one of which can be applied by direct mechanical action; or
 - (ii) two efficient braking systems each having a separate means of operation and so constructed that the failure on the part of the one shall not affect the effectiveness of the other; the same brake shoes operating within or upon the braking surface of the vehicle may be used when operating either of the two braking systems;
- (b) means for giving adequate audible warning;
- (c) a safe driving position for the driver;
- (d) adequate lighting, which shall be used when such vehicle is operating underground or

when such vehicle is operating on the surface between the hours of sunset and sunrise as prescribed hereunder—

- (i) in the case of a vehicle which travels regularly in a forward direction, two white headlights affixed to the front capable of illuminating the way ahead for a distance of at least 30 m, and a suitable reflector or red light affixed to the rear in such manner as to be visible directly from the rear; or
- (ii) in the case of a vehicle which may travel regularly in either direction, two white headlights affixed to the front and two to the rear of the unit, each set capable of illuminating the way ahead for at least 30 m, and a suitable reflector or red light affixed to the front and the rear in such manner as to be clearly visible:

Provided that any self-propelled vehicle operated by compressed air shall be exempt from the provisions of subregulations (a), (b) and (a).

319. Driver to ensure that vehicle has necessary safety requirements

It shall be the duty of the driver in charge of any self-propelled vehicle to ensure that—

- (a) the brakes are in good working order;
- (b) the warning signals and lights are in good working order and that in the event of them not being in good working order or not being affixed he shall not move such vehicle except to the nearest place where repairs can be effected; and
- (c) such vehicle is not moved when the brakes are not in good working order:

Provided that where only one of the braking systems specified in regulations 313 and 318 is out of order, the driver may move such vehicle to the nearest place where repairs can be effected to the defective system, but where both such systems are defective then such vehicle may only be towed to the workshop by another vehicle connected to the defective unit by means of a rigid towing bar.

320. Fire extinguisher for vehicles

(1) Every self-propelled vehicle excluding private motor cars shall be equipped with a portable fire extinguisher which shall be readily accessible to the driver when the vehicle is in use.

(2) It shall be the duty of the driver of any self-propelled vehicle to ensure that the portable fire extinguisher required in accordance with subregulation (1) is affixed to the vehicle and if not so affixed he shall forthwith notify his immediate superior:

Provided that for any open cast workings this requirement need not apply if the manager submits to the Engineer for his prior written approval under such conditions as he may prescribe a suitable alternative scheme.

321. Speed indicator for vehicles

Where the speed of any self-propelled vehicle may be limited for any reason an operative speed indicator shall be provided, maintained and used unless the speed of such vehicle is governed mechanically in such manner that the limited speed cannot be exceeded.

322. Manager to ensure that vehicle has unobstructed view

(1) The manager shall take all reasonable measures to ensure that every vehicle in use has a reasonably unobstructed view in the direction of travel or he shall make arrangements to ensure that when this is not so the driver is guided by suitable signals given only by persons authorized to do so.

(2) No driver shall move his vehicle when his view is obstructed unless he receives a suitable signal as required in accordance with subregulation (1).

(3) No person authorized in accordance with subregulation (1) shall give any signal until he has satisfied himself that it is safe for the vehicle to move.

323. Vehicle not to be left unattended

The driver of any self-propelled vehicle shall not leave the vehicle unattended other than at a place where it is normally kept when not in use, unless he has taken all reasonable precautions to ensure that it cannot inadvertently be set in motion.

324. Manager to establish a scheme for inspection, examination and testing of vehicles

(1) The manager shall ensure that there is in force a scheme for the systematic inspection, examination and testing of all self-propelled vehicles in use.

(2) The self-propelled vehicles on the surface required to be inspected in accordance with subregulation (1) are those—

- (a) owned by the mine, quarry or works;
- (b) not owned but operated by the mine, quarry or works; or
- (c) not owned, but operated by a contractor at the mine, quarry or works:

Provided that this regulation shall not apply to any vehicle owned and operated by Botswana Railways.

(3) The inspections, examinations and tests referred to in this regulation shall be such as to ensure that the external parts of the engine or motor, the condition and operation of all controls, safety devices and signal arrangements are in all respects in proper working order.

325. Vehicles to be examined at suitable workshop

Every self-propelled vehicle which is required to be examined in accordance with regulation 324 shall be so examined in a suitable workshop which shall—

- (a) be constructed of non-flammable material;

- (b) be provided with not less than two means of egress;
- (c) be ventilated by a current of air sufficient to dilute and render harmless the exhaust gases emitted while the engine is being run therein;
- (d) have a ventilated concrete floor;
- (e) be equipped with suitable means for inspecting the vehicle from below;
- (f) be kept provided with suitable equipment located in suitable positions for extinguishing fires; and
- (g) between the hours of sunset and sunrise on the surface and at all times underground, be equipped with suitable electric lighting for use when persons are working therein and the bulbs or tubes therein used shall be adequately protected.

326. Offences in connection with any vehicle

No person shall—

- (a) wilfully damage or interfere with or order any other person to damage or interfere with any vehicle or part thereof;
- (b) neglect to inspect or maintain any vehicle which he is required to inspect or maintain under the provisions of these Regulations;
- (c) get on or off any vehicle whilst it is in motion, except those persons directly engaged in shunting operations on the surface;
- (d) ride in or on any vehicle unless authorized to do so and then only in such position as not to endanger himself or any other person;
- (e) drive or operate any vehicle unless he is competent to do so and has been so authorized in writing; or
- (f) negligently or wilfully drive or operate or cause to be driven or operated any vehicle in such manner as to endanger the safety of the mine, quarry or works or the safety or health of any person therein.

327. Safety provisions in respect of tipping vehicles

(1) No vehicle or trailer equipped with a tipping body shall be used unless there are provided (whether as part of the equipment of the vehicle or trailer or otherwise) one or more sufficient devices for keeping the tipping body from collapsing from the raised position during maintenance or inspection, being devices whose mode of operation is independent of the tipping mechanism.

(2) The manager shall take such steps, including provision where appropriate of stop blocks, anchor chains or other suitable devices, as are necessary to prevent the occurrence, at every place at which any vehicle or trailer equipped with a tipping body or tipping gear is unloaded, of

accidents likely to cause bodily injury to persons, being accidents caused by vehicles so used running away, falling or overturning.

328. Safety devices for trucks or cars attached to a rope or chain

On every inclined track where trucks or cars are attached to a rope or chain adequate safety devices shall be provided to prevent danger from such tracks or cars in the event of their runaway.

329. Restriction on riding in vehicles

No person shall ride in or on any vehicle unless suitable and adequate accommodation has been provided for this purpose.

PART XXI

Conveyors (regs 330-344)

330. Standard of construction

Conveyor belts installed underground, or in any other place where a belt fire might endanger the lives of workmen, shall be—

- (a) made of material certified by an authority approved by the Engineer as being flame retardant; or
- (b) provided with adequate means of extinguishing fires.

331. Guards

(1) All head, tail, drive, tension pulleys and feeders shall be adequately guarded at the pinch points, and the length of the guards shall extend at least 900 mm from the pinch points.

(2) Every take up pulley shall be guarded so as to avoid injury to any person should it become detached from its fastenings.

332. Anchoring

The anchoring of return stations of conveyors shall be made independent of roof or road supports.

333. Warning device before starting

When the full length of the conveyor belt is not within sight of the starting point, means shall be provided to warn persons along its course before the belt is started.

334. Emergency stop device

Means of stopping a conveyor belt, by a device that is not capable of restarting the conveyor belt until the remote control circuit has been restored, shall be available to every person along its course from head pulley to tail pulley.

335. Cleaning

No person shall, or cause or permit any person to, clean manually any conveyor, its belt, rollers or pulleys, while the belt is in motion.

336. Riding of persons

No person shall travel or ride or permit another person to travel or ride on any moving conveyor unless so permitted by the manager under a man-riding scheme approved by an inspector.

337. Walkways

(1) Where practicable, walkways fitted with suitable safety rails shall be provided to all elevated parts of conveyors for the safe passage of persons engaged in making examinations and repairs.

(2) No unauthorized person shall use such a walkway as a thoroughfare.

338. Crossing places

(1) No person shall cross, or be permitted to cross, over a conveyor at a place other than a crossing place authorized by the manager.

(2) A crossing place authorized under subregulation (1) shall be—

- (a) made and installed as a fixture;
- (b) so arranged as to afford head-room clearance; and
- (c) so guarded and stepped as to ensure that all persons may cross over the conveyor without danger.

339. Spillage from conveyors

Reasonable precautions shall be taken generally to prevent spillage from conveyors where the safety of persons may be endangered.

340. Installation

(1) Belt conveyors shall on installation be provided with sufficient clearance above and below and to both sides of the conveyor.

(2) The conveyor shall be provided with a walkway which is free from obstruction, and not less than 600 mm in width between the conveyor and one side of the conveyor road.

(3) The space under the conveyor shall be kept clear of wood and other combustible material.

341. Overheating

Conveyors shall be so constructed, operated, maintained and supervised as to avoid friction or defect liable to cause dangerous heating.

342. Inspection of rollers and bearings

(1) Belt conveyors and belt conveyor systems shall be inspected at regular intervals so as to ascertain whether the rollers and bearings are operating freely.

(2) Where the rollers and bearings are found not to be operating freely, the conveyor shall be stopped until they are able to do so.

343. Lubricants

Only lubricants of low electrical resistance and high ignition temperature shall be used for the working parts of the conveyor.

344. Clearing and dust

The following duties shall be carried out—

- (a) material, mineral or waste falling on the road, floor or under the belt shall be regularly cleared so as to prevent the accumulation of such material, mineral or waste; and
- (b) as far as practicable, belts shall be regularly cleared of dust.

PART XXII **Lifts (regs 345-360)**

345. Certificate of permission

(1) No lift installation shall be used until it has been authorized by the Engineer and a certificate of permission is issued; such certificate shall be mounted behind glass in the lift conveyance.

(2) Such certificate of permission shall specify the name of the maker and maker's number, and—

- (a) the maximum permitted weight of material to be carried; and
- (b) the maximum number of persons permitted to travel in the conveyance at any one time.

346. When persons forbidden to ride

No person shall ride upon the platform of any lift authorized for the carriage of goods or material only, and there shall be a legible notice clearly displayed on such platform stating that the carriage of such person is prohibited except for testing or maintenance.

347. Suitability of lift installations

Every lift installation and parts thereof shall be of good construction, suitable material,

adequate strength, free from patent defect and shall be properly maintained.

348. Construction of conveyance

Every lift installation used for carrying persons shall be provided with a conveyance which is so constructed as to prevent any person carried from falling out or being trapped between any part of such conveyance and any fixed structure or other moving part of such lift or from being struck by articles or material falling down such lift shaft.

349. Brakes

(1) In every lift the drum, engine or motor shall be provided with an adequate brake which shall be kept in proper working order.

(2) Electrically operated brakes shall be so arranged as to be applied automatically when the power is shut off.

350. Overrun devices

In every lift installation there shall be provided and maintained efficient automatic devices which will ensure that the platform or conveyance does not overrun the highest or lowest point to which it is for the time being constructed to travel.

351. Underrun and overrun clear space

A clear space of not less than 1,0 m shall be provided between the bottom of the lift shaft and the lowest point of the underside of the lift conveyance when the conveyance is at its lowest landing and between the top of the lift conveyance and the underside of the overhead grating or floor when the conveyance is at its top landing, and also between the top of the counterweight and the underside of the sheave or beams when the lift conveyance is at its lowest landing; in the case of lifts which run at a speed greater than 100 m per minute, the clear space at the top or bottom shall not be less than 1,5 m.

352. Buffers

(1) Lifts shall be provided with spring, air or hydraulic buffers placed at the bottom of the hatchway for both the conveyance and the counterweight:

Provided that if such buffers are attached to the conveyance or to the counterweight this regulation shall be deemed to have been complied with.

(2) Buffers shall be of substantial construction and capable of absorbing gradually and smoothly the energy of a fully loaded conveyance travelling at governor tripping speed.

353. Ropes and attachments

(1) No rope shall be used for supporting a lift or counterweight unless it is of good quality and manufacture and of adequate strength and free from any defect.

(2) Any such rope shall be made of wire, and the gauge of the wires used in the construction

thereof shall be suited to the diameter of the sheaves and drum.

(3) No rope shall be used for supporting a lift conveyance or counterweight when the breaking force at any point therein has become reduced to less than five times the maximum working load, the supporting effect of the other rope, if any, being ignored:

Provided that, in the case of any lift in which such conveyance or counterweight is suspended by more than two ropes fitted with appliances for equally distributing the load, a minimum factor of safety of 10 shall be allowed on the aggregate strength of all the ropes, but no rope shall have a lower factor of safety than three, with respect to the maximum working load.

(4) Every lift conveyance operated by ropes shall be suspended by at least two ropes each of which shall have independent connection with the conveyance or with the special connection bracket hinged thereto; each set of counterweights shall likewise be suspended by two ropes.

(5) No attachment shall be used for supporting a lift conveyance or counterweight when the breaking force at any point within such attachment has become reduced to less than 10 times the maximum working load.

354. Failure of rope

In every lift installation there shall be provided and maintained efficient devices which will support the conveyance together with its safe working load in the event of failure of the ropes or any other part of such installation.

355. Fixing of ropes to drums

(1) In the case of any lift where no part of the rope is rigidly fixed to the drum, the construction shall be such that there shall be no dangerous slipping of the ropes on the drum under any possible working condition, the safety of the apparatus to be judged by an inspector.

(2) When the lifting and counterweight ropes are rigidly fixed to the drum there shall be at least one full turn of rope on the drum when they have run the limit.

356. Provision of gates

(1) Every lift shaft shall be effectively protected by gates so as to prevent any person from falling down such lift shaft or coming into contact with any moving part in such lift shaft when such gates are closed.

(2) Every gate provided in accordance with subregulation (1) shall be installed with an efficient interlocking or other device to ensure that such gate cannot be opened except when the conveyance is at the landing and to ensure that the conveyance cannot be moved away from the landing until such gate is closed.

357. Notices to be exhibited

The following notices shall be exhibited on the door to the engine room—

- (a) a notice prohibiting unauthorized entry; and
- (b) a notice prohibiting unauthorized persons from operating and interfering with installed apparatus.

358. Not to be used during repairs

No lift shall be used whilst repairs are being effected in the lift shaft, or on any other part of the lift installation.

359. Competent person to examine

- (1) The manager shall ensure that a competent person is appointed to examine carefully—
 - (a) at least once in each week, at intervals not exceeding 10 days, the motor, guides and all drums, sheaves and safety appliances of each lift; and
 - (b) at least once in every 30 days, at intervals not exceeding 45 days, the entire lift installation and all such fittings and appliances in connection therewith.

(2) The competent person appointed in accordance with subregulation (1) shall make a report of the result of any test, repairs, examination or inspection which shall be entered in a record book kept for this purpose.

(3) Such record book shall be kept at a suitable place, and each entry shall be signed by such competent person.

360. Lift record book

The manager shall provide for each lift, a lift record book in which shall be entered—

- (a) the name or names of the competent person or persons appointed to carry out the examinations required in regulation 359;
- (b) the following particulars of the construction of the lift—
 - (i) name of manufacturer;
 - (ii) type of lift;
 - (iii) serial number of lift;
 - (iv) date of manufacture; and
 - (v) load capacity;
- (c) the following particulars of every rope used in connection therewith—
 - (i) name of manufacturer;
 - (ii) date of manufacture;

- (iii) diameter of rope;
- (iv) construction of rope; and
- (v) rope test certificate number and place of test.

PART XXIII

Winding Plant, Attachments, Ropes and Examinations (regs 361-389)

361. Inspector to test winding plant

(1) No winding plant other than those referred to in regulation 388 shall be used unless compliance with these Regulations has been proved by actual test to the satisfaction of an inspector, who will then issue a certificate of permission, specifying the limitations for the use of such winding plant.

(2) When an inspector has decided to issue such certificate he shall, by entry to the driver's log book and the machinery record book, authorize the use of any such winding plant prior to the certificate being issued.

362. No modifications to winding plant

(1) The certificate of permission, or a copy thereof, shall be posted in the winding-engine room or chamber, and shall automatically be invalidated by any subsequent modifications or structural or design alterations to the winding plant or any departure from its specified use.

(2) When the manager intends to make any such modifications or he intends to use the winding plant for a purpose other than for which a certificate has been issued he shall receive the prior approval of an inspector.

(3) Such approval shall be confirmed in writing and a copy of or a reference to it shall be kept in the machinery record book.

363. Provisions for shafts

(1) Every shaft exceeding 30 m in depth and used for winding purposes shall have the winding plant worked by a stationary engine.

(2) Prospect pits shall not be sunk to a depth greater than 30 m without permission in writing from the Engineer under such conditions as he may prescribe.

(3) Any winding compartment of any vertical shaft exceeding 30 m in depth shall be provided with guides for the conveyance, and such guides shall—

- (a) in a sinking shaft, allow the lowest part of the crosshead to travel to a position not more than 2,0 m above the sinking platform and while in this position the maximum length of wind below the lowest deck of such platform shall not exceed 25 m;
- (b) in any other shaft, extend to such a distance that in the event of an overwind the

conveyance cannot leave the guides before reaching the limits of its travel; and

- (c) not be required in the case of shaft raising and slyping cages and shaft sinking platforms.

364. Provisions for headgear

(1) In every headgear there shall be provided such permanent ladderways and platforms as may be necessary for the proper maintenance of all equipment installed thereat.

(2) For man winding where the speed of the winding rope may exceed 150 m per minute there shall be provided for each winding plant a clearance such that in the event of an overwind each conveyance shall be free to travel without obstruction for a distance of not less than—

- (a) 7,5 m above the highest stopping point used for passenger landing; and
- (b) except in the case of a shaft in the course of sinking or equipping, 7,5 m below the lowest stopping point used for passenger landing:

Provided that for the purposes of this paragraph the retarding devices required by regulation 367 shall not be deemed to be an obstruction.

(3) For man winding, where the speed of the winding rope may not exceed 150 m per minute, such lesser overrun space at the top and at the bottom of the wind shall be provided as the Engineer may direct.

365. Provisions for winding

(1) Every winding engine shall be such that—

- (a) when running at various speeds with light and heavy loads it can readily be slowed and stopped and, after stopping, can immediately be started again in either direction by the driver; and
- (b) any winding drum, when unclutched from the engine, can be maintained in a position of rest by means of its own brake or brakes with no slipping when loaded to double the maximum permitted weight of persons, or to the maximum permitted weight of mineral, whichever is the greater.

