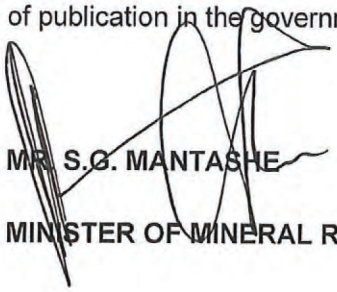
DEPARTMENT OF MINERAL RESOURCES

NO. R. 953 **14 SEPTEMBER 2018**

MINE HEALTH AND SAFETY ACT, 1996 (ACT NO 29 OF 1996)

REGULATIONS RELATING TO EXPLOSIVES

I **Mr. S G MANTASHE** Minister of Mineral Resources, under section 98 (1) (k) of the Mine Health and Safety Act, 1996 (Act No. 29 of 1996) and after consultation with the Mine Health and Safety Council, hereby amends Chapter 4 of the Regulations in terms of the Mine Health and Safety Act, as set out in the in the Schedule below. The Regulations shall come into operation three (03) months after the date of publication in the government gazette.



MR. S.G. MANTASHE

MINISTER OF MINERAL RESOURCES

SCHEDULE

REGULATION AMENDMENTS

CHAPTER 4

EXPLOSIVES

Amendment of Chapter 4 of the regulations

Chapter 4 of the regulations is hereby amended by the substitution for chapter 4 of the following regulations:

EXPLOSIVES

Definitions

In this chapter, unless the context otherwise indicates –

"blasting" means the ***initiation*** of ***explosives*** for the purposes of fragmenting of rock or ore body;

"explosive" means -

(a) a substance, or a mixture of substances, in a solid or liquid state, which is capable of producing an explosion;

(b) a pyrotechnic substance in a solid or liquid state, or a mixture of such substances, designed to produce an effect by heat, light, sound, gas or smoke, or a combination of these, as the result of non-detonative self-sustaining exothermic chemical reaction, including pyrotechnic substances which do not evolve gases;

(c) any article or device containing one or more substances contemplated in paragraph (a); or

(d) any other substance or article which the relevant Minister may from time to time by notice in the Gazette declare to be an ***explosive*** in terms of the **Explosives** Act, Act No 15 of 2003;

"hot holes" means ***shot holes*** in a coal mine which after being drilled has an in hole ambient temperature of 40 degrees celsius or above or an increase of 3 degrees celsius;

"initiate" means the action or intended action of setting off ***explosives***;

"manufacture" means the making or processing of any ***explosive***;

"misfire" means any ***explosives*** which have failed to explode after initiation;

"misfired hole" means a ***shot hole*** or part of a **shot hole** in which any ***explosives*** or any portion thereof has failed to explode after initiation;

"old explosives" means any ***explosives*** that have been used or damaged in any way, or have deteriorated due to exposure to water or the surrounding atmosphere or which have expired; and includes ***explosives*** recovered from ***misfired holes***;

"permitted explosives" means ***explosives*** classified as such by the Chief Inspector of Explosives (as defined in the Explosives Act, Act No 15 of 2003);

"ore-body" means any natural in-situ rock that contains any form of **mineral**;

"**primary blasting"** means all **blasting** other than **secondary blasting**;

"primer" means an **explosive** cartridge or booster into which a detonator or detonating fuse has been inserted or connected;

"pumpable explosive" means:

(1) a mixture of ammonium nitrate, with or without other inorganic nitrates, with combustible substances which are not, classified as UN Number 0082, Class 1.1D;
or

(2) a mixture of ammonium nitrate, with or without other organic nitrates, partially or wholly dissolved in water and with the addition of any of the following:
   (i) ammonium nitrate emulsions, gels and suspensions, intermediate for **blasting**, classified as UN Number 3375;
   (ii) combustible substances which are not **explosive**; or
   (iii) substances which control the density of the final mix, either by chemical reaction or mechanically, and the final mix is classified as UN Number 0241, Class 1.1D; or any form of **explosive** which is inserted in a hole by means of pumping;

"secondary blasting" means **blasting** for the purposes of removing obstructions, reducing rocks in size or making the workings safe;

"shot hole" means any drill hole charged with or intended to be charged with **explosives**;

"sleep-over blast" means any **shot hole** charged with **explosives** but not **initiated** in the same shift during which it was charged with **explosives**;

"socket" means any **shot hole**, or part of any **shot hole**, known not to be a **misfired hole**, which remains after having been charged with **explosives** and blasted or which, for any other reason, may be suspected of having contained **explosives** at any time and includes any **shot hole**, or part of any **shot hole**, from which all **explosives** have been extracted;

"stemming" means filling in **shot holes** with inert material; and

"tamping" means the consolidation of **stemming** and **blasting** materials in a **shot hole**.

