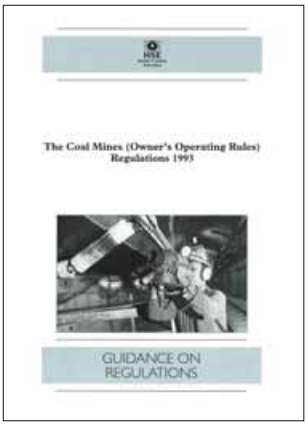
The Coal Mines (Owner's Operating Rules) Regulations 1993

Guidance on Regulations



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This booklet outlines the Coal Mines (Owner's Operating Rules) Regulations and applies to all coal mines. It looks at different aspects of mine operations such as certain areas of safety, the ventilation of blind ends, mine fires and fricitional ignition.

The regulations and guidance is aimed at all owners of mines.

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This guidance is issued by the Health and Safety Executive. Following the guidance is not compulsory and you are free to take other action. But if you do follow the guidance you will normally be doing enough to comply with the law. Health and safety inspectors seek to secure compliance with the law and may refer to this guidance as illustrating good practice.

Contents

Introduction

1 The Coal Mines (Owner's Operating Rules) Regulations come into force on 1 January 1994. The full text of the Regulations (SI 1993 No 2331, available from HMSO) is reproduced in the section which immediately follows this introduction.

2 The Regulations are made under the Health and Safety at Work etc Act 1974 and apply to all coal mines. The Regulations require the owner of a coal mine to ensure that the mine is not worked unless there are in force owner's operating rules which are suitable for that mine. Owners are required to make operating rules covering particular areas of safety; the ventilation of blind ends, mine fires and frictional ignition.

3 The section following the Regulations gives guidance on the content of operating rules. The guidance is in the form of model rules. There are three sets, one covering each of the areas of safety referred to above. Operating rules must be suitable for each mine and must be notified to HSE. If the owner of a coal mine adopts the model rules, they will normally be accepted by the Executive for the purpose of the Regulations. The advice of HSE's Mines Inspectors should be sought in cases where owners believe that it is necessary to vary the model rules in order to ensure that the rules are suitable to the mine.

4 Both the Regulations and the guidance have been prepared after full consultation with the industry.

The Coal Mines (Owner's Operating Rules) Regulations 1993

Regulation 1

Regulation 1 Citation and commencement

These Regulations may be cited as the Coal Mines (Owner's Operating Rules) Regulations 1993 and shall come into force on 1 January 1994.

Regulation 2

Regulation 2 Application

These Regulations shall apply to mines of coal.

Regulation 3

Regulation 3 Owner's operating rules

-(1) The owner of a mine shall ensure that the mine is not worked unless there are in force rules made by the owner (in these Regulations called "owner's operating rules") which are suitable for that mine, are set down in writing and have been notified to the Health and Safety Executive forthwith.

(2) The owner shall ensure that -

(a) the owner's operating rules, as for the time being in force, are brought to the attention of all persons at work at the mine (whether or not employed by the owner) who may be affected by them; and

(b) so far as is practicable -

(i) all operations at the mine are undertaken in accordance with those rules in so far as they affect the conduct of the operations concerned; and

(ii) those rules are observed by all persons at work at the mine.

(3) Where it is so reasonably required in the interests of health or safety at the mine, the Health and Safety Executive may, by notice in writing, require the owner to modify any of the owner's operating rules made by him (whether or not it is already in force) and, in such a case, the owner shall modify the rule in accordance with the terms of the notice and within the time limit specified in it.

Regulation 4

Regulation 4 Subject of owner's operating rules

The owner's operating rules shall relate to the subjects set out in the Schedule to these Regulations.

Regulation 5

Regulation 5 Copies of owner's operating rules to be kept in the covered accommodation

The manager of the mine shall ensure that copies of the current owner's operating rules are kept and made available in the covered accommodation provided at the mine in accordance with regulation 36 of the Management and Administration of Safety and Health at Mines Regulations 1993[(a)].