(2) In calculating the total weight of persons for the purposes of this regulation and of regulation 374, 70 kg shall be allowed for each person.

366. Further provisions for winding engines

Every winding engine other than those referred to in regulation 388 shall—

- (a) in the case of a single drum or single sheave winder, have an overlay rope, and in the case of a double drum or double sheave winder, have an overlay rope on the drum or sheave on the right hand side as seen from the driver's control position, and this

overlay rope shall be termed the "reference rope";

- (b) on the drum or sheaves thereof, have such grooves, flanges or horns and, if the drum is conical, such other appliance as may be sufficient to prevent the rope from slipping off;
- (c) have the pointer of the dial depth indicator for the reference rope which moves in a clockwise direction when lowering the conveyance to which it refers, and, in the case of a spiral or post indicator, one which moves in the same direction as the conveyance to which it refers;
- (d) have any bolts and fittings, which in the event of their becoming loosened might be a source of danger, rendered secure by means of suitable locking devices;
- (e) be provided with a device which shall prevent inadvertent withdrawal of the clutch;
- (f) be fitted with an interlocking device making it impossible to unclutch any drum unless the brakes of such drum are applied, and making it impossible to release the brakes of such drum until the clutch is fully engaged and securely locked;
- (g) be provided with a warning signal to be given when the speed of a conveyance is in excess of 5 per cent of the licensed speed and protective devices to shut off the power and apply the brakes in the event of an overwind of a conveyance or in the event of the speed of a conveyance exceeding the maximum authorized speed by 15 per cent in the case of a winding engine operating a conveyance in a shaft in the course of sinking, such overwind devices need be provided only to guard against overwind of a conveyance above the highest stopping place, and in the case of a winding engine used for man winding such devices shall be so set that any passenger conveyance will be brought to rest within a distance of 3,0 m above the highest stopping point and 3,0 m below the lowest stopping point used for passenger landing:

Provided that at the discretion of an inspector where the maximum possible rope speed of the winding engine does not exceed 150 m per minute such overspeed protective device need not be fitted;

- (h) when fitted with a multi-tooth clutch or clutches, which are not visible to the driver from his position at the controls, be provided with mirrors or other suitable means so that the driver may see, without moving his position at the controls, whether or not a clutch is in the correct position for engagement;
- (i) where necessary, be provided with guards over the drums and brake paths so as to protect the driver and any control gear from flying rope dressing;
- (j) when used for man winding and where the speed of the winding rope may exceed 300 m per minute, be provided with a device which shall prevent the brakes from being applied at high rope speed with such pressure as to produce a dangerous rate of deceleration;
- (k) have all instruments, signal lights, switches and push buttons required by the driver for

the control of the winding engine clearly labelled with their functions where such function is not obvious;

- (l) have all push buttons, controls, adjusting devices and levers, including clutch operating levers, used by the driver for the control of the winding engine, clearly visible to and within the reach of the driver without moving from his driving position;
- (m) have an efficient brake to each drum or sheave and, in addition, when the winding engine is driven by electric power, be fitted with an emergency brake system, which shall be so arranged that the brakes will be applied automatically in the event of a failure of the power supply;
- (n) except in the case of a sheave type winder, have not less than three turns of rope round the drum when the conveyance is at the lowest point in the shaft from which winding is effected, and shall have the end of the rope securely fastened to the hub, boss or arm of such drum;
- (o) where a conveyance is suspended from more than one rope, have the diameters of the bottom of all the rope grooves in the drum or sheave within the limit of 0,06 per cent of the diameter of one of these grooves;
- (p) have an indicating device which at all times shall clearly and accurately show the driver the position of the conveyance in the shaft; in the case of a sheave type winder, disconnection of the indicator drive for the purpose of adjusting the indicator position shall automatically apply the brakes; and
- (q)
 - (i) have the control lever follow the reference rope in the direction of movement;
 - (ii) have a brake lever which shall be pulled towards the driver in order to apply the brake;
 - (iii) be fitted with a rope speed indicator which shall be so situated that the winding speed can at all times be easily read by the driver from his driving position; and
 - (iv) be provided with suitable current and voltage measuring instruments; the current measuring instrument shall be so situated that it can at all times be easily read by the driver from his driving position:

Provided that subparagraphs (ii) and (iii) shall not apply to winding plant having an authorized maximum rope speed of less than 150 m per minute.

367. Safety devices for man winding in vertical shafts

Except where the winding plant is being used for sinking or equipping, in any vertical shaft where man winding is carried out—

- (a) where the end of the winding rope is fastened to the drum of the winding engine—
 - (i) for each winding engine used for man winding there shall be provided catch plates and safety detaching hooks to detach from the winding rope and to support any

conveyance overwound in the headgear; and

- (ii) for each other winding engine there shall be provided in the headgear such unobstructed overwind space over the highest conveyance stopping place in use as the Engineer may direct; such direction shall not specify a space of more than 7,5 m;
- (b) where the winding rope is not fastened to the drum or sheave of the winding engine—
- (i) the overrun space in the headgear above the highest established stopping place shall be provided with rigid guides or other appliances so arranged that an overwound conveyance is retarded in order to minimize the risk of the conveyance colliding with the rope sheave or the buffer stops in the headgear,
 - (ii) the overrun space at the bottom of the shaft below the lowest established stopping place shall be provided with rigid guides or other appliances so arranged that an overwound conveyance is retarded and arrested before it can collide with any fixed obstacle, and
 - (iii) there shall be fitted spring keps or jack-catches above the bank to arrest any conveyance which becomes accidentally disconnected from the rope as a result of an overwind; and
- (c) landing keps shall not be used:

Provided that paragraphs (a) and (b) shall not apply to winding plants having an authorized maximum rope speed of less than 150 m per minute.

368. Attachments between rope and conveyance

In any shaft where man winding is carried out, the suspension gear or attachments for each winding plant between the rope and the conveyance and between the conveyance and the balance rope shall when new—

- (a) have a designed static safety factor of not less than 10 in respect of the load suspended from the rope;
- (b) be designed for movement in at least two planes;
- (c) be proof-loaded by a reliable authority to twice the safe working load and show no permanent set as a result; when in use the load suspended from the attachments shall in no case exceed the safe working load;
- (d) be stamped on a non-vital part or carry a ring or disc with its identity and safe working load; and
- (e) be designed, in cases where more than one rope is used, to provide as far as is practicable for equal sharing of the load between the ropes from which the conveyance is suspended either automatically or by indicating individual rope loads.

369. Suspension gear

Components of suspension gear used for the suspension of any conveyance shall not be welded:

Provided that electric flash butt welding used and necessary in the manufacture of chains and links may be used, and such chains and links shall be subjected to suitable heat treatment after such welding.

370. Hoisting ropes

(1) Any rope used for the suspension of a conveyance shall be made of steel wire when the depth of wind exceeds 30 m.

(2) The gauge of any steel wire rope used for the suspension of a conveyance shall be suited to the diameter of the sheaves and the drums fitted.

(3) In no case shall any winding rope be used which has a splice or joint of any kind except at its attachments and with the written permission of the Engineer.

(4) The connection between any winding rope and a conveyance shall be of such a nature that no accidental disconnection can take place.

371. Provisions for hoisting ropes

For every winding plant used in a shaft where winding is carried out—

- (a) when a new hoisting rope or balance rope is not accompanied by a certificate from the manufacturer showing the breaking load as obtained by actual test on a whole sample of the rope, such rope shall not be used until a specimen cut from the rope has been tested by a reliable authority and the result of such test has been furnished to the manager; where the date of the breaking test certificate required is more than two years prior to the date the rope is installed, an additional test piece shall be cut and a breaking test shall be made at the time the rope is installed;
- (b) a hoisting rope or balance rope newly put on, whether new or previously used, and the attachments connecting any such rope to any conveyance, shall be carefully examined by a competent person appointed for the purpose by the manager, and shall not be used until the conveyance loaded with the maximum permitted weight has been run at least two complete trips down and up between the highest and the lowest stopping places ordinarily in use; and the result of this examination and test shall immediately be recorded in a book, termed the "rope record book", and the record shall be signed by the person who conducted the examination and test;
- (c) the rope record book shall, in addition to the results of the examination and test prescribed in paragraph (b), contain the following information—
 - (i) name of manufacturer of rope;

- date of manufacture of rope;
- date when rope put on;
- name of shaft and whether vertical, inclined or compound;
- name of compartment in which rope is used;
- certificate of permission number of winding plant;
- length of rope in metres;
- coil number of rope;
- mass of rope per metre in kilograms;
- diameter of rope in millimetres, or width and thickness of rope in millimetres;
- construction of rope;
- number of strands;
- type of lay;
- class of heart of rope;
- construction of strands;
- number of wires in strand layers;
- diameter of wires in millimetres;
- class of strand core;
- class of steel wires and tensile strength of main wires in megapascals;
- breaking force of rope in kilonewtons;
- rope test certificate number and place of test;
- (ii) dates of cutting and recapping rope;
- breaking load at each test;
- dates of spooling;
- date rope taken off;
- (iii) a record of the changing, heat treatment and testing of attachments carried out in terms of regulation 372(c);
- (iv) a detailed record of the position of each visible broken wire in the rope together with the month in which the break was found, or a reference to the place in which

such record is kept; and

- (v) a record of the examinations required by regulation 378(a)(iv); and
- (d) all records shall be entered as soon as is practicable after such examination or test and signed by the person who conducted such examination or test.

372. Capping or cutting of hoisting ropes

For any winding plant used in a shaft in which man winding is carried out—

- (a) unless the winding plant is such that it does not allow of the hoisting rope being cut for test, the rope shall be recapped at intervals not exceeding six months, a sample being cut from the rope during this operation and having its ends served with binding wire to prevent disturbances of the strands; the sample shall be properly prepared and sent to a reliable laboratory for a breaking force test; the certificate of test shall be retained and brief particulars thereof shall be entered in the rope record book;
- (b) where the winding plant is such that it does not allow of the periodical cutting of the hoisting rope as required by paragraph (a), such rope shall, at intervals of not more than six months, be moved in its attachment, in such manner that the position of the rope relative to the cappel or thimble is moved at least 150 mm; each successive movement shall always be in a direction which will tend to shorten the rope;
- (c) at intervals of not more than six months, or forthwith if overwinding caused the detaching gear or in the case of a friction winder, any braking appliance or arrester fitted in the head frame to operate the attachments between the hoisting rope and the conveyance, and any connection between conveyances, shall be subjected to suitable heat treatment to relieve stress and to restore the designed physical properties of the material and be examined for defects by a competent person, or be replaced; details of heat treatment and replacement shall be entered in the rope record book;
- (d) the attachments may be used without heat treatment for a period of not more than three years if crack detection tests approved by the Engineer and conducted by a competent person are applied at intervals of not more than six months; if cracks are revealed the attachments shall be discarded and details of the crack detection tests shall be entered in the rope record book and signed by the person conducting the test:

Provided that no such winding rope attachments shall be used for a period exceeding three years except with the written permission of an inspector; and

- (e) the certificate of the destructive test including graphs and interpretation mentioned in paragraph (a) and of the non-destructive tests mentioned in paragraphs (c) and (d) shall be kept on file at the mine, and a copy shall be sent to the Engineer within 14 days after the tests are made.

373. Special tests

The Engineer may require the manager to cut test specimens from any rope discarded for

use in mine hoisting at points specified by him, and send them to an approved testing laboratory for special testing and investigation if he is of the opinion that such testing and investigation is in the interests of better mine hoisting practice.

374. Safety factor for hoisting rope

(1) Where a balance rope is not used and where the end of the hoisting rope is securely attached to the winding drum, no hoisting rope shall be used for man winding if the breaking force of such rope when new is less than—

- (a) five and half times the static tension in the rope at the point where the rope leaves the head sheave when the conveyance is at its lowest working point and is loaded with the maximum number of persons permitted to travel, or the maximum permitted load of material, whichever causes the greatest tension;
- (b) eight times the static tension in the rope at a point immediately above the cappel or splice when the conveyance is loaded with the maximum number of persons permitted to travel or the maximum permitted load of material, whichever causes the greatest tension.

(2) Where a balance rope is used or where the end of the hoisting rope is not attached to the drum or sheave, no hoisting rope shall be used for man winding if the breaking force of the hoisting rope when new is less than a multiplying factor of 8, less 0,00015 of the number of metres of distance between the head-sheave centre and the lowest point of travel of the conveyance in the shaft, multiplied by the weight of the conveyance and attachments plus the weight of the maximum number of persons permitted to travel or the maximum permitted load of material, whichever is the greater, plus the whole weight of the balance rope plus 0,5 of the total suspended weight of the tail carriage if used:

Provided that in no case shall the multiplying factor be less than 6.

(3) Where the weight of the conveyance and balance rope is suspended from more than one hoisting rope in such manner that as far as is practicable the load is shared equally between the hoisting ropes, then the hoisting ropes shall not be used for man winding if the combined breaking force of the hoisting ropes, when new, is less than 1,1 of the minimum breaking force calculated according to subregulation (2).

375. Safety factor for ropes

In any shaft where man winding is carried out—

- (a) no hoisting rope shall be used for winding mineral if the breaking force of such rope, when new, is less than 0,9 of the minimum breaking force calculated according to the provisions of regulation 374(1) and (2), whichever is applicable, by substituting in the breaking force calculation the load of mineral in place of the maximum permitted number of persons or the maximum permitted load of material;
- (b) no balance rope shall be used in a shaft if the breaking force of the rope, when new, is less than 6 times the combined weight of the whole balance rope plus half the

suspended weight of the tail carriage if used; and

- (c) no hoisting rope or balance rope shall be used when its strength as determined by a breaking force test is less than 0,9 of its breaking force when new, or when marked external corrosion appears or when there is any sign of internal corrosion pitting, or when a detailed examination of cleaned portions of the rope indicates that the rope is no longer in a safe condition:

Provided that no such winding rope shall be used for a period exceeding two years, except with the written permission of an inspector.

376. Removal of rope

When a shaft compartment has been abandoned for hoisting purposes, the hoisting rope shall be immediately removed from the shaft.

377. Use of old rope

A winding rope which has previously been in use in any place beyond the control of the manager shall not be put on anew except with the written permission of the Engineer.

378. Examination of winding plant

For any winding plant used in a shaft other than those referred to in regulation 388, the following conditions shall apply—

- (a) the winding plant shall be maintained in proper working order and the manager shall appoint in writing a competent person or persons to be responsible for the safe operation and maintenance of all winding plant, whose duty it shall be to examine such plant carefully and maintain it in good working order and, except as is provided in subparagraph (iv), to record their findings from each examination in a book termed the "machinery record book"—
 - (i) at least once in each day, in respect of the winding rope attachments to the drums and the conveyances, the brakes and depth indicators, the conveyances and any safety devices attached thereto;
 - (ii) at least once in each week at intervals not exceeding 10 days in respect of the guides or rails and the winding compartments generally and overrun clearance as referred to in regulation 364;
 - (iii) at least once in each week at intervals not exceeding 10 days, in respect of the external parts of the winding engine and the condition and operation of all controls and safety devices and circuits, the hoisting ropes, balance ropes and guide ropes, and the signalling arrangements, head frame fittings, sheave wheels and all ancillary equipment for loading and unloading conveyances; and
 - (iv) at least once in each calendar month at intervals not exceeding 45 days, in respect of the structure of the hoisting ropes, balance ropes and guide ropes with

a view to ascertaining the amount of deterioration thereof; for the purpose of this examination the rope shall be thoroughly cleaned at places to be selected by the said person, who shall note and record in the rope record book any reduction in the circumference of the rope, the superficial condition of the wires as to wear, corrosion, fractures and brittleness and all other data necessary for ascertaining the amount, extent and distribution of the deterioration of the rope:

Provided that, where the winding plant is to be shut down for a period, such examinations and tests as are required by this subregulation may be waived, in which event the plant shall not be put back into service until one each of such examinations and tests as would otherwise have been required within the period of shut down has been carried out; and

- (b) if, during any such examination as is hereinbefore required, there is discovered any defect by which the safety of any person may be endangered, such defect shall be recorded in the driver's log book immediately and reported to the responsible person in charge, and until such weakness or defect is remedied the winding plant shall not be used.

379. Provisions for sinking

The provisions of regulations 368, 371, 372, 374 and 378 shall apply to any shaft in the course of sinking or equipping.

380. Driver's log book

The manager shall keep, or cause to be kept, at every winding engine a book to be termed the driver's log book, of a form to be approved by the Engineer, in which shall be recorded signed reports of—

- (a) the condition of the winding engine including the brakes, clutches, reversing gears, depth indicators and all protective devices;
- (b) the condition of the signalling arrangements and a report of any wrong signal, or signals received by the winding engine driver, the accuracy of which he has questioned, or any signal, other than the signal 1, to stop, received while the engine is in motion; and
- (c) any special instructions involving the safety of persons given to the driver, and the time at which such instruction was given; such entry shall be signed by the person giving the instruction, and as soon as possible shall be brought to the attention of the competent person appointed to be in charge of the winding plant or shaft.

381. Offence to deface driver's log book

Any person who, without authority, removes any page from or who defaces any page of a driver's log book, machinery record book or rope record book shall be guilty of an offence.

382. Books open to inspection

The machinery and rope record books and the driver's log book shall at all times be open to inspection by an inspector; the machinery record book shall be kept in the engine room of the winding engine to which it pertains.

383. Cages

(1) Every cage used for the regular conveyance of persons shall be of suitable construction and shall be provided with a proper roof or cover and doors.

(2) The cage shall be enclosed in such a manner as to prevent any portion of the body of any person therein from accidentally coming into contact with the timbering or other equipment in the shaft or winze or the sides of the shaft or winze.

(3) The doors shall be securely attached to the cage and so arranged that they cannot be opened outwards or accidentally.

(4) Provision shall be made for adequate ventilation through the cage.

384. Other conveyance

Every skip or kibble used for the regular conveyance of persons in a vertical or steeply inclined shaft or winze shall be provided with a substantial roof cover which will safeguard the occupants.

385. Roof or cover

Every conveyance used for examining, repairing or doing other work in a vertical or steeply inclined shaft or winze shall be provided with a substantial roof or cover and shall be sufficiently enclosed to protect any person from accidentally falling out.

386. Examination platform

(1) Where the roof or cover of a cage or skip is used as a platform for persons engaged in examining, repairing or doing other work in a vertical or steeply inclined shaft or winze, the persons so engaged shall be protected by a hood or cover immediately above them.

(2) Such hood or cover shall be removed as soon as this work is completed.

387. Trailers

No trailer or trolley shall be attached to a conveyance operated by a winding engine in a shaft or winze where persons are regularly conveyed unless permission in writing has been obtained from an inspector who may impose conditions for its use.