Security in respect of explosives

4.1(1) The **employer** at any **mine** must take **reasonably practicable** measures to prevent persons not authorised by the **employer** from -

(a) gaining access to **explosives**;

(b) being in possession of **explosives**, or

(c) removing or attempting to remove **explosives** from a **mine**

4.1(2) Only persons authorised by the **employer** at any mine may -

(a) gain access to or attempt to gain access to **explosives**;

(b) be in possession of **explosives**, or

(c) remove or attempt to remove **explosives** from a **mine.**

4.1(3) Subject to regulation 4.2(2), no person may, or cause or permit any other person to bury, hide, submerge or abandon any **explosives**.

Receipt, storage, issuing and transportation of explosives

4.2(1) The **employer** at any **mine** must ensure that:

(a) **explosives** that are not being transported or prepared for use are stored in **explosive** stores, silos or containers which are securely locked or, as far as **reasonably practicable**, designed and located so as to facilitate the safe and secure receipt, storage and issuing of **explosives** by a person referred to in regulation 4.1(2)

(b) a written procedure is prepared and implemented, after consultation with the **explosive manufacture**r or supplier, to prevent persons from being exposed to the significant **risks** associated with the receipt, storage, issuing and transportation, inadvertent initiation and the deterioration of **explosives**. This written procedure referred to in this sub-regulation must include the following:

Storage of explosives

(i) measures to ensure that every container used for the storage of **explosives,** including **old explosives,** is -

(a) of robust construction;

(b) provided with an effective lock and the key kept only by an authorised person referred to in regulation 4.1(2);

(c) clearly marked to indicate the type of **explosives** to be placed therein;

(d) of a capacity determined by the **employer** in consultation with the **explosive manufacture**r or supplier;

(e) spaced apart from any other container used for storage of **explosives**, at a distance determined by the **employer** after consultation with the **explosive manufacture**r or supplier;

(f) approved in writing for that purpose by the **employer;**

(ii) measures to ensure, at every **mine** where there is a significant **risk** of **old explosives** being present, that adequate storage facilities are provided for such **old explosives**;

(iii) no person must place, or cause or permit any other person to place any other materials or any implements or tools, in the **explosives** containers other than those necessary for the preparation of initiation systems or **primers**; and

(iv) measures to ensure that **primers** are kept separate from other **explosives** and stored in a container complying with regulation 4.2(1)(b)(i);

Issuing of explosives

(v) measures to ensure, as far as **reasonable practicable**, that the **explosives** that have been ordered or issued do not exceed the **explosive** storage capacity of the storage facility in which it is intended to store those **explosives,** either underground or on surface; and

Transportation of explosives

(vi) measures to ensure, as far as **reasonably practicable**, that **explosives** are only transported in vehicles, conveyances, unopened cases or locked containers approved in writing for that purpose by the **employer.**

4.2(2) The **employer** at any **mine** must take reasonable measures to ensure, when **mine** closure is intended, or when a **mine** is not being worked as contemplated in section 2(2), that the **Principal Inspector of Mines** and the Chief Inspector of **Explosives** (as defined in the **Explosives** Act, (Act No. 15 of 2003) are notified in writing as soon as **reasonably practicable**, if any **explosives** have been left behind at the **mine**, of –

(i) the type, quantities and location of such **explosives**; and

(ii) the measures taken to safeguard persons from any significant **risks** associated with such **explosives**.

Destruction of explosives

4.2(3) The **employer** at any **mine** must ensure that a written procedure is prepared and implemented, after consultation with the **explosive manufacturer** or supplier, to ensure that **explosives** are destroyed safely and not re-used for any purpose. Such procedure must include measures to ensure that:

(i) only the competent person contemplated in regulation 4.4(1) destroys **explosives;**

(ii) in the case of underground coal **mines**, **explosives** must be destroyed only on surface;

(iii) the Chief Inspector of **Explosives** and **Principal Inspector of Mines** are informed in advance if more than 50kg of **explosives** are to be destroyed at any one time; and

(iv) no person destroys **explosives** on surface within a horizontal distance of 150 metres of any public building, public thoroughfare, railway line, power line or any place where people congregate or any other structure, which it may be necessary to protect in order to prevent any significant **risk**, unless:

(a) a **risk** assessment has identified a lesser safe distance and any restrictions and conditions to be complied with;

(b) a written application accompanied by the following documents is submitted to the Principal Inspector of Mines for approval-

(i) a sketch plan indicating the distance from the explosives destruction area to the affected structures;

(ii) a **risk** assessment;

(iii) proof of consultation with the owners of the affected structures; and

(iv) restrictions and conditions.

(c) a written approval has been granted by the **Principal Inspector of Mines**; and

(d) any restrictions and conditions determined by the **Principal Inspector of Mines** are complied with.

Approved explosives and the usage of explosives at mines

4.3(1) The **employer** at any **mine** must take reasonable measures to ensure that only **explosives** approved in writing by the **employer** are used at the **mine**.