Regulation 6

Regulation 6 Defence on contravention of regulation 3 (3)

It shall be a defence in proceedings against any person for an offence consisting of a contravention of regulation 3(3) for that person to prove that at the time the proceedings were commenced -

(a) an improvement notice under section 21 of the Health and Safety at Work etc. Act 1974 relating to that contravention had not been served on him; or

(b) if such a notice had been served on him -

(i) the period for compliance therewith had not expired, or

(ii) he had appealed against the notice and that appeal had not been withdrawn or dismissed.

Regulation 7

Regulation 7 Disapplication of section 157 of the 1954 Act

Section 157 of the 1954 Act (which provides a defence in legal proceedings and prosecutions in certain circumstances) shall not apply in relation to any prosecutions or other legal proceedings based on an allegation of a contravention of a requirement or prohibition imposed by or under these Regulations.

Schedule

The Schedule Subject of Owner's Operating Rules

Regulation 4

1 The owner's operating rules shall relate to -

(a) ventilation of blind ends;
(b) mine fires; and
(c) frictional ignition.

[(a)] SI 1993/1897.

Guidance on The Coal Mines (Owner's Operating Rules) Regulations 1993: The Model Rules

Owner's operating rules on the ventilation of blind ends

Model Rules for the purposes of regulation 4 of, and sub-paragraph (a) of the Schedule to the Coal Mines (Owner's Operating Rules) Regulations 1993

These model rules which apply to all coal mines have been drawn up by the Health and Safety Executive for the purpose of regulation 4, and sub-paragraph (a) of the Schedule to, the Coal Mines (Owner's Operating Rules) Regulations 1993 relating to ventilation of the mine. Rules must be suitable for each mine and notified to HSE. If the owner of a coal mine adopts these rules they will normally be accepted by the Executive for the purpose of the Regulations. The advice of HSE's Mines Inspectors should be sought in cases where owners believe that it is necessary to vary the model rules in order to ensure that the rules are suitable to the mine as required by regulation 3(1).

Model Rules

Application

1 These rules apply to all blind ends at coal mines.

2 These rules are additional to, and not a substitute for, any relevant statutory provisions which remain unchanged.

Interpretation

3 'Blind end' shall include any drivage, heading, drift, scour, single entry or shaft-sinking being a place from which there are not two different ways, each of which is entirely separate and leads to a different exit from the mine.

4 'Auxiliary ventilation system' means all plant, equipment and devices installed to provide auxiliary ventilation to a blind end and includes any standby system.

5 'Auxiliary ventilation rules' means rules made by the manager of the mine in accordance with paragraph 8.

6 'Upstream' and 'downstream' refer to the direction, relative to a place, of the movement of air. 'Upstream' means against the direction of movement and towards the source of air reaching that place. 'Downstream' means in the direction of movement of air leaving that place.

Model Rules

Requirements for auxiliary ventilation and rules and plans

7 The manager of the mine shall ensure that every blind end is ventilated by an auxiliary ventilation system and that as far as is practical interruptions to the operation of the system are prevented and the need for degassing operations minimised. This may require consideration of a standby system.

8 Auxiliary Ventilation Rules shall be established by the manager for each blind end.

9 The manager shall make arrangements to provide a suitable copy or extract of the ventilation plan showing the ventilation arrangements for the blind end and, additionally, the location of electrical equipment. The plan should show the details of any planned changes in the ventilation arrangements and the stage of development at which such changes are to take place.

10 A copy of the Auxiliary Ventilation Rules and the ventilation plan shall be displayed near to the blind end at a suitable place where it may be seen by all workers entering the blind end. Where multi-entry working is practised it may be sufficient to display the rules and plans at a suitable place common to all entries. A copy of the rules shall also be kept in the covered accommodation.