388. Manually operated or remote controlled winding plant

(1) In the case of any service or ramp raise having winding plant used for the conveyance of materials between two or more levels underground, and at which no man winding or winding of

mineral is permitted at any time, and of which the motive power does not exceed 75 kW, the following conditions shall apply—

- (a) where winding plant is manually operated, such winding plant, together with any auxiliary lifting apparatus, guides, tracks, conveyance, rope and attachments, shall be examined at least once in each week by a competent person, who may be the shift boss carrying out the inspection required by regulation 17(3);
 - (b) no person shall operate such winding plant unless he is competent and duly authorized by the shift boss or other senior official in charge of the section in which the winding plant is situated;
 - (c) each drum of such winding plant shall have an efficient brake capable of being fixed in the applied position, that is to say, locked in the ON position, when such winding plant is at rest in such a way that it cannot be inadvertently released;
 - (d) such winding plant shall be provided with an efficient and effective signalling arrangement for transmitting distinct and definite signals from all levels in use to the driver; and
 - (e) for such winding plant in use for multi-level operation, adequate precautions shall be taken to protect persons engaged in loading or unloading the conveyance from any movement of such conveyance.
- (2) Where such winding plant referred to in subregulation (1) is operated by remote control—
- (a) each drum shall be provided with an efficient brake which shall operate automatically in the event of a failure in the supply of motive power to such winding plant;
 - (b) every winding plant shall be provided with a device for applying the brake efficiently in case of an overwind; and
 - (c) adequate precautions shall be taken to ensure the safety of persons working in close proximity to such winding plant.

389. Stop blocks

Stop blocks or other similar contrivances shall be provided and maintained at every entrance to every shaft, winze or incline to which vehicles or conveyances are brought.

PART XXIV ***Shaft Signals (regs 390-397)***

390. Banksmen, onsetters and cagetenders

(1) No person shall be permitted to carry out the duties of a banksman, onsetter or cagetender or be in possession of or use the keys of any locked-bell system unless he is authorized in writing to do so.

(2) The manager shall ensure that a register is kept in which are entered the names of all

persons authorized under the provisions of this regulation to use or be in possession of keys of a locked-bell system:

Provided that this regulation shall not be taken to prohibit the giving of signals by the person in charge of a shaft in the course of sinking or by a person acting under his immediate supervision.

(3) The manager shall ensure that, before a person is authorized to use the keys of a locked-bell system or to carry out the duties of banksman, onsetter or cagetender, such person has a competent knowledge of the shaft signals and of his duties and of the provisions of these Regulations pertaining thereto.

391. Persons authorized to give signals

The person authorized to give signals on a locked-bell system and who is in charge of the conveyance—

- (a) shall not, after the driver has signalled that persons may enter the conveyance for the purpose of travelling in the conveyance, give any signal on the locked-bell for that winding compartment until all passengers have entered the conveyance, and the doors or gates of the conveyance and the doors or gates or barriers at the station or landing platform are properly closed, and when the person authorized to use the keys of the locked-bell system or other person authorized to carry out the duties of a banksman, onsetter or cagetender intends to travel, such doors, gates and barriers as will prevent his entrance into the conveyance may be left open until he has given the signal to raise or lower and has entered the conveyance;
- (b) shall not, when the conveyance containing persons is brought to rest in the proper position at the station, after the driver has signalled that persons may enter or leave the conveyance, give any signal on the signalling arrangements for that winding compartment until all persons who are to leave the conveyance are out and clear of it, and any persons whom he has permitted to enter the conveyance are properly placed in it;
- (c) shall use and give all signals appropriate to the operation intended;
- (d) shall take all reasonable measures to prevent persons from having unauthorized access to or egress from the conveyance and to the winding compartments;
- (e) shall not, except as is provided in regulation 409, allow any person to travel in any shaft on the top, side, rim or in any position outside a conveyance;
- (f) shall acquaint himself with the maximum number of persons authorized to travel at any one time in the conveyance and shall not allow this number to be exceeded;
- (g) shall not allow any unauthorized person to give any signal except when such person is undergoing training in the use of the locked-bell system under his direct supervision;

- (h) shall lock the signalling system before leaving it and retain the key in his possession;
- (i) shall not give the "clear signal" or any signal to raise or lower the conveyance unless all persons at the bank, station, landing platform, loading box or other place where he is in charge, are in a position in which they will not be endangered by the movement of such conveyance or any other conveyance operated by the same winding engine;
- (j) shall not give a signal to clutch unless all persons are out of and clear of the conveyance or conveyances operated by the winding engine;
- (k) shall not cause or permit any person to enter or have access to the conveyance or conveyances until he has received a signal from the winding engine driver that clutching operations are completed; and
- (l) shall take all reasonable measures to safeguard against accident all persons at the place where he is in charge, whether such persons are under his direct supervision or not.

392. Effective signals between driver, bank and stations

Unless exempted in writing by the Engineer and where not more specifically provided for in regulation 393, 395, 396, 397, every shaft in which winding is carried out shall be provided with effective signalling arrangements in respect of each winding engine for interchanging distinct and definite signals between the winding engine driver and the bank and every station in the shaft from which winding is carried on.

393. Signalling arrangements in main winding compartments

In every winding compartment used for man winding, the following provisions shall be observed except where the compartment is used for sinking or equipping—

- (a) there shall be provided and maintained in good working order two separate, independent and efficient signalling arrangements hereinafter referred to as the "locked-bell system" and the "call-bell system", which shall be used for transmitting signals;
- (b) the locked-bell system shall—
 - (i) provide for the interchange of signals between the winding engine driver and the bank;
 - (ii) provide for the interchange of signals between the winding engine driver and every established point below the bank from which winding is normally carried on;
 - (iii) be so arranged so that it shall not be possible to signal from the bank to anyone other than the winding engine driver; and
 - (iv) comprise different types or tones of signals so that the winding engine driver can distinguish without doubt between signals received from the bank and signals

received from below the bank;

- (c) the signal operating mechanism of the locked-bell system at the bank and at points below the bank shall be of a type securely enclosed in a metal case of substantial construction and shall be kept locked when not in actual use, and the key shall be retained by the banksman, onsetter, cagetender or other authorized person; subject to the provisions of paragraph (a), no person shall give a signal on any locked-bell system unless the conveyance to which it refers is at or near the station served by that bell;
- (d) if an inspector should so require in the case of any winding engine used for man winding, there shall be used a device which automatically prevents the conveyance from being raised or lowered after the engine driver has given a signal on the locked-bell system until he has received a signal on each of the circuits on which previously he gave a signal, and the manager shall lay down a procedure to be followed at each shaft when the driver of a winding engine has locked his winding engine with the conveyance at any position other than at an established point;
- (e) the call-bell system shall enable signals to be transmitted between every station below the bank from which winding is normally carried on and the bank;
- (f) where the bells or other audible devices of more than one signalling system are installed together, their tones shall be different and easily distinguishable by the person receiving their signals; and
- (g) in addition to the foregoing requirements of this regulation, there shall be installed a permanent standby communication system, which shall provide for the transmission of signals to the driver from all stations for the time being in use, and such stand-by system may be a magneto telephone, a pull wire or a radio bell having its own independent power supply.

394. Code of signals

- (1) The following code of signals shall be used in connection with all winding plant—
 - (a) for the locked-bell system and for any other signalling system used to direct the movements of a winding engine—

SIGNALS

1		Raise when engine is at rest.
1		Stop when engine is in motion.
1	From Driver:	Repeat signal last given.

2		Lower.
2 — 1		Clear signal — driver may move at his discretion.
2 — 1	From Driver:	Request for "Clear" signal to be given by responsible person at shaft.
2 — 2		Lower conveyance slowly.
3	To Driver:	Persons about to travel.
3	In reply:	Persons may travel or may enter the conveyance for the purpose of travelling.
3	From Driver:	When conveyance is brought to rest: persons may enter or leave the conveyance.
3 — 3	To Driver:	Raise conveyance slowly.
2 — 2 — 2	From Driver:	Persons must leave conveyance.
2 — 2 — 2	In reply:	No persons in conveyance.
4	From Driver:	Engine temporarily unavailable.
4 — 4	To Driver:	Mark signal.
4 — 4	In reply:	Acknowledgement of "Mark" signal.
4 — 4 — 4	To Driver:	Clutching signal.
4 — 4 — 4	In reply:	Clutching operations completed.
5 — 5	To Driver:	Request for explosives to be placed in conveyance.

5 — 5	In reply:	Explosives may be placed in conveyance.
5 — 5 — 5	To Driver:	All explosives removed from conveyance.
5 — 5 — 5	In reply:	Above signal acknowledged.
6	To Driver:	Request for persons to work in winding compartment.
6	In reply:	Persons may work in winding compartment.
6 — 6	To Driver:	Request for winding compartments served by engine to be locked.
6 — 6	In reply:	Winding compartments served by engine have been locked.
6 — 6 followed by station signal	To Driver:	Request for winding compartments served by engine to be locked below station designated.
6 — 6 followed by station signal	In reply:	Winding compartments served by engine have been locked below
6 — 6 — 6	To Driver:	Request for winding compartments served to be reopened
6 — 6 — 6	In reply:	Compartments served by engine have been reopened
13	To Driver:	Electricians testing bells.
13	In reply:	Bell test satisfactory.

1 long ring

Accident in shaft: winding operations to be suspended immediately in all compartments of the shaft until a responsible person instructs the driver as to further procedure.

8

To Driver:

Heavy material about to be loaded.

8

In reply:

Acknowledgement that heavy material is about to be loaded.

8 — 8

To Driver:

Heavy material unloaded.

8 — 8

In reply:

Above signal acknowledged.

9

To Driver:

Obstruction to winding referred to in log book now exists.

9

In reply:

Acknowledgement of above signal.

9 — 9

To Driver:

All obstructions to winding now removed.

9 — 9

In reply:

Acknowledgement of above signal.

10

Telephone communication required;

and when both an onsetter and a banksman are used:

3 — 3 — 3

To Driver:

Person giving signal is about to travel.

3 — 3 — 3

In reply:

Acknowledgement of above signal:

Provided that—

- (i) when persons are travelling in a conveyance the signal 1 meaning "raise" and the signal 2 meaning "lower" shall be preceded by a signal indicating the point in the shaft to which the conveyance is to be raised or lowered; any signal given on the locked-bell system or on any other signalling system used to direct the movements of the winding engine whilst in motion shall be treated by the driver as a stop signal; and
- (ii) the manager may authorize such additional signal codes as local conditions may demand, but any such additional signal shall not be in conflict with any signal required under this paragraph;

(b) for the call-bell system—

7 followed by station signal Accident to person: station where conveyance is required.

10 Telephone communication required.

(2) Copies of the above codes of signals in use at that shaft, as well as any additional signals authorized by the manager, shall be suitably displayed and so placed that they can be conveniently read on the driver's platform or in the winding engine room, at the bank and at all shaft stations for the time being in use.

(3) Copies of codes of signals shall be maintained in proper repair and shall be so placed that they can be conveniently read by persons operating the signalling system.

(4) The person in charge of blasting operations in a shaft in the course of sinking shall notify the driver by means of a special signal, namely five knocks or rings, when blasting is about to take place, and, except in the case of firing by electricity, the driver shall reply by raising and lowering the conveyance about 2 m.

(5) On receiving the signal 1 following 5, signifying that persons have entered the conveyance, the driver shall raise the conveyance without delay.

(6) Any person who fails to act in conformity with the signals laid down in subregulations (1) and (5) or any additional signals authorized by the manager shall be guilty of an offence.

395. Signals for shaft examinations

Any shaft where persons travel on or in a conveyance whilst carrying out shaft examination shall be provided with some efficient means, in respect of each conveyance used in connection with such examination, whereby such persons can signal effectively from any depth in the shaft to the driver.

396. Signalling system for vertical shaft sinking

(1) Any vertical shaft in the course of sinking shall, in respect of each winding engine used

for sinking, be provided with—

- (a) an efficient signalling system for interchanging distinct and definite signals between the driver and the bank and between the driver and every established intermediate passenger landing point below the bank;
- (b) two separate means whereby persons employed in connection with the sinking process can signal effectively from the shaft bottom and from any depth in the shaft to the bank and to the driver; such means shall be so installed that they cannot be used from intermediate passenger landing points and the tone of the bells shall be easily distinguishable from that of the system referred to in paragraph (a); and
- (c) an efficient means whereby the driver can signal to the shaft bottom and to the sinking platform.

(2) Only signals necessary for the control of the winding plant shall be transmitted to the driver from a shaft in the course of sinking.

397. Signalling system for inclined shaft sinking

Any inclined shaft in the course of sinking shall be provided with efficient signalling arrangements in respect of each winding engine for interchanging distinct and definite signals between—

- (a) the driver and the bank;
- (b) the driver and every established intermediate passenger landing point below the bank; and
- (c) the driver and a point not more than 40 m from the bottom of the shaft; when this point is more than 15 m from the bottom of the shaft, an additional efficient signalling system shall be provided and used for signalling from the bottom of the shaft to this point.

PART XXV

Winding, Engine Drivers and Certificates (regs 398-427)

398. Windlasses and ropes

(1) Every windlass shall be provided with a pawl and brake maintained in good working order to prevent the load from descending accidentally.

(2) Every rope shall have at least four turns round the drum of every windlass when the conveyance is at the lowest point of travel. The end of such rope shall, in addition, be securely fastened to such drum, or the hub, boss or arm of such drum.

399. Instructions of onsetter, etc., to be obeyed

Every person, while in a conveyance for the purpose of travelling, or when presenting himself for the purpose of travelling, shall obey all reasonable instructions given by the onsetter,

banksman or cagetender in charge of such conveyance.

400. Restrictions on entering winding compartment

No person shall enter any winding compartment except for the purpose of entering or leaving a conveyance, or for the purpose of conducting an examination, effecting repairs or doing other necessary work in such compartment:

Provided that this regulation shall not apply to persons working at the bottom of a shaft in the course of sinking.

401. Winding prohibited during repairs

(1) No winding operations shall be carried on in a winding compartment of a shaft or headgear and no driver or other person shall touch or move the brakes, the clutch or the controller of the winding plant whilst any person is engaged in effecting repairs, conducting an examination or doing other such work in such compartment except—

- (a) where winding operations in such compartments are necessary for the purpose of effecting such repairs, conducting such examination or doing such other work; and
- (b) where such persons engaged in effecting such repairs, conducting such examination or doing such other work in the shaft or headgear are adequately protected from any conveyance as well as from falling objects.

(2) No person shall effect repairs, conduct an examination or do any other work in a winding compartment of a shaft or headgear whilst winding operations are being carried on in such compartment, except—

- (a) where winding operations in such compartment are necessary for such person to effect such repairs, conduct such examination or do such other work; and
- (b) where such person is adequately protected from any conveyance as well as from falling objects.

(3) When any person makes any examination, alterations or repairs to the locked-bell system which involves the use of the locked-bell key or which renders the system temporarily inoperative, such person shall be accompanied by the onsetter or cagetender, or the winding plant shall be shut down.

(4) The person in immediate charge of any work in a winding compartment of a shaft or headgear in which winding is being done by mechanical power shall, before any such work is commenced, specifically warn the driver of the winding engine operating the conveyance that such work is about to be undertaken and, except in special circumstances where it is impracticable for him to do so, shall forthwith record such warning and the time in the driver's log book; such entry shall not be valid until countersigned by the driver so warned:

Provided that in special circumstances where it is not practicable for such person to record the warning the record shall be made by the driver on duty.

(5) The entry shall be cancelled and the time recorded by such person on completion thereof and such driver shall countersign such cancellation. Until so cancelled, the entry shall be countersigned by each subsequent driver of the winding engine concerned.

(6) For the purposes of subregulation (4) "work" includes any repairs and examinations and any maintenance or installation of equipment but does not include work at the bottom of a sinking shaft or the loading or unloading of a conveyance.

(7) After the completion of the alterations or repairs to a winding compartment of a shaft or to its winding plant, no person shall travel, or be permitted to travel in a conveyance until such time as the conveyance has been caused to make a complete trip up and down the working portion of the shaft.

(8) The manager shall ensure that there is in force a code of safe practice covering all work in or about every shaft and such code shall be suitably displayed in the winding engine room.

402. Protection for sinkers

(1) No person shall work or permit or instruct any other person to work at the bottom of any vertical or steeply inclined shaft in the course of sinking unless protected by an adequate covering extending over the whole area of such shaft, only sufficient opening being left therein for the passage of the conveyance.

(2) Such covering shall be situated—

- (a) in the case of vertical shafts, not more than 25 m above any place where a person is working in the shaft; and
- (b) in the case of steeply inclined shafts, not more than 30 m above any place where a person is working in the shaft.

(3) A set of doors to cover the sinking compartments shall be maintained at the collar or other point of service of every vertical or steeply inclined shaft in the course of sinking, and shall be closed at all times except when required to permit the immediate passage of the conveyance.

403. Crossheads, filling and cleaning of conveyances

In every shaft—

- (a) the driver shall pick up and land the crosshead without undue shock;
- (b) no conveyance shall be filled with loose rock or ground or material in such a manner as to cause danger from spillage to any person working in the shaft; and
- (c) in the course of sinking, except at blasting time, every such conveyance, when being hoisted from the bottom of the shaft, shall be stopped approximately 1,5 m from the said bottom, steadied, and any stones or mud shall be removed from the sides and bottom of such conveyance, which shall not be further hoisted by the driver until a

signal to do so has been received.

404. Stopping of conveyance 5 m from bottom

In every shaft in the course of sinking, no conveyance shall be lowered directly to the bottom of such shaft, but shall be stopped at least 5 m from the bottom until a signal to lower it further has been given by one of the men thereat:

Provided that this regulation shall not apply to shafts less than 15 m in depth.

405. Securing of projecting materials

Any material, when being raised or lowered in a shaft, shall, if it projects beyond the top of the conveyance, be fastened to the winding rope or to some suitable device attached to such conveyance.

406. Drivers not to be distracted and only authorized person in winding room

(1) No person shall in anyway distract the attention of the person operating a winding engine whilst it is in motion except in a case of emergency.

(2) No unauthorized person shall enter a winding engine room, chamber or enclosure, and notices to this effect shall be posted at each entrance to any such winding engine room, chamber or enclosure.

407. Driver not to work more than 10 hours

No person in charge of a winding engine shall work, or be caused or permitted to work, for more than 10 hours in any one period of 24 hours, except in cases of emergency and then only with the permission of an inspector; if after 48 hours the emergency still exists, the written permission of the Engineer shall be required:

Provided that during the normal changeover of his working shift such person may work, within one 24 hour period, two shifts of not more than eight hours each, which must be separated by a period of not less than eight hours between the end of the first shift and the start of the second shift.