4.3(2) The **employer** at any **mine** must take reasonable measures to ensure that **explosives** are used in accordance with a written procedure prepared and implemented for that purpose by the **employer,** after consultation with the **explosive manufacturer** or supplier. The written procedure must include the following:

(a) All **explosives** must be used in the same sequence as they are issued;

(b) Under no circumstances must any **blasting** cartridge be broken or cut or a wrapper around any **blasting** cartridge be interfered with, except when preparing the **blasting** cartridge for the insertion of a detonator or detonating fuse;

(c) The only **primers** that are permitted to be prepared are **primers** that are required for immediate use;

(d) Where igniter cord is used, such an igniter cord must be laid as close as practicable to the face and not on, or in contact with timber or other combustible material or flammable substance not forming part of the **explosives** charges; and

(e) Where **pumpable explosives** are used, the **pumpable explosives** are only sensitised at a **working place** where **explosive** charges are being prepared prior to the **pumpable explosives** being pumped into a **shot hole**.

4.3(3) The **employer** at any **mine** must take reasonable measures to ensure, if **explosives** are **manufactured** at the **mine**, that:

(a) it is done in accordance with a written procedure prepared and implemented for that purpose after consultation with the **explosive manufacturer** or supplier; and

(b) all mobile and portable **explosives** manufacturing units at a **mine** are used, inspected, serviced and maintained in accordance with a written procedure prepared and implemented for that purpose after consultation with the **explosives manufacturer** or supplier.

4.3(4) The **employer** at any **mine** must take reasonable measures to ensure that **explosive** powered tools are issued, stored, used and maintained in accordance with a written procedure prepared and implemented for that purpose by the **employer** after consultation with the **manufacturer** or supplier of such **explosive** powered tools.

4.3(5) The **employer** must take reasonable measures to ensure, subject to regulation 4.3(3), that only **permitted explosives** are used in fiery **mines.**

4.3(6) The **employer** at any **mine** must take reasonable measures to ensure that a written procedure is prepared and implemented after consultation with the **explosives manufacturer** or supplier to prevent persons from being exposed to significant **risks** associated with the spillage of **explosives**.

Primary and Secondary blasting to be performed by a competent person

4.4(1) The **employer** at any **mine** must take reasonable measures to ensure, where **primary** or **secondary blasting** takes place, that a **competent person** is appointed in writing to –

(a) exercise control over all **explosives** to be used for **blasting** at those **working places** for which the **competent person** is responsible;

(b) prepare **primers**;

(c) examine any **shot hole** to be deepened to ensure it is safe to deepen;

(d) examine for and deal with **misfires** and **sockets,** in accordance with the written procedure prepared in terms of regulation 4.11;

(e) mark or indicate **shot holes** for drilling or to authorise the drilling of **shot holes** marked or indicated by another person authorised to do so by the **employer**, except where the **shot holes** were marked or indicated by means of electronic software system, including but not limited to Global Positioning System or Laser, the **competent person** must be required to over inspect and authorise the commencement of drilling of **shot holes;**

(f) exercise control over any manufacturing at the **working places** for which such **competent person** is responsible for, of pourable or **pumpable explosives** to be used;

(g) connect **blasting** rounds or circuits;

(h) charge **shot holes** with **explosives** or place **explosive** charges; and

(i) make safe all **hot holes** in terms of the written procedure contemplated in regulation 4.16(5).

Management and control over explosives

4.4(2) The **employer** at any **mine** must take **reasonably practicable** measures to ensure that the **competent person** referred to in regulation 4.4(1) reports to the **employer**, whenever **explosives** are delivered to the **working place** for which that **competent person** is in charge, whether or not the correct quantity of **explosives** was delivered.

Persons performing primary or secondary blasting may be assisted

4.4(3) The **employer** at any **mine** may appoint a **competent person** in writing to assist the **competent person** referred to in regulation 4.4(1) with the following activities:

(a) exercising control over those **explosives** to be used during the performance of the duties of the **competent person** referred to in regulation 4.4(1) as stipulated in paragraphs (b), (c), (d) and (e) below;

(b) the preparation of **primers**;

(c) the charging of **shot holes** with or the placing of **explosive** charges;

(d) the connecting of **blasting** rounds or circuits; and

(e) the handling and transport of **explosives**, initiation systems and accessories.

Certification of initiation apparatus and blasting systems

4.5(1) The **employer** at any **mine** must take reasonable practicable measures to ensure that where initiation of **explosives** charges takes place by means of electricity -

(a) apparatus used for the initiation of electronic detonators complies with SANS 1717-1 (2006) 'The design and approval of Electronic Explosive Devices (EED) initiation systems for use in mining and civil **blasting**' and SANS 551 (2010) 'Detonators, relays and initiating devices for commercial applications';

(b) apparatus used for the initiation of electric detonators complies with SANS 1717-2 (2006) 'The design and approval of **EED** initiation systems for use in mining and civil **blasting**' Part 2 "Electric Initiation System – Shot Exploder Based of SANS 1717';