Auxiliary ventilation rules

11 The rules shall specify:-

(a) the mode of the auxiliary ventilation system to be used for the blind end (forcing, exhausting, overlap, etc). If the mode is to be changed for different times, eg when using the standby system, this should be specified;
(b) the plant, equipment and devices to be used in the auxiliary ventilation system including where installed:

  (i) all fans including any overlap fans;
  (ii) the type of ducting and its method of suspension;
  (iii) the type and position of electrical control gear and cables;
  (iv) any equipment for degassing, environmental monitoring equipment, dust extraction, noise control equipment or air cooling;
  (v) any other devices, plant or equipment used to provide, direct or control ventilation, eg brattice sheets, doors, regulators;

(c) the maximum quantity of air to be taken by the auxiliary ventilation system from the main air current. This quantity shall be such that the air quantity and velocity shall, at no place in the main air current, be reduced below that necessary to provide adequate ventilation;
(d) the minimum quantity and velocity of air to be delivered to the face of the blind end when working normally and when on standby. Where overlap systems are used, the minimum and maximum quantity of air to be supplied to and circulated by the overlap fan should be stipulated. The arrangements should be such that the overlap zone is adequately ventilated;
(e) that when an auxiliary ventilating system is installed it shall remain operational as far as it is practical to do so. Planned changes shall be organised to achieve this and inspection and maintenance should be arranged with minimum interruption to the system;

Model Rules

(f) that except in the case of an overlap fan, the switchgear and cables controlling electrical fans are installed outside the auxiliary ventilated blind end and shall, wherever practical, be sited upstream of both the auxiliary ventilated blind end and the fan;

(g) that all the components of the auxiliary ventilation system shall be inspected and reported upon by competent person(s) on commissioning and thereafter at specified intervals. (This may be incorporated into the manager's Scheme of Maintenance for the mine);

(h) the method of sealing off in the event of the abandonment or discontinuance of the blind end and the method of fencing to be used following any temporary derangement or interruption of the ventilation;

(i) the arrangements for reporting any matter which is of an abnormal or unusual nature relating to the auxiliary ventilation system;

(j) that when the ventilation has been interrupted or ceases to be adequate, and an accumulation of flammable or noxious gas has occurred sufficient to indicate danger, the person in charge of the mine is informed at once;

(k) the circumstances requiring direct reporting to the person in charge which should include those occasions when there is:

  (i) a concentration of firedamp in excess of 1.25% by volume in the general body of air;
  (ii) an accumulation of firedamp in excess of 5% by volume at any place in sufficient quantities to indicate danger and require special attention;
  (iii) an indication that blackdamp may be present;

(l) that the person in charge of the mine shall:

  (i) forthwith assess the circumstances;
  (ii) having regard to any action already taken, give further instructions to prevent danger in that place or any other place;
  (iii) shall decide whether or not a degassing operation is necessary;
  (iv) give priority to remedying the situation.

Degassing operations

12 The manager shall ensure, by means of the provision of equipment, arrangements, supervision and training that degassing of blind ends can be done safely. Equipment should normally include the provision of purposely designed degassing units permanently installed as part of the system.

13 When a decision is taken by the person in charge of the mine that a degassing operation will be necessary, then he shall ensure that all electrical power to the blind end has been isolated and all persons withdrawn.

14 The person in charge of the mine shall decide if it is necessary for him to take charge or to arrange for a competent, authorised person to do so. A list of persons who have been so authorised by the manager shall be posted at a suitable location.

Model Rules

15 For each degassing operation, the person in charge of the mine shall review the circumstances which are specific to the problem area. The review should address the following matters:

(a) the nomination of an authorised person competent to supervise the degassing operation and the need for any further specialist assistance, eg electrical staff for isolation;
(b) the anticipated scale of the proposed degassing operation and the foreseeable consequences should anything go wrong;
(c) the location of the problem area and its proximity and relevance to other sections of the mine;
(d) the availability of equipment suitable for degassing and for monitoring the operation.

16 Degassing should be closely controlled and before any degassing operation is started, consideration shall be given to the area likely to be affected to ensure that:

(a) the quantities of air required for degassing can be accurately and positively controlled;
(b) where it is possible that firedamp in the general body of the air at any place on the downstream side of the area could exceed 1.25%, that place shall be included in the degassing zone and all electrical power thereto cut off;
(c) where it is possible that the percentage of firedamp in the general body of the air on the downstream side could exceed 2%, or that oxygen might be less than 19%, all persons shall be withdrawn from the area likely to be affected and entry prevented until the degassing operation has been completed and it has been inspected and found safe. For major degassing operations this may mean withdrawing all persons from the downstream side;
(d) no firedamp concentration greater than 1.25% shall be passed through a moving fan impeller;
(e) during degassing, all persons in charge of areas likely to be affected by the degassing shall be kept informed of the progress of the operation. The manager (or the person in charge) of the mine shall also ensure that the manager or person in charge of any other mine which may be affected is kept informed;
(f) during degassing, electrical power shall remain isolated from the blind end at all times;
(g) any necessary additional requirements or precautions because of known or anticipated gradients (which could result in the formation of a swilley that could be blocked by water, or complicate degassing because of the density effect of the gas) are adopted;
(h) following the dispersal of concentrations of firedamp exceeding 2% by volume from the general body of air, some gas may remain within equipment. Enclosures which include normally arcing or sparking devices should be purged of flammable gas before operations resume.

Note: This requirement quotes the Approved Code of Practice to regulation 20 of the Electricity at Work Regulations 1989.

17 In exceptional circumstances, where large volumes and/or high percentages of firedamp need to be removed, consideration may be given to its removal as a plug; but only in circumstances where all electrical power can be isolated on the downstream side and all persons evacuated from underground.

Model Rules

Electrical power supplies

18 The electrical power supply to any blind end shall meet the following requirements:

(a) electrical power shall be isolated by automatic means from all electrical apparatus, including power cables, installed in the blind end if:

(i) the contactor(s) controlling the supply of electricity to the auxiliary fan(s) ventilating the blind end is open (any interlocks provided to meet this requirement shall not be capable of being readily defeated by the operation of test switches or test plugs); or
(ii) any other means used to ventilate the blind end is not operating normally.

(b) the power supply to the auxiliary ventilation system shall be capable of being maintained while the power supply to all, or any of, the other plant installed in the blind end is isolated.

19 If the quantity of air delivered to the face of an auxiliary ventilated blind end is less than the minimum air quantity specified in the Manager's Auxiliary Ventilation Rules, electrical power to any mineral cutting machine shall be isolated until the matter is corrected.

20 Nothing in paragraphs 13, 16(b) and (f) and 18(a) shall require the isolation of electrical circuits approved for the purpose of remaining energised in concentrations of firedamp exceeding 1.25% by volume. However, unless it is necessary for safety reasons for such circuits to remain live in the blind end itself, then they should be isolated during degassing.

Inspection and reports

21 The inspection and reporting procedure for an auxiliary ventilation system shall include:

(a) the mechanical condition of the fan, dust filtration and noise control equipment on commissioning, on recommissioning and at intervals specified in the manager's Scheme of Maintenance for the mine;
(b) the electrical components and associated switchgear and cables prior to commissioning, re-commissioning and at intervals specified in the manager's Scheme of Maintenance for the mine. The electrical inspection must specifically include a physical check on the efficacy of the arrangements required by paragraph 18 of these Rules (ie fan operational/electrical power interlock, etc);
(c) the condition of the ventilation ducting;
(d) the measurement and recording of the quantity of air being delivered to the face of the auxiliary ventilated blind end, upon installation and at not more than weekly intervals thereafter - as required by regulation 25 of the Coal and Other Mines (Ventilation) Regulations 1956. Quantities circulated by overlap fans should also be recorded;
(e) where an alternative ventilation system is employed as standby, eg at weekends or holidays which is different from the system used during normal working, it will be sufficient to measure the air quantity upon first commissioning the standby system and thereafter at monthly intervals, so long as the trend of weekly readings taken for the operational system remains satisfactory;

Model Rules

(f) where the weekly statutory determinations of air quantity of the system indicates a deteriorating trend or sudden change, then the efficiency of the alternative ventilation system must be verified;
(g) records of reports shall be maintained in accordance with regulation 35 of the Management and Administration of Safety and Health at Mines Regulations 1993.

Special reporting to the manager

22 The manager of the mine shall define the arrangements for any interruption to the ventilation to be reported to him when he is not present at the time of the interruption. Such arrangements shall include a written report, by the senior person in charge, of the circumstances causing the interruption, the consequences of the interruption and the actions taken to restore the ventilation. Where an auxiliary fan transmits an alarm signal immediately the fan stops, the reporting procedure should require the person receiving the alarm to inform the senior person in charge of the mine at once. This should be in addition to the normal reporting procedure by the appropriate underground official required by sub-paragraph 11 (k).