408. Persons not to travel with material

(1) No person shall travel or be permitted to travel in any conveyance together with mineral or material when such mineral or material is of such shape, size or weight or is stowed in such a manner, that the safety of any person is likely to be endangered.

(2) No person other than the onsetter or cagetender and his crew shall travel in any conveyance together with explosives.

409. Persons not to ride outside conveyance

(1) No person shall travel or be permitted to travel in any shaft on the roof, top, rim or bridle

or in any position outside a conveyance:

Provided that persons engaged in examining or repairing the shaft or doing other work in the shaft may travel on the roof of such conveyance if this is necessary for the efficient conduct of such examination, repairs or work, and if such persons, when engaged in a vertical shaft, are adequately protected from objects falling from above.

(2) Except in the case of an emergency, no person shall travel and no person shall order or permit any other person to travel in a conveyance to within 60 m of the highest stopping place used for passenger landing while any fitting is attached to the winding rope above the safety detaching hook:

Provided that this prohibition shall not apply to persons whose presence is necessary for operating the conveyance or to persons engaged in shaft repairs, examination or other work which requires the use of such fitting on the rope.

410. Persons to enter only when conveyance properly positioned

No person shall enter or leave or be permitted to enter or leave a conveyance except when the conveyance is properly positioned at an established landing place, and until the appropriate signals required in terms of regulation 394(1) have been exchanged:

Provided that this regulation shall not apply to shaft sinking operations or to examinations, repairs, or other work conducted in accordance with regulations 401, 402 and 409.

411. No smoking in cage, kibble or skip

No person shall smoke in any cage, kibble or skip and a clearly visible notice to this effect shall be displayed in every cage:

Provided that where the man winding has been authorized in a kibble or skip such notice shall be suitably displayed and maintained at the bank and at each shaft station for the time being in use.

412. Medical certificates for persons in charge of winding engine

(1) No person shall drive, or be caused, instructed or permitted to drive, any winding engine unless he holds a certificate from a registered medical practitioner granted within the previous year stating that he is free from deafness, defective vision, epilepsy, disease of the heart, or any other infirmity likely to interfere with the efficient discharge of his duties or which might cause him to lose control of that engine.

(2) The renewal or endorsement by a registered medical practitioner of such a certificate as is referred to in subregulation (1) has the like effect as the grant of a new certificate.

(3) The Engineer may, at any time, require the renewal of such a certificate as is referred to in subregulation (1), and if, within 14 days of the requirement being made, the certificate is not renewed or endorsed by a registered medical practitioner, it shall cease to be of effect.

413. Driver to be certificated

(1) No person shall drive, or be caused, instructed or permitted to drive, any winding engine unless he is the holder of a valid winding engine driver's certificate of competency issued in accordance with regulations 417 and 421, or is a learner acting under the direct supervision of a holder of a valid winding engine driver's certificate of competency:

Provided that, unless otherwise ordered by the Engineer in a written order to the manager, where the winding engine has a maximum rope speed of not more than 150 m per minute and where the maximum number of persons permitted to travel in the conveyance or conveyances suspended from it does not exceed five, and subject to any other condition an inspector may impose, such engine may be driven by the holder of a valid winding engine driver's certificate of test, issued in accordance with the provisions of regulation 426.

(2) Only one driver with a valid certificate shall be in charge of a winding engine at any one time, and where it may be necessary for such driver to be replaced for any period of time by another driver with a valid certificate, the driver taking over such winding engine shall, when taking charge, comply immediately with all the requirements of regulation 414.

414. Duties of driver

The driver of a winding engine shall—

- (a) immediately on taking charge of such engine, examine and sign the driver's log book and acknowledge by his signature or initials each uncanceled entry made in terms of either regulation 401(4) or regulation 380(c);
- (b) not start such engine before he has received a distinct and proper signal to do so except in any case of emergency when he is instructed to do so by the manager or other responsible person;
- (c) not act on any signal if he has been unable to do so within one minute after receiving it but shall call for a fresh signal:

Provided that in the case of the clear signal 2—1, the driver may at his discretion move his engine, but if a period of more than five minutes has elapsed since receiving such clear signal he shall move the conveyance away very slowly;

- (d) not run such engine at a speed greater than that specified by an inspector, except where he is testing the overspeed device;
- (e) avoid undue shocks in starting, running and stopping such engine;
- (f) not, after receiving a signal to raise or lower persons, start his engine until the expiration of at least 10 seconds:

Provided that this paragraph shall not apply when the engine driver has received the special signal used in accordance with regulation 394(4);

- (g) not unclutch a drum of such engine until he has assured himself immediately

beforehand by testing the brake of the drum against the normal starting power or normal starting current of the engine applied in the direction of the out-of-balance load, that the brake is in proper condition to hold the load suspended from the said drum;

- (h) when the drum is unclutched, use the brake only for the purpose of maintaining such drum stationary; and shall not on any account lower a conveyance with the drum unclutched;
- (i) observe only authorized signals and operate such engine in accordance therewith;
- (j) whenever any conveyance is not in use, leave it at some point in the shaft other than at the bank or at a station;
- (k) within two hours of taking charge of such engine, test the brakes, check the clutch, reversing gear and depth indicator, and test such safety devices as he can readily reset, and shall enter in the driver's log book the results and time of such tests; for the purpose of this test the brakes shall be considered satisfactory if each brake is capable of holding the drum or drums stationary against the normal starting power, or normal starting current of the engine, applied in the direction of the out-of-balance load:

Provided that such two hour period may be extended when the operation of changing ropes or any other maintenance operation is occurring when the driver takes charge of any engine but such extension shall cease immediately such ropes have been changed and the requirements of this paragraph shall be complied with forthwith;

- (l) if during any such test as is hereinbefore required there is discovered any defect by which the safety of persons may be endangered, record such defect in the driver's log book immediately and shall report it to the responsible person in charge and, until such weakness or defect is remedied, the winding plant shall not be used;
- (m) having taken charge of such engine, throughout his period of duty—
 - (i) remain immediately available to receive and to act in accordance with all authorized signals received;
 - (ii) except in the case of any such engine running on automatic or remote control, remain at the controls whilst the engine is in motion, and not speak on any telephone; and
 - (iii) remain at the controls whilst men are in or on a conveyance or in any compartment served by such engine unless the compartments served by such engine are locked; and
- (n) not, after receiving the "compartment locked" signal, move such engine until the compartments have been re-opened, and shall record both these signals in the driver's log book at the time he receives the respective signals.

415. Manager to check validity of certificate

(1) Any manager employing a driver who is required by regulation 413 to be the holder of either a certificate of competency or a certificate of test shall ensure that such driver is the holder of a valid certificate.

(2) Upon employing a driver who is required by regulation 413 to be the holder of either a certificate of competency or a certificate of test the manager shall ensure that the Engineer is notified forthwith in writing to that effect, and shall also ensure that the termination of the employment of such driver is notified in a like manner.

416. Qualifications of driver

Every applicant for a winding engine driver's certificate of competency shall submit to the Engineer an application in writing together with—

- (a) evidence in writing to the effect that he is over 21 years of age;
- (b) a medical certificate issued within 30 days preceding the date on which the application is submitted specifying that his sight and hearing are not defective and that he is not subject to any other infirmity, mental or physical, likely to interfere with the efficient discharge of the duties of a driver;
- (c)
 - (i) evidence of at least six months of training, including evidence of experience in the driving of the class of winding engine for which a certificate of competency is required, of which period at least four months must have been spent under the supervision of a holder of an appropriate winding engine driver's certificate of competency;
 - (ii) in the case of a person who holds a winding engine driver's certificate of competency and who wishes to drive a winding engine of a class other than that permitted by such certificate of competency, evidence of having undergone a further period of at least two months, training for that class of winding engine for which a certificate of competency is required;
 - (iii) evidence that he has, as a fitter or electrician, been employed for at least 12 months on winding engine maintenance, or, as an apprentice fitter or electrician, been employed for at least 12 months on winding engine maintenance during the last two years of his period of apprenticeship, and, in either of such cases, two months of the six months of experience of driving winding engines may be waived; or
 - (iv) evidence that he has completed satisfactorily a course of training for drivers approved by the Engineer, in which case he may be accepted as having had training and experience equivalent to all or part of that required by subparagraph (c)(i).

417. Board of examiners

(1) An application for a winding engine driver's certificate of competency shall, if in order, be

referred by the Engineer to the board of examiners:

Provided that if an applicant is already the holder of a recognized certificate of competency the Engineer may, at his discretion, grant the applicant a winding engine driver's certificate of competency without referring the application to the board of examiners, and in such cases the requirements of regulation 416(c) shall be deemed to have been met.

(2) The board of examiners shall consist of an inspector, who shall be chairman, and two other members selected by the chairman as and when required from a panel of examiners approved in writing by the Engineer.

418. When board to meet

(1) The board of examiners shall meet at such time and places as shall be appointed by the Engineer and shall keep such records and submit such reports of their proceedings as he shall direct.

(2) Examinations shall be conducted in English.

419. Qualifications of members of board

(1) The chairman and the members of the board of examiners shall be present at every examination of an applicant.

(2) One of the two members of the board of examiners shall be a qualified engineer and the other member shall be a person holding a winding engine driver's certificate of competency for the class of winding engine for which a certificate of competency is required by the applicant.

(3) If there is a difference of opinion among the members of the board of examiners on any matter connected with the examination of a candidate under these Regulations the chairman's decision shall be final.

420. Rules for the conduct of the board

(1) Rules for the conduct of the examination by the board of examiners shall be framed by the Engineer who may alter such rules as occasion may require.

(2) Copies of such rules for the time being in force may be obtained from the office of the Engineer.

421. Recommendation for issue of certificate

After the examination of an applicant the chairman of the board of examiners shall submit his recommendations in writing to the Engineer; the board may recommend that a certificate of competency be refused, and the Engineer shall follow the recommendations of the board and either issue to the applicant a certificate of competency, in the form authorized by the Engineer, subject to any qualifications and limitations recommended by the board, or inform the applicant that his application for a certificate of competency has been unsuccessful.

422. Validity of certificate

A certificate of competency or a certificate of test issued under these Regulations shall not be valid unless it bears the holder's signature in ink.

423. Suspension of certificate

(1) If at any time a certified driver is, in the opinion of an inspector, guilty of gross inattention or negligence or of any misconduct in the execution of his duties or suffers from an infirmity likely to be detrimental to the efficient discharge of his duties, such inspector may suspend such driver's certificate of competency.

(2) Any suspension shall be reported immediately by the inspector to the Engineer who, after giving the driver concerned an opportunity to state his case, may confirm the suspension for such period as he may think fit, or cancel the driver's certificate of competency or rescind the suspension.

(3) Any driver who is aggrieved by the Engineer's decision under subregulation (2) may within seven days of the date on which he was notified of such decision request that his case be submitted to the board of examiners, whose chairman for this purpose shall be either the Principal Government Mining Engineer or another inspector.

(4) The case shall then be so submitted and the board, after giving the driver an opportunity to present his case before it in person, shall submit its recommendations thereon to the Engineer who shall, if in agreement with those recommendations, give his decision in accordance therewith, which shall be final.

(5) Should the Engineer disagree with the recommendations of the board the case shall be referred to the Minister, whose decision shall be final.

(6) Any certificate of competency which has been suspended or cancelled shall forthwith be returned, together with any copies thereof, to the Engineer who may, after an appeal under subregulation (3), (4) or (5) has been finally decided, endorse the certificate accordingly.

(7) The Engineer shall forthwith notify the manager of the mine at which the holder of the certificate of competency is employed as a driver of the suspension, termination of suspension or cancellation of such certificate.

424. Fee

(1) The fee payable on application for a winding engine driver's certificate of competency shall be P5.

(2) An applicant whose application is rejected without examination shall be entitled to a refund of the fee paid but no applicant who has been accepted for examination shall be entitled to a refund.

(3) If satisfied that a certificate of competency issued under these Regulations has been lost

the Engineer may issue a duplicate thereof on payment of a fee of P1.

425. Non-certificated person to drive in emergency

(1) In case of emergency the manager may, notwithstanding the provisions of regulation 413, give written permission to a person who is not the holder of a winding engine driver's certificate of competency to operate any winding plant if the manager is satisfied that such person is competent to do so.

(2) A copy of any permission so given shall be sent immediately to the Engineer together with full details of the emergency necessitating the giving of that permission and the Engineer may also be immediately notified on the telephone of such permission.

426. Issue of certificates of test

(1) A driver's certificate of test in the form authorized by the Engineer shall be issued free of charge by an inspector after he has satisfied himself by oral and practical examination of the applicant that such applicant is competent.

(2) Each applicant must produce a medical certificate issued within 30 days preceding the date of application to show that he does not suffer from any deficient hearing or eyesight and that he does not suffer from any other infirmity, mental or physical, likely to interfere with the satisfactory conduct of his duties as a driver.

427. Regulations applicable to certificate

Subregulations (1), (2), (6) and (7) of regulation 423 and regulation 425 shall apply to the validity of a winding engine driver's certificate of test.

PART XXVI

Machinery, Lifting Appliances and Welding (regs 428-481)

428. Safe use

As far as is practicable, all machinery shall be selected, arranged, installed, protected, adjusted, worked and maintained so as to prevent danger to persons.

429. Suitability of machines

All parts and working gear, whether fixed or movable, including the anchoring and fixing appliances of all machinery and apparatus used as or forming part of the equipment of a mine, quarry or works and all foundations in or to which any such appliances are anchored or fixed, shall be of good construction, suitable material, adequate strength and free from patent defect and shall be maintained in good working order.

430. Provision of guards

(1) Unless situated in such a place or manner as to prevent a person coming into accidental contact with projecting moving pieces and other dangerous parts of moving machinery—

- (a) every belt, pulley, gear and wheel, and every opening through which any belt, pulley, gear or wheel operates;
- (b) every bolt, key, and set-screw, and every part of any wheel or other revolving, oscillating, or reciprocating part which projects unevenly from the surface,

shall be covered, enclosed or guarded with substantial casing or railing.

(2) The manager shall ensure that any such guard installed in accordance with subregulation (1) is kept in position and is properly maintained:

Provided that, when such guard is temporarily removed for the purpose of repairs or other operations, proper precautions shall be taken for the safety of persons, and on the completion of such repairs or other operations the guard shall be securely replaced.

431. Admittance to place where machinery used

No person other than a person authorized by the manager, or entitled by law, shall enter a place where machinery is used.

432. Charge of machinery

(1) The manager shall ensure that all machinery shall be in the charge of a competent person.

(2) No person having charge of any machinery which is required to be constantly supervised shall for any reason whatsoever absent himself or cease to have continual supervision of such machinery during the time for which he is in charge unless he is replaced by another competent person.

433. Repairing and oiling

(1) Where machinery or equipment is shut down or stopped, no work shall be carried out on the machinery or equipment until designated and effective means have been taken to immobilize or lock out the source of power which could put the machinery or equipment into motion.

(2) Where it is necessary to run the machinery or equipment a competent person shall perform any adjusting or lubricating.

(3) In special cases, an inspector may require the provision of an automatic device for lubricating machinery.

434. Precautions for belt driven machinery

(1) Where it is necessary to stop and start belt-driven machinery without interfering with the speed of the prime mover a suitable appliance for the purpose shall be permanently fitted.

(2) Where machinery is in motion the shipping and unshipping of driving belts is forbidden except that the customary shifting of light belts on the coned pulley of machine tools for the

purpose of altering the working speed may be permitted.

435. No loose clothing or long hair near machinery

No person in close proximity to moving machinery shall wear or be permitted to wear loose outer clothing, and long hair shall be suitably protected.

436. Means of access to machinery

Where persons are required to work on, near or about machinery, proper lighting, safe footing and adequate space shall be provided.

437. Starting machinery

No machine shall be started if, by so doing, any person is likely to be exposed to danger, unless adequate warning has been given that such machine is about to be started.

438. Inspection of machinery

Provided he gives reasonable notice, an inspector may at any time require a user to prepare any machinery or part of machinery for inspection.

439. Provision of goggles and screens when using machinery

The manager shall ensure that suitable goggles, face masks or screens are provided to protect the eyes of operators and of any other person in the immediate vicinity, and these shall be used by persons when—

- (a) grinding surfaces of metal, stone, concrete or similar materials by means of a power-driven wheel or disc;
- (b) chipping or scaling painted or corroded metal surfaces or wire-brushing such surfaces; or
- (c) treating stone, metal, concrete, slag or similar materials where danger to the eyes may arise:

Provided that this shall not apply to rock drills using water in mining and quarrying operations.

440. Guards for grinding wheels

(1) Every power-driven grinding wheel shall be provided with a hooded guard of sufficient strength to withstand the shock of a bursting wheel.

(2) The guard specified in subregulation (1) shall be adjusted close to the wheel and extended forward, over the top of the wheel to a point at least 30° beyond a vertical line drawn through the centre of the wheel.

441. Audible warning device for lifting appliance

The manager shall ensure that every lifting appliance on which the operator travels shall be

fitted with an effective audible warning device.

442. Stability of lifting appliance

No lifting appliance shall be—

- (a) used on a soft or uneven surface or on a slope, in circumstances in which the stability of the appliance is likely to be affected, unless adequate precautions are taken to ensure its stability; or
- (b) used unless it is securely anchored or adequately weighted by suitable ballast properly placed on the structure so as to ensure its stability.

443. Ballasting diagram for lifting appliance

Where the stability of a lifting appliance is ensured by means of removable weights a diagram or notice indicating the position and the amount of such weights shall be affixed where it can readily be seen.

444. Passageway to be maintained

On every stage, gantry or other place where a lifting appliance having a travelling or slewing motion is used, an unobstructed passageway not less than 600 mm wide shall be maintained between the nearest part of the appliance at any time in the course of its movement and the guard rails, fencing or any nearby structures:

Provided that if at any time it is impracticable to maintain such a passageway all reasonable steps shall be taken to prevent the access of any person to the place where the lifting appliance is in motion and obstructing free passage.

445. Use of lifting appliance near power lines

Where any mobile lifting appliance or other equipment having a mast or movable boom is to be operated near any electrical transmission or distribution conductors, a clearance of 3,1 m shall be maintained between the maximum reach of the machine or equipment and the live conductors, unless—

- (a) the conductors are disconnected from the electrical supply, and confirmation of the disconnection has been received from the authority supplying power, or the person in charge of the electrical supply;
- (b) the conductors are first given adequate mechanical protection by the electrical authority involved to prevent contact by the machine, its attachment or load; or
- (c) the work involves the conductors and is being carried out by competent electrical personnel using a machine with an insulated boom designed, built, and tested for use on electrical potentials at least as high as that of the conductor involved.