(c) apparatus used for the initiation of detonators by means of a controlled **blasting** system complies with the relevant SANS 1717-3 (2014) "The design and approval of detonator initiation systems for use in mining and civil **blasting** Part 3 Controlled **Blasting** System";

(d) every shot exploder, initiator or electronic delay detonator system is tested and certified by a test laboratory accredited for this purpose by the government endorsed national accreditation body as contemplated in Approved Recommended Practice (ARP) 1717 (2010) "Guide to the regulatory requirements for the approval of detonators, initiators and initiation systems used in mining and civil **blasting** applications";

(e) every inherently safe apparatus used for the testing of a circuit containing an electric detonator, electric or electronic initiator electronic delay detonator or a similar device is tested and certified for that purpose by a test laboratory accredited for this purpose by the government endorsed national accreditation body approved by the approving authority as contemplated in **ARP** 1717; and

(f) the shot-firing apparatus is maintained in an efficient and safe working order. Each shot-exploder must be provided with a removable operating handle or key or with a locking arrangement to secure it against unauthorised use and must be marked with a serial number, and a record must be kept of all examinations and tests carried out on it.

4.5(2) The normative reference in the SANS standards in regulation 4.5(1) above are not applicable to the **employer**.

Precautionary measures before initiating explosive charges

4.6(1) The **employer** at any underground coal **mine** must take reasonable measures to ensure that the **competent person** referred to in regulation 4.4(1) does not **initiate explosive** charges in any underground coal **mine** unless the -

(a) coal to be blasted has two free faces;

(b) end of the **shot hole** is at least 150 millimetres short of the back of the cut providing the second of the two free faces; and

4.6(2) The **employer** at any underground coal **mine** must take reasonable measures to ensure that the **competent person** referred to in regulation 4.4(1) does not fire an **explosive** charge in an underground coal **mine** where the place where the **explosive** charge is to be fired is dry and dusty, unless -

(a) a **permitted explosive** is used; and

(b) the place of firing and all contiguous accessible place(s) within a radius of 20 metres from it at the time of firing have been wetted through watering or have been given effective treatment with incombustible dust, in all parts where dust is lodged, whether roof, floor or side.

4.6(3) The **employer** at any underground **mine** must take reasonable measures to ensure that:

(a) **explosives** are not brought to the working face where **blasting** is to be carried out unless–

(i) the drilling of **shot holes** has been completed;

(ii) the **shot holes** are ready to be charged with **explosives**;

(iii) the quantity of **explosives** does not exceed the estimated required quantity to be used for the blast; and

(iv) a safe distance, to which **explosives** may be brought to the working face where drilling of **shot holes** is not completed, is determined by means of a **risk** assessment conducted by the **employer** in consultation with the **explosives manufacturer** or supplier.

(b) the **competent person** referred to in regulation 4.4(1) does not **initiate** any **explosive** charge unless:

(i) the portion of the **shot hole** between the **explosive** charge and the collar of the **shot hole** is **stemmed** and **tamped** in accordance with the requirements of regulation 4.14;

(ii) all persons have been removed from the **working place** where **explosive** charges are to be **initiated**;

(iii) all entrances to the working place(s) where **explosive** charges are to be **initiated**, or to the places where the safety of person(s) may be endangered by such **initiation**, are effectively guarded so as to prevent inadvertent access to such place(s) while such **explosive** charges are being **initiated**; and

(iv) such **competent person**, gives or causes to be given due warning in every direction and is satisfied that no person remains where they might be exposed to danger from the **initiating** of such **explosive** charges;

4.6(4) The **employer** at any underground **mine** must take reasonable measures to ensure that the **competent person** referred to in regulation 4.4(1) or any person authorised to do so by the **employer** does not **initiate** an **explosive** charge in any underground **mine** where a centralised **blasting** system is being used, unless all persons who may be endangered by such **initiation** of **explosive** charges have been moved to a safe area.

4.6(5) The **employer** at any surface **mine** must take reasonable measures to ensure that:

(a) no person remains or approaches, or is caused or permitted to remain or approach, within 15 metres of any **shot hole** being charged with **explosives**, unless such person is assisting in the charging up of **shot holes** with **explosives** or authorised by the **employer** in the interest of health and safety;

(b) **explosives** are not brought to the working bench where **blasting** is to be carried out unless:

(i) the drilling of **shot holes** have been completed;

(ii) the **shot holes** are ready to be charged with **explosives**;

(iii) the quantity of **explosives** do not exceed the estimated required quantity to be used for the blast; and

(iv) a safe distance, to which **explosives** may be brought to the working bench where drilling of shot holes is not completed, is determined by a **risk** assessment conducted by the **employer** in consultation with the **explosive manufacturer** or supplier

(c) the **competent person** referred to in regulation 4.4(1) does not **initiate** any **explosive** charge unless the portion of the **shot hole** between the **explosive** charge and the collar of the **shot hole** is **stemmed** and **tamped** in accordance with the requirements of regulation 4.14;

(d) before the **initiation** of **explosive** charges, an adequate number of guards are stationed at a safe distance determined by a **risk** assessment to prevent persons accessing the **blasting** area and that the guards remain at the safe distance until the **initiation** of **explosive** charges is completed and the guards are recalled by the **competent person** referred to in regulation 4.4(1); and

(e) at least three minutes before an **explosive** charge is **initiated**, the **competent person** referred to in regulation 4.4(1) gives due warning of the **initiation** of **explosive** charges.