Measurement and regulation of airflow

23 Before any auxiliary ventilation system is installed or augmented, the quantities of air flowing in the airways which will be or may be affected by the operation of the auxiliary system shall be measured. The system shall not be installed or augmented unless the measurements show that the requirements contained in the following paragraph and the manager's Auxiliary Ventilation Rules can be complied with.

24 Where the inlet and outlet ends of an auxiliary ventilation duct are separated by doors or seals:

(a) the quantity of air flowing in the intake airway on the upstream side of the auxiliary ventilation system shall at all times be sufficient for the proper ventilation of the inbye workings and must be measured and recorded weekly when the auxiliary system is in operation;
(b) the differential air pressure across the doors or seals shall be such that no recirculation occurs and must be measured and recorded weekly.

25 Any regulator in an auxiliary ventilation system shall be designed to prevent unauthorised or inadvertent operation.

26 No person other than an official of the mine or a person instructed by that official or a person authorised by the manager of the mine to do so shall regulate the quantity of air passing through or delivered by an auxiliary ventilation system and equipment.

Co-ordination between colliery personnel

27 The manager of the mine shall make arrangements for designated responsible persons to sign all working ventilation development plans and any amendments thereto.

28 The manager of the mine shall make arrangements to ensure effective co-ordination in the planning, installation, operation and maintenance of all auxiliary ventilation systems.

Model Rules

29 The provisions for co-ordination should, in particular, allow adequate time for the electrical engineer or electrician-in-charge to:

(a) design new layouts and interlock systems and any subsequent modifications;
(b) produce the necessary circuit diagrams;
(c) prepare the equipment properly; and
(d) brief the installation and maintenance staff.

30 It is important to ensure that, in the event of any unexpected or unusual situation, there is effective communication between persons responsible for taking action and the appropriate persons in the management structure of the mine.

Criteria for the operation of battery-powered free-steered vehicles

31 Battery-powered free-steered vehicles may be used in auxiliary ventilated blind-ends provided that:

(a) the driver of the vehicle carries a properly calibrated automatic firedamp detector which is capable of giving an alarm at a pre-determined level of firedamp;
(b) arrangements are made to ensure that, if normal ventilation ceases or becomes inadequate or the percentage of firedamp in the general body of the air exceeds 0.8% by volume (or such lower figure as may be specified by the manager), such vehicles are prohibited from entering the blind end. If a vehicle is already in the blind end the arrangements should require it to be brought out in safety or, where this is not practical, it is suitably immobilised and all isolators are switched off.

Owner's operating rules on mine fires

Model Rules for the purposes of regulation 4 of, and sub-paragraph (b) of the Schedule to the Coal Mines (Owner's Operating Rules) Regulations 1993

These model rules which apply to all coal mines have been drawn up by the Health and Safety Executive for the purpose of regulation 4, and sub-paragraph (b) of the Schedule to, the Coal Mines (Owner's Operating Rules) Regulations 1993 relating to mine fires. Rules must be suitable for each mine and notified to HSE. If the owner of a coal mine adopts these rules they will normally be accepted by the Executive for the purpose of the Regulations. The advice of HSE's Mines Inspectors should be sought in cases where owners believe that it is necessary to vary the model rules in order to ensure that the rules are suitable to the mine as required by regulation 3(1). These model rules are based on best practice in modem highly-mechanised mines. In less sophisticated mines where the risk and consequences of fire are reduced owing to the simpler methods employed, it may be appropriate to vary the requirements of paragraphs 11 to 19. Mines Inspectors will be pleased to advise in these cases.

Model Rules

Interpretation

1 'Upstream' and 'downstream' refer to the direction, relative to a place, of the movement of air. 'Upstream' means against the direction of movement and towards the source of air reaching that place. 'Downstream' means in the direction of movement of air leaving that place.