446. Erection and testing of lifting appliance

(1) No lifting appliance shall be erected or dismantled except under the supervision of a competent person.

(2) No lifting appliance shall be used for the first time unless it has been proof load tested and thoroughly examined by a competent person.

(3) At least once in every 12 months at intervals not exceeding 14 months every lifting appliance shall be thoroughly examined and tested by a competent person.

(4) Subregulation (2) shall also apply after any subsequent modification or a structural design alteration or major repairs to any lifting appliance.

447. Safe loads and identification marks

Except for rope blocks with a safe working load of 900 kg or less, every lifting appliance shall have plainly marked thereon its safe working load or loads and an identification mark.

448. Automatic indicator or tables for variable lifting device

Any lifting appliance so constructed that the safe working load may be varied by the raising or lowering of a jib shall have either an automatic indicator of safe working loads or a table indicating the safe working loads.

449. Provision for chain or wire rope

Any drum or pulley around which the chain or wire rope of any lifting appliance is carried shall be of suitable diameter and construction for the chain or rope used thereon.

450. Securing of chain or wire rope

Any chain or rope which terminates at the winding drum of any lifting appliance shall be properly secured thereto and at least three turns of such chain or rope shall remain on the drum in every operating position of such appliance, except where the design of such appliance permits less than three turns.

451. No suspension of load from unattended appliance

No load shall be left suspended from a lifting appliance which is unattended and which may be a danger to any person.

452. Warning to oncoming craneman

Where a cab-operated crane is operated on consecutive shifts, the oncoming craneman shall give warning to, and receive acknowledgement from, the operating craneman before stepping on the crane.

453. Leaving crane cab

Before any crane operator vacates the crane cab he shall leave the switches and controls in the "Off" position.

454. Efficient brakes to hold load

Every lifting appliance shall be provided with an efficient brake or brakes or other such safety device which will prevent the fall of the load when suspended and by which the load can be effectively controlled:

Provided that this regulation shall not apply to rope blocks if adequate precautions are taken to ensure the safety of persons.

455. Suitable controls

The controls of any lifting appliance shall be suitably placed and so constructed as to prevent accidental or inadvertent operation of such controls.

456. Persons not to ride except on platform of lifting appliance

No person shall be raised, lowered or carried by a lifting appliance except on the driver's platform:

Provided that a person may be raised or lowered within the safe limits of the appliance for the sole purpose of making a working place safe.

457. Safety factor for lifting appliance

(1) Power-driven mobile cranes shall be so constructed as to hold without overturning a sustained load, in weight not less than 1,5 times the safe working loads for ordinary lifting duty when the crane is standing on level ground.

(2) Cranes used for grabbing duties shall be so constructed as to hold without overturning a sustained load, in weight not less than 1,875 times the safe working loads of the crane for ordinary lifting duty when the crane is standing on level ground.

458. No appliance to be loaded beyond safe load

No lifting appliance or any part thereof shall be loaded beyond the safe working load, provided that for the purpose of making tests of any such appliance the safe working load may be exceeded by such amount as a competent person appointed to carry out the tests may authorize.

459. Inspection before use

(1) Every lifting appliance and all plant or gear used for anchoring or fixing such appliance shall, as far as the construction permits, be inspected for patent defects by a competent person before use.

(2) Every power-driven crane which travels on fixed tracks and is operated from a cab mounted on the crane, or handles molten material, shall be inspected by a competent person on each day on which a crane is used, or those parts of the crane, or of the apparatus pertaining thereto, upon the working of which the safety of persons depends.

(3) A record of each inspection made under subregulation (2) shall be kept and signed by the person making the inspection.

460. Competent person only to operate lifting appliance

No lifting appliance shall be operated except by a person competent to operate that appliance, or by a person under the direct supervision of a competent person for the purpose of training.

461. Distinct signals to be given

Any signal given for the movement or stopping of a lifting appliance shall be distinctive in character and such that the person to whom it is given is able to see or hear the signal distinctly.

462. Provisions for platforms of lifting appliance

Any platform used for the operation of a lifting appliance shall be—

- (a) of sufficient area for the persons to work thereon in safety;
- (b) close planked or plated;
- (c) provided with safe means of access; and
- (d) provided with guard-rails and toe-boards.

463. Suitability of track upon which lifting appliance moves

(1) No rail track on which a travelling lifting appliance moves shall be used unless it is of good construction, suitable material, adequate strength, free from patent defect and maintained in good condition.

(2) Any overhead track upon which a travelling lifting appliance moves shall be provided with effective stops at its ends.

464. Travelling brakes on lifting appliance

Every power-operated travelling lifting appliance shall have effective brakes fitted to the travelling mechanism.

465. Overwind and over-running device

Every power-driven lifting appliance shall be equipped with devices to prevent overwinding and over-running of limits; such overwind devices shall be tested at the start of each shift.

466. No person to work on lifting appliance

No person shall work on or near, or order any other person to work on or near, any wheel track of any travelling lifting appliance in any place where he would be liable to sustain injury by the passage of such lifting appliance unless adequate precautions are taken to ensure his

safety.

467. Load to be secured

Every part of a load shall be adequately secured whilst being raised or lowered by any lifting appliance.

468. Containers to be designed to prevent spillage

Any container used for raising or lowering material shall be so designed as to prevent spillage:

Provided that this regulation shall not apply to a grab, shovel or similar excavating equipment if adequate precautions are taken to ensure the safety of persons.

469. Record to be kept

The manager shall ensure that there is maintained a record showing the condition and location of all lifting appliances with a safe working load in excess of 900 kg.

470. Provisions for all lifting gear

The following provisions shall apply to all lifting gear—

- (a) no lifting gear shall be used unless it is of good construction, sound material, adequate strength, free from patent defect and maintained in good condition;
- (b) there shall be posted at the store in which such lifting gear is kept and at other prominent and convenient places where lifting gear is regularly used a table showing the safe working loads—
 - (i) of every size and kind of such lifting gear in use; and
 - (ii) of every multiple sling at different angles of the sling legs;
- (c) the safe working load of all lifting gear shall be that determined by a competent person;
- (d) no lifting gear shall be used for any load exceeding the safe working load, except for the purpose of making tests;
- (e) all lifting gear shall be visually examined before use; and
- (f) no lifting gear which is defective shall be used.

471. Repairs to lifting appliances

Where repairs are made to any lifting appliance, the manager shall ensure that the repairs are made in such a way that the original loading ratings, as set out on the loading plates, are met.

472. Provisions for hooks

Any hook used in connection with any lifting appliance shall be of good construction, suitable material, adequate strength, free from patent defect and shall be properly maintained, and be provided with an efficient device to prevent the displacement of the sling or load from such hook when specifically required by an inspector.

473. Annealing of chains and lifting gear

(1) An inspector may direct that any wrought iron chains or lifting gear in use shall be annealed or otherwise treated by heat at such specified intervals as he considers necessary.

(2) The manager shall ensure that a record is kept of such annealing and treatment.

474. Testing of chains and examinations of wire rope slings

(1) No chain shall be taken into use for the first time unless it has been examined and tested by a competent person.

(2) No wire rope sling with a safe working load exceeding 900 kg shall be taken into use for the first time unless it has been thoroughly examined by a competent person.

(3) The manager shall ensure that a record is kept of such examination and testing.

475. Use of impaired rope prohibited

No person shall use or permit or instruct any other person to use any vegetable or synthetic fibre rope which has been exposed to any process or substance which has or could have impaired its efficiency; any rope so exposed shall be destroyed forthwith.

476. Platforms, etc., becoming slippery

When any platform, gangway, run or stair becomes slippery appropriate steps shall be taken to remedy such defect as soon as is reasonably practicable.

477. Welding or cutting by electric arc or gas flame

No welding or cutting by electric arc or gas flame shall be undertaken unless—

- (a) protection against heat, sparks and dangerous radiations, is provided for eyes and, where necessary, face, hands, feet, legs and clothes;
- (b) leads and electrode holders are electrically insulated for other than spot welding; and
- (c) where practicable, the workplace is screened or partitioned off.

478. Ventilation during welding or cutting

No welding or cutting operation shall be undertaken in a confined space unless—

- (a) continuous forced ventilation is provided and maintained; or
- (b) fresh-air masks are provided and used by the operator.

479. Precautions whilst welding or cutting

(1) No welding or cutting operation shall be undertaken in wet or damp situations in closely confined spaces, inside metal vessels or in general in contact with masses of metal, unless—

- (a) the insulation of the leads is in sound condition;
- (b) the electrode holder is completely insulated to prevent accidental contact with current carrying parts;
- (c) the operator is completely insulated by means of suitable boots, gloves or rubber mats; and
- (d) at least one other person, during the operations, is, and remains in, attendance.

(2) Unless the position is rendered safe to persons against falling, no welding or cutting operation shall be undertaken in an elevated position.

(3) No welding or cutting operation or an operation of a similar kind shall be undertaken to tubes, drums, vessels and the like if they—

- (a) are completely closed, unless a rise of internal pressure is consistent with safety; or
- (b) contain substances which, under the action of heat, may—
 - (i) ignite or explode; or
 - (ii) react to form poisonous or otherwise dangerous substances,

unless a competent person has certified after examination that the dangers had been removed by opening, ventilation, purging with water, steam or gas or by other approved means.

480. Gas cylinders

No cylinder containing oxygen, acetylene or other compressed gas shall be used unless the cylinder is—

- (a) rendered easily distinguishable by means of an identifying colour in accordance with an approved code;
- (b) stored in such manner and place that the contents cannot become dangerous from the effects of heat; and
- (c) fitted with an approved type of pressure regulator.

481. Transport of cylinders

Where one or more cylinders of oxygen, acetylene, or other compressed gas are transported—

- (a) all fittings, such as regulators, or manifolds, shall be disconnected from each cylinder, and the valve of the cylinder shall be protected;
- (b) the protective device shall be removed only at the point of use, and shall be replaced before a cylinder is left unattended, or moved to a new location:

Provided that short moves for continued use in the same work area on the same level, may be permitted without removal of the fittings, if the cylinder is moved on a suitable carrier and remains under the care of the person using the cylinder; and

- (c) where cylinders of acetylene, oxygen, or other compressed gas are used underground, special precautions shall be observed in their transportation and use so as to avert the possibility of damage to, or failure of, the regulators, manifolds, and hoses used in conjunction with the equipment.

PART XXVII

Steam Boilers, Steam Containers and Steam and Air Receivers (regs 482-511)

482. Standard of construction

In respect of every air receiver, boiler or steam container, their foundations and installations referred to in these Regulations shall be of good construction, sound material, adequate strength, free from patent defect and shall be maintained in good condition.

483. Boilers underground

(1) No boiler for the generation of steam shall be installed underground in any mine, except with the permission in writing of the Engineer.

(2) No person shall use or cause or permit to be used any steam underground unless he holds a permit, in writing, issued by the Engineer and upon and subject to such terms and conditions as may be imposed by the permit.

(3) The Engineer may at any time suspend or cancel a permit issued by him under this regulation.

484. Requirements for boilers

(1) Before the first installation of any boiler the manager shall ensure that the following details of such boiler are submitted to the Engineer for his approval in writing—

- (a) the manufacturer's complete specification;
- (b) legible, dimensioned drawings of the complete boiler showing details of the plating, riveting and welding;
- (c) drawings showing the boiler house, if any, in plan and elevation and the position therein of the boiler; and

- (d) a certificate issued by an inspecting authority incorporating the following information—
- (i) that the authority is satisfied that the boiler is constructed in accordance with the specified code;
 - (ii) results of the physical and chemical tests carried out on the material used in construction;
 - (iii) details of the heat treatment; and
 - (iv) details of the hydraulic test, witnessed by the inspecting authority.

(2) In the case of a used boiler full records of the previous history of the boiler shall be submitted.

(3) No boiler shall be encased during erection, and when erected shall not be used until it has been examined and tested to the satisfaction of an inspector or approved inspecting authority.

(4) From the result of this examination and test the inspector shall specify the authorized working pressure, and shall enter such authorized working pressure in the boiler record book.

(5) Every boiler shall be provided with a plate upon which is marked in clearly visible characters the year of first examination and the authorized working pressure at which such boiler may be worked.

(6) The plate required by subregulation (5) shall be securely fixed to the boiler in a suitable position.

(7) The maximum continuous steaming rate of every boiler in kilograms of steam per hour shall be specified by an inspector and such specification shall be based on the maker's specification.

(8) Safe access must be provided to and maintained to every point where any boiler safety device is installed.

485. Safety valves for boilers

(1) Every boiler shall be provided with one or more reliable safety valves. The loading of such safety valves shall be such that at least one will lift when the authorized working pressure in such boiler is reached.

(2) The loading of such safety valves and the aggregate area available for the discharge of steam shall be such as to prevent accumulation of steam pressure in the boiler greater than 10 per cent above the authorized working pressure:

Provided that one safety valve, which shall be locked and which shall be accessible only to the person in control, shall be sufficient for—

- (i) any boiler with a total capacity of 90 l or less;
 - (ii) any economizer and any separately fired superheater which can be shut off from the boiler;
 - (iii) any oil, gas or electrically heated boiler where a means is provided for automatically isolating the source of heat should the pressure rise above that at which the safety valve is loaded to open.
- (3) Every safety valve shall be constructed and installed so that—
- (a) it can be easily freed from its seat at any time by lifting gear worked by hand from some accessible place, and shall be free to rotate on its seat; and such arrangements shall be free from steam danger;
 - (b) where directly loaded by springs the compression nuts shall abut against metal stops or washers at the working load compression to prevent such safety valve being loaded to beyond the authorized maximum working pressure; adequate precautions shall be taken to ensure that the load settings of such safety valve cannot be altered by any unauthorized person; and
 - (c) where loaded by a weight or spring action on a lever, the load can only act at the extreme end of such lever.
- (4) Every safety valve shall be installed so that—
- (a) it is mounted on or as near as possible to the boiler shell;
 - (b) no stop valve shall be placed between the safety valve and the boiler which it serves;
 - (c) no person is exposed to danger from the discharge of such valve; and
 - (d) such safety valve is fitted with a suitable drain.

486. Provision of stop valves

(1) At any point at which steam is taken from a boiler a stop valve shall be provided as close as is practicable to the point of draw-off.

(2) Where any boiler delivers its steam into a range or main common to other boilers a non-return valve shall be fitted in such manner that accidental reversal of flow of steam shall be prevented.

487. Pressure gauges for boilers

(1) Every boiler shall have connected to the steam space one or more reliable pressure gauges which shall be so installed that any gauge may be changed while the boiler is in service.

(2) The dial or every pressure gauge shall be calibrated in kPa and shall have a range greater than the authorized working pressure of the boiler by not less than 20 per cent and not

more than 100 per cent.

(3) The authorized working pressure of the boiler shall be marked with a red line on the dial of the pressure gauge.

(4) Suitable arrangements shall be made to ensure that the element of any pressure gauge is not subjected to live steam.

(5) Every boiler shall be provided with a suitable attachment to enable an inspector to affix a pressure gauge for the purpose of carrying out pressure tests.

488. Feed water

(1) Every boiler shall be provided with two independent means of feed water supply.

(2) Where the feed apparatus is an injector, a second means of feeding consisting of a power or hand pump shall be fitted.

(3) For the purposes of this regulation, two or more such boilers combined for joint working shall be regarded as one boiler.

(4) Where a multiple pump supply system is in use sufficient capacity shall always be maintained to ensure a safe steaming rate.

(5) The capacity of these means of supply shall be such that in the event of a failure of any one means of supply the feed water requirements of the boiler can still be met:

Provided that one reliable means of feed water supply shall be sufficient for any boiler having a total volume of 90 litres or less for the combined steam and water spaces.

(6) Where the feed delivery pipe enters a boiler such pipe shall be provided with a self acting non-return valve and a stop valve; such stop valve shall be fitted between such non-return valve and such boiler, and these two valves may have a common body.

489. Water levels

(1) Every boiler shall be provided with two or more reliable water level indicators, one of which shall be a glass water level gauge, each of which shall be provided with means so that such gauge may be changed while the boiler is in service:

Provided that one glass water level gauge shall suffice for any boiler having a total volume of 90 litres for the combined steam and water spaces.

(2) Fusible plugs shall be fitted to any fire-tube boiler:

Provided that an inspector may give written exemption from this requirement.

(3) Every glass water level gauge shall be efficiently guarded in such manner so as not to obstruct the reading of such gauge; any isolating cock must be of such type that it can clearly be seen whether it is in the open or closed position.

(4) The lowest safe water level for every stationary boiler shall be clearly marked on every water level gauge as well as on the boiler shell or masonry and shall be not less than 75 mm above the highest part of the flues passing round or through the boiler, and for any portable boiler and any boiler of a locomotive or locomobile such level shall be of sufficient height above the fire line that even with oscillation of the boiler the highest part of the surface reached by the fire and heated gases remains covered by water.

(5) Every boiler, other than an economizer and a separately fired superheater shall be provided with some means, independent of visual observation, whereby any deficiency of water is made known.

(6) Notwithstanding the provisions of subregulation (5) every oil, gas or electrically heated boiler shall either have a low-liquid alarm other than a fusible plug or be provided with a means for automatically isolating the source of heat should there be a deficiency of liquid.

490. Blow down valve

(1) Every boiler shall be provided with one or more blow down valves effectively placed.

(2) Every joint between a boiler and such blow down valve shall be flanged, and where such flanges are not integral with the pipe or valve they shall not be fastened by means of screw threads alone.

(3) No pipe between any boiler and blow down valve shall be in contact with any masonry or any supporting structure in such manner that it will be subject to dangerous stress by the relative movement of various parts of such boiler.

(4) The discharge from a blow down valve shall be conducted by means of a pipe into an open tank, drain or sump fitted with adequate vents so situated and guarded as to prevent danger to persons.

(5) A blow down valve of two or more boilers shall not be allowed to discharge into a common pipe.

(6) Adequate safety measures shall be taken to ensure the safety of any person working on the piping system of any blow down valve between such valve and any tank, drain or sump.

(7) Any key used to operate any main blow down valve shall be so constructed that it cannot be removed whilst such valve is in the open position.

491. Pipes, fittings not to be screwed into shell

No pipe or fitting shall be screwed directly into the shell of any boiler.