4.7 The **employer** at any **mine** must take reasonable measures to ensure that when **blasting** takes place, air and ground vibrations, shock waves and fly material are limited to such an extent and at such a distance from any building, public thoroughfare, railway, power line or any place where persons congregate to ensure that there is no significant **risk** to the health or safety of persons.

4.8 The **employer** at any **mine** must take reasonable measures to ensure that the **stemming** or **tamping** is not withdrawn from a **shot hole** that has been charged with **explosives** except when dealing with **misfired holes** in accordance with the provisions of regulation 4.11.

Precautions after charges have been initiated

4.9 The **employer** at any **mine** must take reasonable measures to ensure that after **explosive** charges have been **initiated** or **misfired holes** have been re-initiated, the **competent person** referred to in regulation 4.4(1) does not approach, or causes or permits any other person to approach, within the range of the exploding charges until such competent person is satisfied that all the **explosive** charges have exploded or until a period of 30 minutes has expired, after the **initiation** of the charges.

Precautions when initiating by means of electricity

4.10(1) The **employer** at any **mine** must take reasonable measures to ensure that, where **initiating** takes place by means of electricity, the **competent person** referred to in regulation 4.4(1), after such **competent person** has connected the **blasting** cable to the detonator wires of any **explosive** charge or charges and before such **explosive** charge or charges have been **initiated**, does not-

(a) remain or approach, or cause or permit any other person to remain or approach, within a distance where such person may be endangered by the **initiating** of such **explosive** charges, except for the purpose of examining the **blasting** circuit; and

(b) examine the **blasting** circuit, or cause or permit the **blasting** circuit to be examined, unless both leads are disconnected from any source of electricity, whether for **initiating explosive** charges or testing the **blasting** circuit.

4.10(2) The **employer** at any **mine** must, where **initiation** takes place by means of electricity, take reasonable measures to ensure that the **competent person** referred to in regulation 4.4(1) -

(a) only uses a **blasting** cable provided for that purpose and which is in good order and of sufficient length to ensure that the **blasting** cable cannot come into contact with any other cable or electrical apparatus;

(b) secures the **initiating** device of the blast in an adequate and reasonable manner so as to prevent unauthorised access or use of the **blasting** system;

(c) connects the **blasting** cable to the detonator wires of any **explosive** charge or charges or to the wires of the initiator or similar device only after completing all **blasting** precautions, other than those referred to in paragraphs (d), (e) and (g) of this regulation;

(d) does not apply any electrical test to the **blasting** circuit except through the **blasting** cable and from a place of safety;

(e) does not connect the **blasting** cable to the terminals of the **initiating** device until immediately before **initiation** of **explosive** charges or attempting to **initiate** the **explosive** charges;

(f) except in the case of a remotely operated centralised electric **blasting** system, immediately after **initiating** or attempting to **initiate** the **explosive** charges, disconnects both leads of the **blasting** cable from the **initiating** device and then -

(i) removes the operating handle or key of the **initiating** device; or

(ii) secures the locking arrangement of the **initiating** device and removes the key;

(g) in the case of a remotely operated centralised electric **blasting** system, does not connect the **blasting** cable to the terminals of the **blasting** box until immediately before leaving such **competent person's working place** at the end of the shift; and

(h) in the case of a remotely operated centralised electric **blasting** system, disconnects immediately at the commencement of the shift any **blasting** cable from the terminals of the **blasting** box;

4.10(3) The **employer** at any **mine** must take reasonable measures to ensure that, after the **explosive** charges have been **initiated** by means of electricity, the competent person referred to in regulation 4.4(1):

(a) carefully examines for **misfired holes** where the charges have been **initiated**, before permitting any person to work there;

(b) instructs any person engaged in clearing the broken rock, **mineral** or ground to report immediately to such **competent person** the finding of any wires that may lead to a **misfired hole**; and

(c) carefully traces any such wires to determine whether or not a **misfired hole** has occurred.