Mutual recognition of standards

2 Any requirement for goods or material to comply with a specified standard shall be satisfied by compliance with:

(a) a relevant standard or code of practice of national standards body or equivalent body of any Member State of the European Community; or
(b) any relevant international standard recognised for use in any Member State of the European Community; or
(c) a relevant technical specification acknowledged for use as a standard by a public authority of any Member State of the European Community; or
(d) traditional procedures of manufacture of a Member State of the European Community where these are the subject of a written technical description sufficiently detailed to permit assessment of the goods or materials for the use specified; or
(e) a specification sufficiently detailed to permit assessment for goods or materials of an innovative nature (or subject to innovative processes of manufacture such that they cannot comply with a recognised standard or specification) and which fulfil the purpose provided by the specified standard;

provided that the proposed standard, code of practice, technical specification or procedure of manufacture provides, in use, equivalent levels of safety, suitability and fitness for purpose.

Part 1: Fire-fighting

This part deals with the fire-fighting arrangements at coal mines.

The first section deals with training and practices. The second section deals with the facilities, tests, plans and records required for underground and surface fire-fighting.

Model Rules

Section 1: Training and practices

3 It shall be the duty of the manager to ensure that all persons who may be required to combat an outbreak of fire have, prior to appointment to their job, received instruction from suitably qualified instructors on the methods of combating fire. Such persons shall include:

underground personnel:

(a) conveyor loading point and transfer point attendants;
(b) conveyor patrol and maintenance personnel;
(c) locomotive and free steered vehicle drivers;
(d) machine operators;
(e) booster fan attendants;
(f) firedamp exhauster attendants;
(g) haulage drivers and pump attendants;
(h) shaftsmen;
(i) engineering supervisory officials;
(j) inspection and supervisory officials.

surface personnel:

(k) firedamp drainage plant attendants;
(l) fan attendants;
(m) explosives store attendants;
(n) coal preparation plant foremen;
(o) burners and welders;
(p) supervisory officials;
(q) conveyor attendants;
(r) mobile equipment drivers;
(s) winding enginemen.

This list is not exhaustive and should not be taken as precluding the training of other groups of workers.

Other personnel

4 The manager of the mine, before making any other appointments or giving authorisations, shall consider whether fire-fighting training is appropriate for that post. If such training is considered necessary, it should form part of the authorisation requirements.

Refresher training

5 All underground personnel shall receive annual refresher training in the safe operation and use of fire extinguishers and the use of fire hose where applicable.

6 All other personnel shall receive refresher training, at intervals not exceeding five years, in the safe operation and use of fire extinguishers and the use of fire hose where applicable.

Model Rules

On-site instruction and practice

7 On-site instruction and practice in fire-fighting shall be carried out at intervals not exceeding six months. These sessions shall be carried out at places selected at random. They shall involve all persons present in the vicinity. The subject matter shall include:

(a) operation of fire extinguishers;
(b) types of fire extinguishers;
(c) fire prevention measures;
(d) emergency exit routes;
(e) dangers to other persons likely to be affected.

8 The sessions shall be conducted and supervised by a competent person and shall be chosen to include, in rotation, places underground and at the surface which have a higher potential fire risk. Persons not directly employed by the owner should be included in such random sessions.

Office and canteen personnel

9 Office and canteen personnel shall receive instruction on the action to be taken in the event of fire, at intervals not exceeding 12 months. The instruction shall include:

(a) practice in the evacuation of the premises;
(b) how to deal with fires;
(c) practice in the operation of fire extinguishers;
(d) such other provisions that are required by any fire certificate.

Records

10 Records shall be kept of dates, locations of, and participants in, all initial and refresher courses held under these rules. They shall include a brief description of activities undertaken. The records shall be compiled and maintained by a person appointed by the manager of the mine.

Section 2: Underground fire-fighting

Water supply

11 A reservoir or water tanks with a capacity of not less than 90 000 litres of water shall be provided on the surface. The water shall be supplied direct from the water main or other dependable source, at an adequate rate of feed to satisfy the requirements of paragraph 12. The reservoir or water tanks provided on the surface shall be coupled to the water main or other dependable source by means of a connecting pipe with a minimum internal diameter of 75 mm and fitted with a valve which shall not restrict the flow of water when fully opened.