492. Steam receiver modification

(1) Any steam receiver not so constructed as to withstand with safety the authorized working pressure of the boiler or the maximum pressure which can be obtained in the pipe connecting such receiver with any other source of supply of steam shall be fitted with—

- (a) a steam reducing valve or other automatic appliance to prevent its own authorized working pressure being exceeded;
- (b) a suitable safety valve so adjusted as to permit the steam to escape as soon as the authorized working pressure of such receiver is exceeded, or a suitable automatic appliance for cutting off the supply of steam to such receiver, as soon as the authorized working pressure is exceeded;
- (c) an accurate pressure gauge which shall indicate the steam pressure in kilopascals;
- (d) a suitable stop valve; and
- (e) a plate bearing a distinctive and clearly visible identification number.

(2) Every safety valve and pressure gauge required by subregulation (1) shall be fitted either on the steam receiver or on the supply pipe between the receiver and any reducing valve or other appliance provided to prevent the authorized working pressure being exceeded.

(3) For the purposes of subregulation (1)(a), (b), (c) and (d), any set of receivers supplied with steam through a single pipe and forming part of a single unit may be treated as one receiver and further, for the purposes of subregulation (1)(a), (b) and (c), any other set of receivers supplied with steam through a single pipe may be treated as one such receiver:

Provided that this subregulation shall not apply to any set of receivers unless the reducing valve, or other such appliance provided to prevent the authorized working pressure being exceeded, is fitted on such single pipe.

(4) Every steam receiver and its fittings shall be properly maintained and shall be thoroughly examined by an inspector or approved inspecting authority so far as its construction permits, at intervals not exceeding two years.

(5) A record of the result of every examination of a receiver, containing such particulars as the Engineer may require, shall be kept and made readily available for inspection at all times.

(6) Every steam container shall be properly maintained so as to ensure that the permanent outlet to atmosphere is kept open and free from obstruction at all times.

493. Blowing down of boilers

Every boiler shall be blown down continuously or with sufficient frequency so as to ensure that no dangerous amount of sludge or dissolved salts is allowed to accumulate.

494. Conditions before cleaning boilers

No person shall enter or be permitted to enter any part of a boiler which has been opened for cleaning, repairs or examination until the person charged of such work has satisfied himself that it is safe to do so; before giving permission the person in charge shall ensure that—

- (a) any pipe through which steam or water might enter such boiler has been disconnected or effectively isolated therefrom and, where valves are used to achieve such isolation,

that they have been closed and securely locked; and

- (b) all reasonable precautions have been taken to safeguard any person working in the boiler or its flues against any danger from heat, gases, dust and falling objects.

495. Examination of boilers not to exceed 14 months

(1) Every boiler in service or on standby for emergency generation shall, at intervals not exceeding 14 months, be thoroughly examined internally and externally as far as is practicable by an inspector or approved inspecting authority, and before being put back into service shall be hydraulically tested in the presence of such inspector or approved inspecting authority.

(2) Boilers which have been out of use for 14 months shall not be used again before permission is obtained from the inspector:

Provided that an inspector may specify in writing an extension of such period of 14 months but not exceeding 24 months within which the next examination is to be made.

(3) If the examination of any boiler cannot otherwise be properly executed, any parts or the whole of the masonry or casing shall be removed if an inspector or approved inspecting authority deems this to be necessary.

(4) If at any time it is necessary to remove the masonry or casing of such boiler for the purpose of major renewal or repairs and this work reveals parts of such boiler which would otherwise be inaccessible, an inspector shall be notified before any such masonry or casing is replaced.

496. Examination by hydraulic pressure

(1) Any boiler having an authorized working pressure of less than 500 kPa shall be hydraulically tested to double such pressure.

(2) Every boiler having an authorized working pressure of 500 kPa or more shall be hydraulically tested to not more than 1,2 times such pressure plus 400 kPa.

(3) Except with the special permission of an inspector the masonry or casing of any boiler may not be replaced before the prescribed examination and test by hydraulic pressure has been carried out.

(4) The manager shall place, free of charge, at the disposal of the inspector, workmen, tools and any other equipment which may be required for the purpose of carrying out the inspection or test.

(5) Any manager who fails without good reason to have any boiler prepared for inspection or test on the date and at the time notified or who fails to provide the necessary facilities for the inspection or test shall be guilty of an offence.

497. Reduction of maximum working pressure

If any examination reveals that any boiler can no longer be worked safely at the authorized

working pressure originally specified, and the manager considers it inadvisable to have the necessary repairs made, an inspector may specify a lower working pressure and such lower pressure shall be recorded in the boiler record book.

(2) If on examination any boiler is found to be in a dangerous condition, an inspector or approved inspecting authority may order such boiler to be shut down and such boiler shall not be used again until such time as it has been examined by an inspector and he is satisfied that such boiler is safe to operate.

498. Record of particulars and information on boilers

(1) A record shall be kept for every boiler installed which shall contain the following particulars—

- (a) the country of origin, date of manufacture and name of maker;
- (b) the technical description and history;
- (c) the location and official number;
- (d) the authorized working pressure in kPa;
- (e) the dates on which the boiler is cleaned or examined and the condition of such boiler at the times of such examinations;
- (f) the dates on which the boiler is hydraulically tested, the test pressure applied and the result of the test; and
- (g) details of any repair made to the boiler or its fittings.

(2) Every entry in a boiler record book shall be signed by the person responsible for carrying out the work.

(3) If no work is carried out on any boiler in the course of any calendar month, an entry to that effect shall be made.

- (4) The manager shall ensure that notice is given to the Engineer when any—
- (a) major repairs or any design or structural alterations are to be executed to any boiler;
 - (b) part of any boiler is damaged so as to affect its authorized working pressure;
 - (c) boiler is being disposed of;
 - (d) boiler is moved from location to another; and
 - (e) boiler is out of commission for more than three months.

499. Safety valves for evaporators

Every evaporator shall be fitted with at least one suitable safety valve which will be so loaded

that it will lift when the authorized working pressure of such evaporator is exceeded.

500. Regulations not applicable to evaporators

Regulation 484(1), (2), (3) and (4) and regulation 488 shall not apply to evaporators operated above atmospheric pressure.

501. Air receivers

(1) Every air receiver shall have marked upon it so as to be clearly visible the year of manufacture, the serial number and the authorized working pressure.

(2) Every air receiver and its fittings shall be of sound construction consistent with the relevant British Standard or equivalent specification and shall be properly maintained.

502. Examination and testing of air receivers

(1) No air receiver shall be used until it has been examined and tested to the satisfaction of an inspector or approved inspecting authority.

(2) From the result of the examination and test the inspector shall fix the authorized working pressure:

Provided that any new air receiver on any new self-propelled vehicle shall be exempt from this regulation.

503. Mounting of air receivers

Every air receiver shall be so mounted that the shell is visible for external inspection at all times, and provision must be made for free expansion of the shell under all conditions of temperature.

504. Safety valves for air receivers

(1) Every air receiver shall have at least one reliable safety valve which shall be so loaded that it will lift when the authorized working pressure is exceeded.

(2) The area available for discharge of air shall be such as to prevent accumulation of pressure greater than 10 per cent above the authorized working pressure.

(3) Adequate precautions shall be taken to ensure that the load setting of every safety valve cannot be altered by any unauthorized person.

(4) Where directly loaded by springs the compression nuts shall abut against metal stops or washers at the working load compression, or be positively locked in position.

(5) No stop valve shall be placed between any safety valve and any receiver which it serves.

(6) When loaded by a weight or spring acting on a lever, the load shall act only at the extreme end of such lever.

(7) Every safety valve shall be so constructed that such safety valve shall be free to rotate on its seat.

(8) Every air compressor, except one which discharges into an air receiver and cannot be closed off therefrom, shall be provided with a pressure relief valve or other automatic device capable of preventing an accumulation of pressure greater than that for which such air compressor was designed or 10 per cent above the pressure for which the system into which the air compressor discharges was designed, whichever is the lesser pressure.

505. Pressure gauges for air receivers

(1) Every air receiver shall have at least one reliable pressure gauge so connected that it may be changed when such receiver is in use.

(2) The dial of every pressure gauge shall be calibrated in kPa and shall have a range greater than the authorized working pressure of such receiver by not less than 20 per cent and not more than 100 per cent.

(3) The authorized working pressure of the air receiver shall be marked by means of a red line on the dial of the pressure gauge.

506. Drain valves

(1) Every air receiver shall be provided with at least one drain valve which shall be so arranged that persons operating it are not exposed to danger from the discharge from such drain valve.

(2) Every air receiver shall be drained with sufficient frequency to ensure that no dangerous amount of water or sludge is allowed to accumulate.

(3) Every compressor, air receiver, intercooler and their connections to air compressors shall, as far as is practicable, be kept clean and free from water and carbonised oil and other material liable to ignition.

507. Pipes, plugs, fittings

No pipe, plug or fitting shall be screwed directly into the shell of any receiver.

508. Examination of air receivers

Every air receiver shall be—

- (a) examined internally by a competent person at intervals not exceeding 12 months and shall be tested by hydraulic pressure to the satisfaction of an inspector or approved inspecting authority at intervals not exceeding two years; the pressure applied during such test shall be 1,5 times the authorized working pressure; and
- (b) provided with suitable manhole, handhole or other means which will allow the interior to be thoroughly cleaned and inspected:

Provided that, if it is so constructed that the internal surface cannot be thoroughly examined, a suitable hydraulic test of the receiver shall be carried out instead of the internal examination.

509. Record of examination and test

The result of any examination and test referred to in regulation 508 shall be suitably recorded and the record signed by the competent person making such examination and test.

510. Fitting of thermometers and pyrometers

(1) Thermometers or pyrometers, the indications of which can be clearly read in degrees Celsius, and fusible plugs, shall be fitted close to the outlet valves or discharge ports of all positive displacement air compressors having a rating exceeding 7 m³ of free air per minute.

(2) Thermometers or pyrometers, the indications of which can be clearly read in degrees Celsius, shall be fitted to the discharge pipes of all other compressors having a rating exceeding 7 m³ of free air per minute.

(3) The maximum temperature allowed shall be indicated by a red mark on the scale of each such thermometer or pyrometer.

511. Exemption for gas cylinders

Regulations 501 to 510 inclusive shall not apply to any portable gas cylinder or working cylinder of any engine.

PART XXVIII

Processing Plants and Metallurgical Works (regs 512-531)

512. Working in storage bins

When any person enters any bunker, hopper, or storage bin while material is stored therein, or works on any stockpile where the material may move by gravity—

- (a) suitable precautions shall be taken against the danger of the material caving or sliding;
- (b) he shall wear an approved life belt and line;
- (c) there shall be continually in attendance one or more persons who will keep minimum slack on the life line, which shall be securely snubbed at all times; and
- (d) lock-out procedure in accordance with subregulation 433(1) shall be taken for both the feed and discharge of material to the bin, and warning signs and other adequate protection shall be provided against the dumping of material into the bin.

513. Inspection of stock pile

Before any person or persons are allowed to work on stock piles of ore, coal, or any other material, the stock pile shall be inspected by a competent person, whose duty it shall be to see

that it is in a safe working condition.

514. Transfer of liquids by compressed air

The transfer of liquids from one location or container to another location or container by the application of air under pressure shall not be permitted, except where properly designed and tested equipment is used for the purpose.

515. Storage of acids and poisons

Due provision shall be made at all processing plants and metallurgical works where acids or poisonous compounds are used to reduce to a minimum the hazards of storing and handling of such materials.

516. Cleaning screw conveyors

No person shall use a metal implement for cleaning around or in a screw conveyor; bamboo sticks or similar material shall be used when cleaning hoppers or containers above a screw conveyor.

517. Poisonous vapours

In every processing plant and metallurgical works where poisonous vapours or gases exist or may be formed suitable means shall be adopted to provide such ventilation as will prevent the formation of dangerous concentrations of the same.

518. Life lines when noxious gases present

Life lines and belts in good order shall be provided and kept in some secure and readily accessible place for immediate use in case it becomes necessary to rescue any person whose duties require him to work in an atmosphere which is liable to become dangerous by reason of the presence of noxious gases.

519. Rescue apparatus

(1) In every processing plant and metallurgical works where the atmosphere may contain dangerous concentrations of poisonous gases or vapours there shall be maintained at readily accessible places breathing apparatus of an approved type, with an adequate supply of material for the proper operation of such apparatus; there shall also be on duty in each working shift a person or persons appointed by the manager and trained in the use of breathing and resuscitating apparatus.

(2) Every person required to work in an area such as mentioned in subregulation (1) shall be instructed in the hazard involved and the procedures to be taken in case of an emergency.

520. Only authorized persons to enter

No persons shall enter any metallurgical works where furnaces are working unless authorized to do so by the manager.

521. Shields for protection against burning

Persons employed at metallurgical works where furnaces are working shall be supplied with suitable shields and appliances to protect them as far as possible against being burned with molten metal or other material, and it shall be the duty of all such persons to use such shields and appliances.

522. Supervision of hazardous work

The manager shall appoint a competent person to supervise work around any furnace involving unusual accident hazard, such as work in gas mains or cleaners, removing linings and work in the casthouse.

523. Work inside furnace

Before any work is undertaken inside a furnace or in a furnace hood any flue dust build-up shall be barred down from the outside; isolating valves shall be locked before any person climbs onto or inside any furnace.

524. Persons to be warned whilst charging furnace

- (1) Audible warning signals shall be given when any material is being charged to a furnace.
- (2) Persons working behind or below a furnace shall move to a safe position when audible warning signals are given.

525. Clearing blockages

No person shall use a hollow pipe for clearing any blockage or for poking in tapholes of furnaces.

526. Coal dust spillages

No coal dust or spillage of coal which constitute a safety hazard shall be allowed to accumulate in or around a furnace, and coal spillages shall be cleaned up with the least possible delay to prevent the danger of a fire.

527. Examination of moulds

Every ladle or slag vessel shall be examined before molten material is placed therein. Every effort shall be made to prevent molten material from coming in accidental contact with cold, damp or rusty surfaces where such contact may cause an explosion.

528. Overfilling ladles not permitted

When skimming slag or pouring molten material from furnaces, ladles or vessels shall not be overfilled to allow subsequent spillage.

529. Transportation of molten material

(1) When molten material is transported by mechanical means in ladles or slag vessels and the safety of persons is endangered from splashing no such ladle or slag vessel shall be filled above a point 100 mm from the top of the vessel.

(2) Where a ladle or slag vessel is filled with molten material above the point specified in subregulation (1), it shall not be moved unless the supervisor, or a person deputed by him, has warned all persons in the vicinity of the condition of the ladle or slag vessel.

530. Slag or matte launders

No person shall step over slag or matte launders whilst skimming operations or tapping operations are in progress.

531. Precautions by trains conveying slag

Locomotives shall push full slag vessels to the slag dump with a crew member riding on the leading bogie to act as look-out. Ample warning of the approach of the train must be given by audible warning signals.

PART XXIX

Special Provisions for Fiery and Coal Mines (regs 532-556)

532. Application of Part

The Regulations in this Part apply to fiery and coal mines and are in addition to, and not in derogation of, other provisions of these Regulations.

533. Surface protection at coal mines

(1) Coal debris shall not be allowed to accumulate on any ground where there exist, or where there are likely to occur, surface fissures or cavities, the result of underground operations.

(2) Broken ground which has finally subsided may be filled up with earth and then used as site for depositing coal and other debris, provided the consent of an inspector has first been obtained.

(3) The manager of a coal mine shall be responsible for all damages resulting from the combustion of waste heaps.

534. Danger from carbonaceous materials

Any dump containing carbonaceous material or any other dump containing material liable to spontaneous combustion shall be situated at a safe distance from any shaft, open pit working, roadway and building so as to ensure, as far as is reasonably practicable, that any outbreak of fire or spontaneous combustion of such dump shall not cause danger to any person or property:

Provided that where it is impossible or unduly onerous for such dump to be situated at such safe distance the manager shall take such steps as he may deem necessary to ensure that no person working or walking near such dump is endangered.

535. Inflammable gas in intake airways

(1) Without prejudice to the generality of regulation 108, the manager of a fiery mine shall take such steps as are necessary for securing that every airway therein which, as regards any working section, is an intake airway and the air in which has not previously ventilated a working section shall normally be kept free from inflammable gas.

(2) For the purposes of this regulation an airway shall be deemed not to be normally kept free from inflammable gas if the average percentage by volume of inflammable gas found in the general body of the air exceeds one quarter.

536. Determinations of firedamp content

(1) The manager of a fiery mine shall make and secure the efficient carrying out of arrangements whereby determinations of the percentage of inflammable gas present in the general body of the air (the "firedamp content") are made at the following points—

- (a) in the case of a longwall face where electric power is used or shots are fired, at a point 10 m from the face in each airway serving that face; and
- (b) in the case of any other working where electric power is used or shots are fired, at suitable points in each airway serving that working as fixed by the manager:

Provided that an inspector may serve on the manager a notice requiring determinations to be made also at one or more additional points as specified in the notice.

(2) Determinations of firedamp content shall be made at every point required by the preceding regulations once in every week:

Provided that:

- (i) if any determination at any such point shows a firedamp content exceeding 0,8 per cent by volume, determinations shall be made at the corresponding point at intervals not exceeding 24 hours so long as the content is shown to exceed or to have exceeded that percentage and for the next seven days following;
- (ii) if every determination made during a period of 30 days at any such point showed a firedamp content not exceeding 0,6 per cent by volume, it shall be sufficient to make determinations at the corresponding point at intervals not exceeding 30 days for so long as the firedamp content shown thereby does not exceed that percentage.

(3) If any determination shows a firedamp content at one point exceeding 1 per cent by volume the manager shall forthwith give notice thereof to the Engineer unless—

- (a) the excess was caused by temporary derangement of the ventilation at the mine which has been remedied; or
- (b) an inspector by notice served on the manager has otherwise directed.

(4) Notwithstanding anything in subregulation (3), whenever any alteration is made in the arrangements for ventilating a fiery mine which affects or may affect substantially any part of the mine in which determinations of the firedamp content have to be made, a determination of the firedamp content at each point in that part shall be made as soon as any substantial effect of the alteration would be apparent.

(5) Determination of the firedamp content shall be made—

- (a) by means of apparatus of a type approved by the Engineer by a competent person appointed for that purpose by the manager; or
- (b) by means of samples of air taken by a competent person so appointed and analysed within four days of the taking thereof.

(6) Particulars of every determination of firedamp content made in accordance with these Regulations shall be recorded forthwith in a book provided for that purpose.