4.10(4) The **employer** at any **mine** must take **reasonably practicable** measures to ensure that where the **initiation** of **explosives** takes place by means of electricity and where there is a **risk** of an **explosive** charge being **initiated** by lightning, operations in connection with the preparation or **initiation** of **explosive** charges are not started or continued on the approach of or during a thunderstorm and that no person remains, or is caused or permitted by any other person to remain, within an area where any person may be injured by the accidental **initiation** of **explosives.**

Precautions for misfires, sockets and old explosives

4.11 The **employer** at any **mine** must take reasonable measures to ensure that a written procedure is prepared and implemented, after consultation with the **explosive manufacture**r or supplier, to prevent persons from being exposed to the significant **risk** associated with **misfires, sockets** and **old explosives**. Such procedure must include measures to ensure that:

4.11(1) no person gains inadvertent access to any **misfired hole** which is not immediately dealt with, and which measures should include clearly marking the **misfired hole** or barricading it off and requiring reporting of the **misfired hole** to all subsequent shifts, at the start of each such shift, until the **misfired hole** has been dealt with;

4.11(2) in any shaft in the course of being sunk, in addition to the requirements of regulation 4.9:

(a) the **competent person** referred to in regulation 4.4(1) makes a sketch showing the position of every **misfired hole** and **sockets;**

(b) every sketch referred to in regulation 4.11(2) is kept at the **mine** for a period of at least seven days unless directed otherwise in writing by the Principal Inspector of **Mines**; and

(c) the washing or blowing over and the preparation of the sketch required in terms of regulation 4.11(2) is done at least once a day under the immediate supervision of the **competent person** referred to in regulation 4.4(1) to do so, and this **competent person** ensures that the washing or blowing over has been effectively done and the sketch properly prepared by means of personal inspection;

4.11(3) **explosives** are only extracted from any **misfired hole** by a means determined for this purpose after consultation with the **explosives manufacturer** or supplier;

4.11(4) the person extracting **explosives** from a **misfired hole:**

(a) ensures as far as **reasonably practicable** that all the **explosives** in the **misfired hole** are extracted; and

(b) recovers all **explosives** that have been extracted from the **misfired hole**;

4.11(5) no person removes or causes any other person to remove the plugs that are used to plug **sockets** or **misfired holes** unless such plugs are removed by the **competent person** referred to in regulation 4.4(1) for the purpose of inspection or are removed at the end of the shift prior the **initiating** of **explosive** charges;

4.11(6) At any surface **mine** the **competent person** referred to in regulation 4.4(1):

(a) re- **initiates** the **misfired hole**; or

(b) drills or causes to be drilled in the presence of such **competent person,** a relieving hole not less than 150 millimetres deeper than the **misfired hole** and which relieving hole is parallel to and not nearer than a distance determined by **risk** assessment to the **misfired hole** and that such **competent person** charges and **initiates** this relieving **shot hole** and recovers the **explosives** liberated from the **misfired hole.** The **risk** assessment must consider the following:

(i) hole diameter;

(ii) hole depth;

(iii) burden and spacing; and

(iv) geology.

or

(c) extracts the **explosives** from the **misfired hole** in accordance with the provisions of regulation 4.11(3).

4.11(7) At any underground **mine**, except underground coal **mines**, the competent person referred to in regulation 4.4(1):

(a) examines every **socket** and **misfired hole** to ascertain its depth, direction and whether it contains any **explosives,** by a means determined by the **employer** after consultation with the **explosives manufacture**r or supplier; and

(b) extracts **explosives** from the **misfired hole** in accordance with the provisions of regulation 4.11(3) and plugs the **socket** with a plug supplied for that purpose by the **employer**; or

(c) re-primes and **blasts**; or

(d) charges up the **misfired holes** with **explosives** and **initiates** the **explosive** charges; or

(e) **blasts** the **misfires** at the end of the shift;

4.11(8) At any underground coal **mine** the **competent person** referred to in regulation 4.4(1):

(a) where a **misfired hole** is in stone, extracts the **explosives** from the ***misfired hole*** in accordance with the provisions of regulation 4.11(3) and charges up the **misfired holes** with **explosives** and **blasts** the **misfires** before or at the end of the shift;

(b) where a **misfired hole** is in a coal, drills or causes to be drilled in the presence of such **competent person**, a relieving **shot hole** parallel to and not nearer than 300 millimetres to the **misfired hole** and that such **competent person** charges and **initiates** the **explosives** charge contained in the relieving **shot hole** before or at the end of the shift.

Precautionary measures for marking, drilling and blasting

4.12 The **employer** at any **mine** must take reasonable measures ensure that a written procedure is prepared and implemented, after consultation with the **explosive manufacture**r or supplier, to prevent persons from being exposed to the significant **risk** associated with marking, drilling and **blasting** of **shot holes**. Such procedure must include measures to ensure that:

4.12(1) At any underground **mine** before the **competent person** referred to in regulation 4.4(1) points out or marks any **shot hole** for drilling, such **competent person**:

(i) removes or causes to be removed all loose or loosened rock, **mineral** or ground to a safe distance from the **shot hole** determined by a **risk** assessment;

(ii) searches for any **misfired hole** or **socket** within a distance of at least the length of the drill steel used in all directions from the proposed position or mark; and

(iii) ensure that no person drills or causes or permits to be drilled any **shot hole** unless the position and direction of the **shot hole** has clearly been marked by such **competent person** with a paint or other suitably visible material, or, if such marking is impracticable, has pointed out the exact position and direction of the **shot hole**;

4.12(2) At any underground **mine** other than coal **mine**:

(a) no person drills or causes or permits to be drilled any **shot hole** unless it-

(i) is placed more than 150 millimeters from any **socket** and is drilled in such a direction that it will nowhere come nearer than 150 millimeters from any **socket**;

(ii) is placed more than two metres from any **misfire** and is drilled in such a direction that it will nowhere come nearer than two metres from any **misfired hole**; and

(iii) deviates from the position and direction indicated as contemplated in paragraph (i) above;

(b) no person drills or causes or permits to be drilled any **shot hole** in any shaft, drive, crosscut, winze, raise, bord, stall or other similar confined space underground where there is known to be a **misfired hole** until the **misfired hole** has been dealt with in accordance with the provisions of regulation 4.11(3);

(c) no person deepens or causes or permits any other person to deepen any hole which has been left standing or which is not completed at the end of a shift, unless:

(i) it has not been charged with **explosives** and it has been clearly described by the **competent person** referred to in regulation 4.4(1) in charge of the shift leaving work to the **competent person** referred to in regulation 4.4(1) in charge of the shift about to commence; or

(ii) the **competent person** referred to in regulation 4.4(1) examines such hole and finds it not to contain any **explosives**.

4.12(3) At any surface **mine**:

(a) before any **competent person** referred to in regulation 4.4(1) points out or marks any **shot hole** for drilling or authorises any other person to point out or mark the position and direction of any **shot hole** for drilling, such **competent person** searches for any **misfired hole** or **socket** within a distance referred to in regulation 4.11(6)(b).

(b) no person drills or causes or permits to be drilled any **shot hole**, unless:

(i) it is placed at a distance as referred to in regulation 4.11(6)(b) from any **socket** and is drilled in such a direction that it will nowhere come nearer than such determined distance from the socket;

(ii) it is a **shot hole** that deviated from the position and direction indicated in paragraph (a) above; and

(iii) no person deepens or causes or permits any other person to deepen any **shot hole** that has been left standing or which has not been completed at the end of a shift, unless it has not been charged with **explosives** and has been clearly described by the **competent person** referred to in regulation 4.4(1) in charge of the shift leaving work to the **competent person** referred to in regulation 4.4(1) in charge of the shift about to commence.

Prevention of flammable gas and/or coal dust explosions

4.13 The **employer** at any underground **mine** must take reasonable measures to ensure that:

4.13(1) a blow out, ignition of flammable gas or **initiation** of a coal dust explosion does not occur due to the design and positioning of the **shot holes** or due to the type of **explosives** that are used;

4.13(2) **initiating** devices or systems used in **blasting** operations are designed not to cause a methane or coal dust explosion;

4.13(3) testing for flammable gas is done in accordance with a written procedure prepared and implemented for this purpose; and

4.13(4) no **explosives** are **initiated** where flammable gas or coal dust may be present in sufficient quantities to cause a flammable gas or coal dust explosion or to cause flammable gas to burn.

Shot holes to be stemmed and tamped

4.14 The **employer** at any **mine** must take reasonable measures to ensure that:

4.14(1) no **explosives** contained in a **shot hole** are initiated unless a portion of the **shot hole** between the **explosive** charge and the collar of the **shot hole** is **stemmed** and **tamped** by means of a material determined for that purpose by the **employer** in consultation with the **explosives manufacturer** or supplier and **stemming** manufacturer or supplier, to prevent persons from being exposed from the significant **risks** associated with **explosives** detonating outside the **shot hole**, blow outs, fly rocks and harmful **explosives** gases escaping from the **shot hole**.

4.14(2) the length of **stemming** and **tamping** of a portion of a **shot hole** between the **explosive** charge and the collar of a **shot hole** is determined by means of a **risk** assessment conducted by the **employer** in consultation with the **explosives manufacturer** or supplier, **stemming** manufacturer or supplier and the **competent person** contemplated in regulation 14.1(8). The **risk** assessment must consider at least the following:

(a) coupling ratio of **explosives**;

(b) energy released to protect in situ rock;

(c) containment of fly rock and air blast;
(d) blast design and type of explosives;
(e) geology and type of rock; and
(f) safety in dealing with misfired holes.

4.14(3) the material used for **stemming** and **tamping** complies with SANS 120:2009, Edition 2 "Stemming for use in blasting";

Amount or mass of explosives in a shot hole

4.15 The **employer** at any **mine** must take **reasonably practicable** measures to ensure that the maximum amount or mass of **explosives** used per **shot hole** is according to the **manufacturer**'s or supplier's recommendations.