537. Measurements of quantity of air

(1) The manager of every fiery mine shall make and ensure the efficient carrying out of arrangements whereby the quantity of air passing each of the points hereinafter mentioned is measured at intervals not exceeding 30 days—

- (a) in every intake airway at an entrance to a shaft or outlet, as near as is practicable to that entrance;
- (b) in every main split by which air leaves an air current, as near as is practicable to the junction;
- (c) at each point at which firedamp determinations are required to be made in accordance with the preceding regulation; and
- (d) in any part of a mine containing a working section where electricity is not used and where shots are not fired, in each intake airway as near as is practicable 100 m from the nearest part of the working section.

(2) A measurement of the quantity of air at the point specified in subregulation (1)(c) shall be taken on an occasion when a determination of firedamp content is made thereat.

(3) Notwithstanding anything in subregulation (1), whenever any alteration is made in the arrangements for ventilating a mine which affects or may affect substantially the quantity of air passing any point at which measurements thereof have to be taken, a measurement of the quantity at each point shall be taken as soon as any substantial effect of the alteration would be apparent.

(4) Particulars of every measurement taken in accordance with this regulation shall be recorded forthwith in a book provided for the purpose.

538. Firedamp detectors

(1) At every fiery mine there shall be provided appliances for detecting the presence of inflammable gas (hereinafter called "detectors") of a type approved by the Engineer in such number as will enable these Regulations to be complied with.

(2) These detectors shall be adjusted, maintained and tested in the manner (if any) specified in the relevant approval.

(3) The manager of every mine at which detectors are required to be provided shall—

(a) make arrangements to secure that detectors are in use at the places specified in subregulation (5); and

(b) appoint competent persons and make arrangements to ensure that each detector required to be in use is in the personal charge of such a person.

(4) In the case of a detector provided under this regulation which is a flame safety-lamp, the competence of the person appointed shall be determined by his ability to recognize actual gas caps on the lowered flame of the lamp.

(5) The places at which detectors shall be used are as follows—

(a) at each longwall face, one detector for each eight persons wholly or mainly employed at that face during the shift;

(b) in each other working face (including a cross measure drift or heading in coal or stone), one detector;

(c) in each place in a return airway where one or more men are engaged in repair work, one detector; and

(d) at each electric motor in operation at or within 100 m of a working face.

(6) The manager of every mine at which detectors are required to be in use shall give directions to the persons who are to have charge of them (other than automatic detectors) as to the minimum number of tests for inflammable gas to be made by them.

539. Ventilation

In every coal mine not exempted in writing by the inspector—

(a) the quantity of fresh air in dm^3 per second supplied throughout 24 hours to each ventilating district shall be not less than 25 multiplied by the maximum mass in metric tonnes of coal and rock mined per shift in such district;

(b) no ventilating district shall at any time contain more than 200 persons;

(c) in longwall working, the velocity of the air current along any face shall average not less than 0,25 m per second over the working height;

(d) in board and pillar workings, roadways which carry a unidirectional flow of air over the

whole of their cross-sectional area from the main intake to the main return aircourse of any section of the workings for the purpose of ventilating such workings shall be provided and maintained to carry such flow as close as practicable to every working place in such section and; the average velocity of the air current through any such roadway at its nearest point from any working place which it serves with air shall not be less than 0,25 m per second;

- (e) the quantity of air supplied at the face of any heading which is being advanced in coal and which has advanced more than 20 m from its point of communication with the nearest roadway that is carrying a unidirectional flow of air over the whole of its cross-sectional area from the main intake to the main return aircourse of the section of the workings in which such heading is being advanced shall not be less than 150 dm³ per second for each m² of the average cross-sectional area of the heading; and
- (f) the quantity of air supplied at the face of any tunnel being advanced in stone or in dyke and at the face of any shaft in the course of being sunk shall not be less than 150 dm³ per second for each m² of the average cross-sectional area of the excavation, and a waterblast shall be installed in accordance with regulation 135.

540. Doors, regulators, stoppings

At every coal mine—

- (a) any door directly assisting or in any way affecting the ventilation of a mine shall either be self-closing or be operated by an attendant;
- (b) any person who opens a ventilation door, brattice or sheet shall ensure that it is closed again as soon as possible;
- (c) all doors connecting a main intake airway with a main return airway shall afford an effective seal and shall be in duplicate;
- (d) non-inflammable brattice only shall be used in headings or other places in which inflammable gas is being or may reasonably be expected to be given off; and
- (e) an inspector may, in his discretion, require that brick stoppings be used in particular headings.

541. Examination of safety-lamps

Where safety-lamps are required to be used underground in a mine or part of a mine the following provisions shall apply—

- (a) a competent person, appointed by the manager for the purpose, shall examine every safety-lamp at the surface immediately before it is taken into the workings for use, and ascertain if it is in safe working order and securely locked;
- (b) no person shall use a safety-lamp until it has been examined as provided by paragraph

- (a) and found in safe working order and securely locked;
- (c) a safety-lamp shall not be unlocked, except at the surface; and
- (d) no person shall, unless he has been appointed for the purpose of examining safety-lamps, have in his possession a contrivance for opening the lock of a safety-lamp.

542. Contraband

(1) At every fiery mine, no person shall take into the workings of the mine or have in his possession in the workings any device for making any arc, spark or flame, or any match or appliance of any kind for striking a light, and no person shall smoke in the workings or take into or have in his possession in the workings any pipe, cigarette, tobacco or any contrivance or material for smoking.

(2) This regulation shall not apply to an approved locked safety-lamp.

(3) Except with the approval of an inspector in writing and subject to any conditions laid down, no welding, flame-cutting, grinding, vulcanising, soldering or similar equipment shall be taken into or used in a fiery mine.

543. Searching of persons

At every fiery mine—

- (a) the manager shall appoint a banksman or some other person or persons to be present at each entrance to the workings of the mine at all times and such banksman or other person or persons shall ask every person about to enter the workings of the mine whether he is in possession of any of the articles prohibited in terms of regulation 542(1), and the banksman or other person or persons so appointed shall have the right to search any person about to enter the workings of the mine for such articles; and any person, when asked or searched in terms of this regulation, shall immediately produce and hand over any of the prohibited articles which may be in his possession; and
- (b) a mine overman or an official of equal or higher rank shall have the right to search any person in the workings of the mine for articles prohibited in terms of regulation 542(1) if he suspects that such person has any such articles in his possession, and no person shall hinder or obstruct such mine overman or other official in his search for such articles.

544. Inspections

(1) A competent person or persons appointed by the manager for the purpose shall—

- (a) immediately before the commencement of every shift; and
- (b) during the course of every shift,

inspect every underground part of the mine in which men are at work or travel or are working or

travelling, as the case may be.

(2) A person who makes an inspection under subregulation (1)—

- (a) shall have regard to the presence of gas, the ventilation, the condition of the roof, floor, and sides of the mine, and the general safety of the mine; and
- (b) shall use a locked safety-lamp for the inspection, except in a mine where no inflammable gas has been found during the preceding 12 months.

(3) No person (other than the person making an inspection under subregulation (1)(a)) shall go underground into the mine until it has been inspected and found safe.

(4) A report of the results of an inspection under subregulation (1)(a) shall—

- (a) be entered in the fiery and coal mines inspection book;
- (b) be signed by the person who made the inspection; and
- (c) be accessible to the workmen at the mine.

(5) Where a mine is worked throughout the 24 hours of every day, a report of one of the inspections made under subregulation (1)(b) shall be entered in the inspection book.

(6) For the purposes of this regulation, two or more shifts succeeding one another without an interval shall be deemed to be one shift.

545. Persons not to be employed in coal-getting without experience

Except with the consent of the Engineer, no person (other than a person employed or working as a coal-getter or shale-getter) shall work or be permitted to work underground as a coal-getter or shale-getter in the face of the working unless—

- (a) he has been employed or has worked for at least one year underground in or about the face of the workings as a coal-getter or shale-getter; or
- (b) he works in company with a person who has been employed or has worked for at least one year underground in or about the face of the workings as a coal-getter or shale-getter.

546. Riding on haulage

Where any haulage is worked by gravity or mechanical power no person (other than a set-rider) shall ride or be permitted to ride on sets or trains of tubs, except—

- (a) a person travelling on a set or train for the purpose of attaching or detaching tubs to or from the haulage rope, if that set or train is not proceeding at a higher speed than 5 km per hour;
- (b) men being conveyed with the permission of the manager to or from their work at the

commencement or end of their employment; or

- (c) the driver of a locomotive.

547. Electrical installations and equipment

(1) No person shall use an electric motor underground unless it is of an approved totally-enclosed type.

(2) The following provisions apply with respect to a place in which the use of a locked safety-lamp is for the time being required—

- (a) all electrical installations and equipment shall be of an approved flame-proof type;
- (b) a test for inflammable gas shall be made—
 - (i) before any electrical equipment is taken into the place;
 - (ii) within 30 minutes of the commencement of the operation of the equipment; and
 - (iii) after the operation of the equipment is completed;
- (c) when any person finds an amount of inflammable gas in the general body of air in any place exceeding 1,25 per cent by volume, or sees an indication of gas on the lowered flame of a safety-lamp, that person shall forthwith cause the supply of electricity to be cut off from all electrical apparatus at that place (other than any telephone or signalling apparatus or any apparatus for detecting or measuring inflammable gas) if the taking of those measures falls within the scope of his normal duties or, if not, forthwith report the matter to an official of the mine or a person competent to cut-off the supply; and
- (d) any electrical equipment isolated in accordance with subregulation (2)(c) shall not be connected to the power supply until the place has been tested and found to be safe for the operation of the equipment.

(3) The operator of an electrically-driven coal cutter or other mobile or portable electric machine served by a flexible trailing cable shall take all reasonable measures to safeguard the flexible cable against damage, and he shall report immediately to the person in charge any damage or defect he may observe in the cable.

(4) He shall not leave such machine while it is working and shall, before leaving the section, ensure that the power supply to the flexible trailing cable is cut off.

(5) Every flexible electrical trailing cable in use in the section shall be examined at the beginning and again at least once in the course of each shift by the person in charge or by a competent person appointed by the manager.

(6) If any such cable is damaged or becomes defective, its use shall forthwith be discontinued.

- (7) Such damaged or defective cable shall not be further used until after it has been sent to

the surface and there properly repaired.

548. Main fans

(1) Except with the written permission of the Engineer, every main fan shall be—

- (a) situated at surface;
- (b) provided with an automatic alarm to alert responsible persons should it slow down or stop; and
- (c) provided with at least two independent sources of adequate power so that in the event of failure of the power supply from one source the supply from the others will be readily available.

(2) In the event of a main fan stopping for any reason and thereby endangering the safety of persons in the workings, the manager shall ensure that—

- (a) immediate steps are taken to withdraw all persons from such workings to a place of safety;
- (b) as soon as such persons have reached a place of safety all electrical power supplied to the workings ventilated by such fan is switched off; and
- (c) after the main fan has been restarted no electrical power to the workings shall be switched on and no persons other than those engaged in making the necessary examinations shall enter such workings until safe conditions have been restored.

549. Underground fans

(1) No fan shall be installed or operated in the workings of any fiery mine or any coal mine except under the following conditions—

- (a) it shall be installed in such a position as to ensure as far as possible that it is not damaged by an explosion;
- (b) where it is intended to install an auxiliary fan in a return airway from a ventilating district, the Engineer shall first be notified. The site of such fan shall be selected by the manager and the installation shall be such that the motor is situated in intake air and there shall be no possibility of return air passing over the motor and ancillary electrical gear; and
- (c) in the case of any fan installed elsewhere than in the return airway from a ventilating district—
 - (i) each such fan shall be installed at a site personally selected and authorized by the manager or mine overseer;
 - (ii) no such fan shall be operated, or caused or permitted to be operated, if any

recirculation of ventilating air takes place;

- (iii) no such fan shall be removed without the authority of the manager who shall make a suitable endorsement in the book referred to in subregulation (3); and
- (iv) not more than one such fan shall be installed at any one site except with the written permission of the Engineer under such conditions as he may prescribe.

(2) No electrically driven fan shall be started or restarted after it has stopped unless tests are carried out with a flame safety lamp by a competent person immediately before the fan is started or restarted and the site of its motor and ancillary electrical gear has been found to be clear of inflammable gas.

(3) Each fan shall be operated in accordance with the instructions given by the manager who shall record in a book provided for the purpose the particulars of the authorization and the safety instructions relative thereto.

(4) The manager shall ensure that the deputy and the miner in charge are made aware of such instructions.

550. Stone dusting

(1) The manager of every coal mine shall ensure that effective arrangements are provided and used to prevent, suppress, collect and remove, so far as practicable, the fine coal and coal dust created in mining operations.

(2) In all accessible workings every road shall be treated with incombustible dust to ensure at all times that the dust which can be raised into the air from the floor, roof and sides of the road shall contain not less incombustible matter than is determined in accordance with the following table—

Percentage by mass of volatile matter content, calculated on an ash-free dry basis, of the coal being mined	Minimum percentage by mass of incombustible matter content
Over 14, not exceeding 20	50
Over 20, not exceeding 22	55
Over 22, not exceeding 25	60
Over 25, not exceeding 27	65
Over 27, not exceeding 30	68
Over 30, not exceeding 32	70

Over 32, not exceeding 35	72
Exceeding 35	75

For the purposes of this table, the volatile matter content of any coal shall be that determined by analysis of a representative section of the seam or a representative sample of run-of-mine coal from the seam taken within the preceding 12 months. Where no such determination has been made the percentage shall be deemed to exceed 35 per cent.

551. Specification of stone dust

The manager shall ensure that the incombustible dust supplied for use in the workings shall—

- (a) contain not less than 95 per cent by mass of incombustible matter;
- (b) be of such fineness that, when dry, all will pass through a sieve of 600 µm aperture and at least 50 per cent mass through a sieve of 75 µm aperture;
- (c) be a limestone dust that does not contain more than 5 per cent by mass of free silica or be some other dust approved by the Engineer;
- (d) be light in colour and readily dispersible into the air when blown upon; and
- (e) be tested at intervals not exceeding three months for its incombustible matter content and fineness.

552. Sampling of roadway dust

For the purpose of determining the adequacy of the measures taken to comply with the requirements of regulation 550—

- (a) samples sufficient in number and from appropriate locations so as to be representative of dust conditions shall be systematically collected at intervals not exceeding 30 days from the roads in each ventilating district or in each such section of the workings as the inspector, after consultation with the manager, may require;
- (b) (i) each sample shall be collected over a length of road not less than 50 m in length;
- (ii) the sample of the dust on the roof and sides shall be taken separately from the sample of the dust on the floor;
- (iii) in the case of the dust on the roof and sides the sample shall be taken to a depth not exceeding 6 mm, and in the case of the dust on the floor to a depth not exceeding 25 mm; and
- (iv) every sample taken shall be representative of the whole surface of the roof and sides or the floor, as the case may be, of the length of road being samples and shall be collected either by a method of strip sampling by which the dust is

collected from a succession of transverse strips 100 mm wide and equally spaced not more than 5 m apart, or by a method of spot sampling by which the dust for each particular sample is collected from one point for each one metre of that length of road;

- (c) each sample shall be well mixed and a representative portion, after drying in the air if necessary, shall be passed through a sieve of 250 μ aperture and retained for analysis;
- (d) analysis of the sample shall be carried out by the following method or by other methods approved by the inspector—
 - (i) the residue of a weighed quantity of dust, after that quantity of dust has been dried at a temperature not exceeding 140 °C and the loss of mass attributable to moisture ascertained, shall be heated in an open vessel to a temperature not less than 480 °C and not more than 520 °C until the coal is completely burnt away; and the incinerated residue shall be weighed;
 - (ii) the sum of the masses of moisture and incinerated residue shall be reckoned as incombustible matter and be expressed as a percentage of the total mass of the dust; and
- (e) a record shall be kept of the date and place of each sampling and the results of the tests carried out under regulations 550 and 551.

553. Coal spillage

(1) Roads along which coal is moved or transported shall be systematically cleared of any coal spillage and, before any area of the mine is isolated by stoppings, the floor, roof and sides of all roads therein shall be systematically cleared of dust and freshly stone-dusted.

(2) Coal tubs shall be constructed and maintained so as to prevent coal dust escaping through the sides, ends or bottom.

554. Stone dust barriers

Stone dust barriers erected for the purpose of suppressing a coal dust explosion shall be of a design and construction approved by the Engineer and located at such points as the manager, after consultation with the Engineer, may determine.

555. Support

(1) In the workings of any coal mine or part of a coal mine where, in the opinion of an inspector, the roof, hanging or sidewalls are of a nature requiring systematic support he may give notice to that effect to the manager who, in consultation with the inspector, shall specify the support to be provided and the system according to which it shall be placed.

(2) The manager shall ensure that all persons concerned are made aware of such system and that notices setting out its specifications are posted up at suitable places where they can

conveniently be read.

(3) Any person who fails to comply with the specifications of such system shall be guilty of an offence.

(4) If, in the opinion of an inspector, the method of supporting the roof, hanging and sidewalls of any mine or part of a mine is unsafe either by reason of the distances between supports being excessive or for any other reason, he may by notice in writing require the manager to modify the method.

556. Withdrawal of support

In the workings of any coal mine, or part of a coal mine—

- (a) no prop or other support shall be withdrawn except by a competent person trained in the withdrawal of props or other supports or by some other person under the personal supervision of such competent person;
- (b) no prop or other support shall be withdrawn unless a careful examination has been made and additional support has been set or other precautions as may be necessary taken to ensure safety; and
- (c) no person shall withdraw a prop or other support from the roof, hanging or sidewalls otherwise than by a method or device by which he does so from a position of safety.

PART XXX

Opencast Workings and Quarries (regs 557-577)

557. Undermining prohibited

In workings of clay, sand, gravel or other types of unconsolidated material, the method of removing material by undermining shall not be used.

558. Height of working face

Where mechanical equipment is not used, no working face in workings of clay, sand, gravel or other types of unconsolidated material shall have a vertical height of more than 3 m unless the material is at a suitable angle to ensure safety.

559. Benches

(1) Where the thickness of the material exceeds 3 m in vertical depth, the work shall be done in benches or at a suitable angle to ensure safety.

(2) Where a multiple bench system is used in any opencast working or quarry, beams of sufficient width to catch and retain any material falling from above shall be maintained.

560. Use of mechanical equipment

Where mechanical equipment is used in loading clays, sand, gravel or any other type of

unconsolidated material, unless the material is at a suitable angle of repose, no working place shall have a vertical height of more than 1,5 m above the top of the boom of the bucket raised to its highest operating position.

561. Use of internal combustion engines

No internal combustion engine shall be installed or operated in any opencast working or quarry unless adequate provision is made to ensure that exhaust gases and fumes will not accumulate therein to a degree that it is likely to endanger the safety of any person.