General precautions

4.16 The **employer** must take reasonable measures to ensure that:

4.16(1) at any **mine** other than a coal **mine**, no **explosive** charges are **initiated** during the shift unless –

(a) such **explosive** charges are necessary for the purpose of **secondary blasting** or re-**initiating** the **misfired holes** in development faces;
(b) written approval for such **initiation** has been granted by a person authorised to do so by the **employer**; and
(c) reasonable precautions have been taken to prevent, as far as possible, any person from being exposed to smoke, fumes or fly rocks from such **initiation** of **explosive** charges;

4.16(2) no **blasting** operations are carried out within a horizontal distance of 500 meters of any public building, public thoroughfare, railway line, power line, any place where people congregate or any other structure, which it may be necessary to protect in order to prevent any significant **risk**, unless:

(a) a **risk** assessment has identified a lesser safe distance and any restrictions and conditions to be complied with;
(b) a written application is submitted to the **Principal Inspector of Mines** accompanied by the following documents for approval-
  (i) a sketch plan indicating the distance from the **blasting** area to the affected structures;
  (ii) the **risk** assessment;

(iii) a proof of consultation with the owners of the affected structures; and

(iv) restrictions and conditions.

(c) a written approval has been granted by the **Principal Inspector of Mines**; and

(d) any restrictions and conditions determined by the **Principal Inspector of Mines** are complied with.

4.16(3) at any **mine**, no person smokes, lights a fire or brings a naked light or flame, within a distance of 10 meters of where **explosives** are being loaded, transported, off loaded, handled or **explosive** charges are being prepared;

4.16(4) at any **mine**, **blasting** takes place only at a time determined in writing by the **employer**;

4.16(5) at any surface **mine**, a written procedure is prepared and implemented, after consultation with the **explosive** manufacturer or supplier, to prevent persons from being exposed to the significant **risks** associated with **hot holes**. Such procedure must include:

(a) where there is a significant **risk** of **hot holes** occurring, that the **competent person** referred to in regulation 4.4(1) measures the temperature of the **shot hole**; and

(b) that the temperatures of the **shot holes** are measured at any point throughout the length of the **shot hole** and recorded prior and during charging up operations.

4.16(6) at any **mine**, a written procedure is prepared and implemented after consultation with **explosives** manufacturer or supplier to ensure that **sleep-over blasts** are carried out safely;

4.16(7) at any **mine,** a written procedure is prepared and implemented, after consultation with the **explosive** manufacturer or supplier, to prevent persons from being exposed to significant **risks** associated with **secondary blasting**. The written procedure must include measures to ensure that:

(a) all persons are moved to a safe area prior to **secondary blasting** taking place;

(b) guards are placed at all entrances at a safe distance determined by a **risk** assessment, to the area where **secondary blasting** is to take place; and

(c) written approval from a person authorised by the **employer** to do so, is granted before **secondary blasting** is carried out.

4.16(8) the competent person referred to in regulation 4.4(1):

(a) takes all reasonable precautions to safeguard every person assisting such **competent person** in the preparation of **explosive** charges against injury;

(b) only charges **shot holes** with **explosives** within a reasonable time of **initiation** and after all persons not required to assist in the charging have been removed to a safe distance determined by **risk** assessment;

(c) charges only the **shot holes** or prepare only the **explosive** charges that are intended to be **initiated** at the next blast and, while **explosives** charges are awaiting **initiation**, ensures that they are not interfered with;

(d) except as may be necessary to re-**initiate** a **misfired hole** or specialised blast design for holes more than 4 meters in length; does not insert more than one detonator into an **explosive** charge, provided that in wet workings two detonators may be used only if they are both inserted into the same cartridge and securely fastened to it;

(e) only uses a means, appliance or material supplied by the **employer** for the purpose of **initiating** of **explosive** charges or testing of a **blasting** circuit; and

(f) before any charge is **initiated**, takes adequate measures to prevent injury to persons or damage to property caused by **blasting** operations.

4.17 No person:

4.17(1) may drill or cause to be drilled or **blast** any **shot hole** in a subterranean tunnel intended to be used for purposes other than extracting **minerals**, unless -

(a) a **risk** assessment has identified a safe distance to blast such a **shot hole** and any restrictions and conditions to be complied with;

(b) a written application accompanied by the following documents is submitted to the **Principal Inspector of Mines** for approval-

(i) a sketch plan,

(ii) the **risk** assessment,

(iii) restrictions and conditions;

(c) a written approval has been granted by the **Principal Inspector of Mines**; and

(d) any restrictions and conditions determined by the **Principal Inspector of Mines** are complied with;

4.17(2) who is engaged in handling **explosives** or who is travelling in a vehicle in which **explosives** are being transported may carry matches or any other means of producing a flame or a spark;

4.17(3) warned of the **initiation** of **explosive** charges as contemplated in regulation 4.6(5)(d) may remain in or enter the unsafe area surrounding the place where the **initiation** of **explosives** is to take place.

4.18 Every person at any **mine** must report, in a manner prescribed by the **employer**, without delay any case of gassing, however slight, to ensure that such case receives prompt medical attention.