562. Height of face in consolidated material

Unless permission in writing is first obtained from the Engineer, all opencast operations in consolidated material over 20 m in depth shall be worked in benches not more than 20 m high, and due precautions shall be taken to maintain the walls, benches and broken material in a safe working condition, and no working face shall be advanced by undercutting, except where a tunnelling method is used.

563. Fencing

Every opencast working or quarry dangerous by reason of its depth shall be securely fenced or otherwise protected against inadvertent access.

564. Stripping overburden

(1) In all opencast workings and quarries all unconsolidated materials, such as clay, earth, sand, gravel and loose rock, lying within 2 m of the rim of the opencast working or quarry shall be removed.

(2) Beyond this strip, all overburden shall be sloped to an angle less than its natural angle of repose.

565. Property boundaries

(1) Unless the adjoining owners agree to dispense therewith, in sand, clay or gravel or other natural unconsolidated material, excavation operations shall not be carried on within a distance from the property boundary of half the height of the total opencast working face, and material which sloughs from within this distance shall not be removed.

(2) Unless the adjoining owners agree to dispense therewith, no quarrying operations shall be carried on in a rock quarry within a distance of 5 m from the property boundary.

(3) Subject to subregulation (2), where there is overburden in a rock quarry, the natural slope of the overburden shall be allowed for from the property boundary in addition to the 2 m required by regulation 564.

566. Inspections

(1) The manager or a competent person or persons designated by him shall make a daily inspection of the faces and banks, and shall cause all loose or dangerous material to be

dislodged or otherwise made safe.

(2) No person shall work or be permitted to work near any face or bank until it has been examined and made safe.

(3) The manager shall ensure that at least once in every week a competent person or persons shall inspect the top of all faces and banks for cracks which might indicate the imminence of slides or other movement of the face.

567. Log book

(1) The manager shall keep or cause to be kept a book in which shall be recorded a report of every such examination required under regulation 566(1) and (3), signed by the person making such examination.

(2) A note shall be made of any dangerous condition reported and the action taken regarding it.

(3) Such entries shall be read and initialled every week by the manager.

568. Precaution when stock-piling

(1) When dumping material from a vehicle to a stockpile, appropriate precautions considering the weather and other relevant conditions shall be taken to keep the vehicle at a safe distance from the edge of such stockpile.

(2) Not less than two exits shall be provided from a tunnel under a stockpile.

569. Backfilling

(1) In opencast workings where the area which has been mined is backfilled, waste shall be placed in the worked out area in such a manner that there will be no danger from waste sliding into any operating area of such opencast working.

(2) In opencast workings where the worked out area is backfilled, the backfilling shall be graded and drained as far as is practicable.

570. Life lines

(1) No person shall work or be required or permitted to work on the wall of any opencast working or quarry where there is danger of his falling unless he is wearing an approved type of safety belt and life line.

(2) Where a person is required to work on such wall, the life line shall be securely snubbed above the working place, and shall be under the supervision of one or more competent persons.

571. Hoisting

(1) No person shall be lowered or raised or allow himself to be lowered or raised by means of

a hoist or derrick unless permission is first obtained in writing from the Engineer.

(2) Where a load is being hoisted or lowered by means of a hoist or derrick, a signalman, where required, shall notify all persons in the vicinity to retire to a place of safety until the load has been cleared from the danger zone.

(3) An effective block, automatic derail or safety switch shall be provided at the top of each inclined place to prevent cars from accidentally running down.

(4) Such installation, however, is not required where the skip or car remains attached to the hoisting rope.

572. Hoisting signals

Unless the movement of a hoisting conveyance is visible to the hoistman at all times, a suitable signal system shall be installed and maintained, and suitable signals, approved by an inspector, shall be used.

573. Unattended equipment

Any crane, hoist, derrick, earth moving equipment, or excavating machine, dump truck, or other equipment left unattended shall have the movable components of the equipment positioned in such a manner that they cannot move as a result of failure, or release of braking or other mechanical devices or by the manipulation of controls by unauthorized persons.

574. Travelling ways

(1) There shall be provided and maintained in good working condition a suitable travelling way leading from the working level of the opencast working or quarry to the surface.

(2) Where the travelling way is inclined at more than 30° to the horizontal and less than 50° to the horizontal, stairways or ladders shall be provided.

(3) All stairways shall be equipped with substantial and suitably placed hand-rails.

(4) Where the travelling way is inclined at more than 50° to the horizontal, ladders shall be provided.

(5) Substantial platforms shall be built at intervals not exceeding 10 m in the ladderway and at all places where the ladders are off-set.

(6) Except for approved access ladders to equipment, no ladder shall be installed at an inclination of more than 70° to the horizontal.

575. Lighting

When opencast workings or quarries are worked at night there shall be sufficient illumination in all working places, so that the movement of men and equipment can readily be observed.

576. Hard hats, safety shoes

All opencast and quarry workers must wear hard hats and safety toe shoes or boots.

577. Restriction on working

(1) No person shall work opencast over ground which an inspector considers dangerous, except with the written permission of the inspector and in compliance with such conditions for safe working as he may impose.

(2) When an opencast mine is being worked, no person shall carry on any stoping at a level below the bottom of the open-cut except with the permission of the Engineer.

PART XXXI ***Survey Plans (regs 578-586)***

578. Responsibility of manager

(1) The manager shall ensure that plans are prepared and kept at the mine, quarry or works to which they refer and that copies thereof are deposited according to the regulations following.

(2) Where the average number of persons employed is less than 100 the manager may apply to the Engineer for an exemption or partial exemption from the provisions of subregulation (1).

579. Plans to be kept—surface and underground

(1) Subject to the provisions of regulation 578, the following plans, which may be drawn on more than one sheet, shall be kept and shall be brought fully up-to-date as at 31st December in each year—

- (a) a surface plan which shall show—
 - (i) the position of all plant and buildings including explosives magazines, reservoirs, dams and other works of a similar nature and the position of all opencast and quarry workings and boreholes and of all underground workings which are situated between the surface and 5 m below the surface and of any other surface objects which the Engineer may require to be shown;
 - (ii) the position of all railways, tramways, rivers, main roads, electric power lines, public telegraph and telephone lines and main pipe lines;
 - (iii) the boundaries of the prospecting area, the exploration area and the mining area in which work is being carried out; in the case of a prospecting area whose boundaries are too extended to be shown on a plan of convenient size, it shall be necessary to show only that portion of the area on which the surface equipment is situated leaving a reasonable margin for extension and in such cases a key plan on any convenient scale shall also be made showing all the prospecting and principal surface objects;
 - (iv) the position of and connection data to each surveyed triangulation or geodetic or

boundary beacon or beacons within or without the area as may be required by the Engineer; and

- (v) the boundaries of any caved area and the position of any fence erected to protect such area;
- (b) an underground plan which shall show—
- (i) every adit, shaft, stope, station, permanent explosives magazine, main drive, main crosscut, main raise, main winze, major fault, major dyke, safety pillar;
 - (ii) for a coal mine, any adit, shaft, crosscut drift, roadway working, pillar, fault exceeding 0,2 m in displacement or dyke exceeding 0,2 m in thickness;
 - (iii) any abandoned working which is adjacent to the mine workings together with an explanatory note stating specifically the degree of accuracy on which such plan is based; and
- (c) (i) where the average true dip of any mine working is more than 60°, a plan showing a vertical projection of such mine workings shall be kept;
- (ii) in the case of an underground coal mine there shall be kept sections of the working of the mine showing the general direction and rate of dip of the strata, together with the section of the strata to the depth of the shaft;
 - (iii) the Engineer may at his discretion direct that sections of any part of any mine be also kept; and
 - (iv) the plane of any section shall be indicated on the underground plan by lines and letters.

(2) The date, month and year shall be marked against the current position of all workings as at 31st December in each year so that any change or advance of the workings can be easily ascertained with reasonable accuracy.

580. Requirements for plans

Every plan required to be kept under regulation 579 shall comply with the following requirements—

- (a) they shall be laid down on a scale of 1/500, 1/1000, 1/1500, 1/2000 or 1/5000:
Provided that the Engineer may approve in writing any other scale at his discretion;
- (b) all measurements shall be shown in metres;
- (c) co-ordinate grid lines in blue shall be shown which shall not be more than 200 mm apart;

- (d) elevations or contour lines shall be shown in such positions that sections can be made from this data if required; these elevations or contour lines shall be referred to a permanent bench mark which shall be established on all properties and which shall, where possible, be given as the elevation above sea level or, if any arbitrary elevation has to be used, this elevation shall be referred to sea level as soon as this can be obtained and the discrepancy between this arbitrary elevation and sea level shall be noted on all plans;
- (e) the true meridian shall be shown;
- (f) on any prospecting area, exploration area or mining area which is of such size that the plans of the whole would be unwieldy if made on a single sheet, it shall be at the discretion of the manager to have such plans prepared in sections as mining work shall progress together with a key plan of the sheets made to a convenient scale and covering the whole property;
- (g) a sufficient number of surveyed reference points shall be shown on such plans and such points shall be so numbered that they can be readily identified;
- (h) each survey shall be carried out and plotted to standards of accuracy acceptable to the Engineer who may, in any case where he thinks fit, require a check survey to be made, the cost of which shall be borne by the holder;
- (i) on any underground plan, the portions of the mine which have been stoped out shall be shown by hatching.

581. Tracings or transparencies

Tracings or transparencies of the surface, underground plans and sections required in accordance with regulation 579 shall—

- (a) be made on durable material;
- (b) be so prepared that surface and underground tracings or transparencies are to the same scale and can be superimposed one upon the other;
- (c) be deposited at the office of the Engineer and brought up-to-date as at 31st December of each year, for which purpose they shall be sent to the manager by the Engineer;
- (d) be brought up-to-date immediately upon cessation of work or on the closing down or abandonment of any mine, quarry or works;
- (e) be brought up-to-date upon reasonable request by the Engineer;
- (f) not be retained for the purpose of this regulation for a period longer than six weeks.

582. Disposition of records on closing down

All plans, survey co-ordinate ledgers, calculation books and note books shall be properly

numbered and indexed and shall—

- (a) upon the temporary closing down of any mine, quarry or works, be retained for safe keeping on the holder's responsibility in a place and in a manner to be approved by the Engineer:

Provided that if any data is handed over to the Engineer for safe keeping upon such temporary closing down, such data shall be treated as confidential; or

- (b) before the permanent closing down of any mine, quarry or works, abandonment, forfeiture or other lapse of mining rights, be lodged by the manager at the office of the Engineer; all such data lodged with the Engineer shall at his discretion be available for reference to any interested party and for the preparation of copies therefrom.

583. Responsibility for accuracy of plans

All plans and tracings required by these Regulations, when they are first made and also on each occasion that they are brought up-to-date, shall be signed and dated by the surveyor of the mine, quarry or works who shall be responsible for their accuracy.

584. Secure storage

Any plan or record made in pursuance of these Regulations shall be stored in a secure, dry, fireproof place when not in use.

585. Returns treated in confidence

All returns, plans and matters furnished to the Engineer under these Regulations shall be treated as confidential, except in so far as disclosure may be permissible in terms of the law or the mining right or if compelled by a competent court or as may be necessary to ensure the safety of adjacent workings.

586. No modification of Land Survey Regulations

Nothing in these Regulations or regulation 15 shall be deemed to modify the requirements to the Land Survey Regulations.

PART XXXII

Miscellaneous (regs 587-605)

587. Power of Minister to exempt

The Minister may from time to time, in writing, exempt from the operation of these Regulations or from any provisions thereof any mine, quarry or works or class of mine, quarry or works for such period and on such conditions as he may think fit.

588. Power of engineer to exempt

Whenever the circumstances at any mine, quarry or works are such as to render any provision of these Regulations inapplicable or unduly onerous, or whenever it is necessary for

the purpose of carrying out experiments or tests as to the expediency of any regulation, the Engineer may grant written exemption from such provision under such conditions as he may determine.

589. Regulation of construction of dams and reservoirs for water supplies

(1) Notwithstanding section 7 of the Water Act, the manager shall comply with the directions of the Water Registrar in relation to the design and construction of dams and reservoirs for the purpose of carrying out mining operations and domestic water supplies.

(2) The directions given by the Water Registrar shall be in accordance with procedures approved by the Water Apportionment Board in respect of dams required to be authorized by the grant of a water right.

(3) The manager shall comply with any direction of the Water Registrar given in accordance with section 28(2) of the Water Act and, in default, the Engineer may execute the directions of the Water Registrar and recover the costs thereof in any competent court.

590. Water effluent

(1) The manager shall securely fence off any water effluent containing poisonous or injurious chemicals and shall not permit such water to escape beyond the limits so fenced without having previously rendered it harmless.

(2) The manager shall ensure that periodic sampling, testing and analysis of liquid effluents is carried out by a qualified laboratory and the results recorded in a book which shall be open at all times to scrutiny by an inspector.

591. Storage of inflammable materials and calcium carbide

(1) All inflammable material shall be stored in a suitable manner and at a safe distance from any explosives magazine, storage box or shaft, except that any such material awaiting transport underground may be stacked at the shaft bank if suitable precautions are taken to prevent any danger from fire.

(2) Calcium carbide shall be stored on the surface only, in a suitable dry place and in its original container.

592. Hydrocarbon fuels and lubricants forbidden underground

Other than that contained in a cigarette lighter, no hydrocarbon liquid or lubricant with a flash point of less than 60°C shall be taken underground without the prior approval in writing of the Engineer.

593. Safe access and egress

The manager shall ensure that there is provided and maintained adequate and safe means of access to and egress from every place at which any person has at any time to work.

594. Surface drilling platforms

(1) Suitable platforms shall be provided when any person works on any drilling rig on the surface or in any open cast working where there is a danger of him falling.

(2) The person in charge of such drilling rig shall be responsible for ensuring that—

- (a) all such platforms are of good construction, suitable material, adequate strength, free from patent defect and are properly maintained; and
- (b) every ladder providing access to every such platform is securely fastened.

595. Employment register

(1) The manager shall ensure that a register is kept, in which the following entries shall be made and retained therein from the date of engagement up to 12 months after the date on which employment ceases—

- (a) the name of every person employed together with some positive means of identification;
- (b) the dates of engagement and termination of employment of each such person;
- (c) in the case of the death of any such person, the date, place and (as far as can be ascertained) the cause of death; and
- (d) in the case of each person who is employed or works underground and who is less than 20 years old—
 - (i) his date of birth, duly certified wherever possible; and
 - (ii) the date on which he was employed or worked underground in the undertaking for the first time.

(2) Every register kept under subregulation (1) shall, at all reasonable times, be open to inspection by an inspector, an authorized officer of the Department of Labour or an authorized representative of any such person's trade union.

596. Labour and wages returns

(1) The manager shall render monthly labour and wages returns to the Engineer on or before the 15th day of the month following that to which they relate.

(2) Such returns shall be rendered in duplicate on such forms as may from time to time be required by the Engineer.

(3) Separate returns shall be rendered in respect of—

- (a) all persons directly employed by such mine, quarry or works; and
- (b) all persons (if any) employed by contractors who are under contract to the mine, quarry

or works.

(4) On or before the 3rd day of every month contractors referred to in subregulation (3) shall submit to the manager a return providing all the information required for the completion of the labour and wages return in respect of persons employed by them during the preceding month in terms of their contract with the mine, quarry or works.

(5) A list of such contractors by name shall accompany each monthly return submitted in pursuance of subregulation (3)(b) or be written on the reverse side of the return.

597. Health and mortality returns

(1) The manager shall render monthly health and mortality returns to the Engineer on or before the 15th day of the month following that to which they relate.

(2) Such returns shall be rendered in duplicate on such forms as may be required by the Engineer.

598. Mineral returns

(1) The manager shall ensure that a mineral production return is rendered monthly to the Engineer on or before the 15th day of the month following that to which it relates.

(2) Such return shall be rendered in duplicate on such forms as may from time to time be required by the Engineer and shall record all ore raised and treated, and all mineral output whether by way of trial, regular business or otherwise.

599. Obtaining of forms

Persons who, in terms of regulations 596, 597 and 598, are required to make returns may obtain the necessary forms in advance at the office of the Engineer, either by personal request or written application.

600. Ventilation returns

A return of the average volume of air per minute downcast during the main working shift, the maximum number of persons underground at one time and such other information relating to ventilation, temperature and dust as may be required by the Engineer shall be forwarded to the Engineer by the manager of—

- (a) every metalliferous or diamond mine once every 12 months; and
- (b) every coal mine, not exempted by an inspector, once every three months.

601. Yearly and other returns

(1) The owner or manager shall furnish the Engineer yearly and in such form as may be required by the Engineer with returns respecting stores, employees, salaries, wages and machinery.

(2) Such owner or manager shall also provide the Engineer at his request with such other returns and data as may be reasonably required.

(3) Each such return and other data shall be furnished on or before a date to be fixed by the Engineer and specified on the required forms or otherwise notified in writing.

602. Balance sheet: liquidator's report

The owner, agent or local representative shall also file with the Engineer, immediately on publication, a copy of each annual report, including the balance sheet and profit and loss account, issued by the directors of such concern, and also a copy of the liquidator's reports on liquidation.

603. Oath as to accuracy

The Engineer may require that the accuracy of the returns mentioned in this Part be verified on oath.

604. Application to prospecting and exploration operations

(1) Subject to subregulations (4) and (5), these Regulations shall apply to all operations conducted under a prospecting licence granted under the provisions of the Mines and Minerals Act, but only in so far as any of these operations are of a type contemplated by any particular regulation.

(2) The holder of a prospecting licence shall, as soon as he has been granted such licence, and on any renewal thereof or amendment thereto, submit to the Engineer a copy of the programme of his intended prospecting operations together with a plan or description of the area of such operations and of any alteration, re-orientation or enlargement of such area, approved by the Minister.

(3) When, under the provisions of section 28 of the Mines and Minerals Act, proposed amendments to his programme of prospecting operations have not been rejected, the holder of a prospecting licence shall submit to the Engineer a copy of such amendments together with any amended plan or description related thereto.

(4) When submitting the programmes, amendments or plans required by subregulation (2) or (3), the holder of the prospecting licence may apply in writing to the Engineer for a dispensation from subregulation (1) and a declaration specifying which of these Regulations shall apply to his operations.

(5) On receiving an application under the provisions of subregulation (4) the Engineer shall, in order to ensure the safety and health of persons employed or working in or on the prospecting area, either—

- (a) refuse, in writing, to give the dispensation requested; or
- (b) grant the application, and specify, in writing, which particular regulations (with or without any modification, as he may think fit) shall apply to the operations of the

applicant.

605. Regulations not to apply to townships

These Regulations shall not apply to townships.