Water mains

12 Shaft and underground water mains shall be provided to supply water from the surface reservoir or tanks, sufficient to ensure that a rate of flow of not less than 500 litres of water per minute at a minimum flow pressure of six bar is available in each leg of the system in which fire hydrants are installed.

Model Rules

13 In addition to the water requirements of regulation 5 and regulation 6 of the Coal and Other Mines (Fire and Rescue) Regulations 1956, water pipes (or access to water pipes) shall be provided so that in every roadway in which conveyors are installed, and in every other roadway in which hydrants are installed as required in paragraph 15, there is an adequate supply of water to the fire hydrants.

14 In roadways where free-steered vehicles, locomotive haulage and rope haulage systems are installed, hydrants may be replaced by the provision of adequate numbers of suitable portable fire extinguishers (see also paragraphs 24 and 25 on the requirements for the provision of fire extinguishers on diesel and battery-powered vehicles).

Fire hydrants

15 Fire hydrants shall be provided and their locations identified with a suitable reflective sign at the following places:

(a) 20 to 25 metres upstream of all conveyor loading and transfer points, main junctions, engine rooms, fan houses and fixed electrical sub-stations;
(b) elsewhere where conveyors are installed such that the distance between fire hydrants does not exceed 225 metres. Where special precautions are required, for example, single-entry faces, hydrant spacing should be 120 metres maximum;
(c) not more than 120 metres from each longwall working face, development heading face and at suitable central points in bord and pillar workings.

16 In the event of a fire, the products of combustion must not prevent access to the hydrants necessary for fire-fighting.

Fire stations

17 A properly constructed fire station shall be provided in close proximity to the bottom of the downcast shaft or outlet and to any insets in the downcast shaft, or outlet, serving any working districts. In the case of a drift mine the fire station may be on the surface if safety is thereby better maintained.

18 The minimum equipment provided in such fire stations shall be:

(a) not less than 250 metres of suitable fire hose complete with couplings;
(b) two branch pipes and nozzles with inner diameters exceeding 12 mm;
(c) one dividing and one collecting breeching;
(d) a reserve supply of portable fire extinguishers suitable for dealing with all classes of fires.

Additional provisions

19 A reserve supply of at least 1000 sandbags should be kept at the surface under such conditions as to prevent deterioration.

Fire resistant brattice

20 All brattice for use underground shall be fire resistant to an appropriate standard.

Note: For example, British Coal Specifications 245, 440 or 441.

Model Rules

Booster fan houses

21 Underground booster fan houses and their precincts shall be constructed of fireproof materials for at least five metres on the upstream side and 25 metres on the downstream side of the fan.

Fixed electrical sub-stations, transformer houses, motor rooms and battery charging and battery transfer stations

22 All fixed underground and all surface electrical sub-stations, transformer houses, motor rooms and battery charging and battery transfer stations shall be constructed from and lined with fireproof materials.

Portable fire extinguishers

23 At all places near where electric motors (not being portable apparatus), transformers or switchgear are in use (including fixed electrical sub-stations, transformer houses, motor rooms and battery charging and battery transfer stations), provision shall be made for:

(a) at least two dry chemical powder portable fire extinguishers for use in an emergency;
(b) the storage of a supply of sand or inert dust kept in suitable containers or at least one further portable extinguisher containing a minimum of seven kilograms of dry chemical powder.

24 All diesel-powered machines for use underground shall carry at least two suitable portable fire extinguishers. Where the machine is fitted with a fire-quenching system only one portable fire extinguisher is required.

25 Battery-powered vehicles should be fitted with suitable means of extinguishing both battery fires and other types of fire.

Note: The HSE approval for battery-powered vehicles currently stipulates a minimum of two 7 kg dry chemical powder extinguishers.

Fire-quenching systems on diesel vehicles

26 When considered necessary and where practicable, diesel-powered vehicles should be fitted with fixed fire-quenching systems containing sufficient outlets placed to drench the main vehicle components at risk. Such systems should be capable of manual operation from inside or outside the cab.

Use of foams

27 Polyurethane and urea-formaldehyde foams shall not be used underground at a mine. They should not be used at the surface of a mine in such a place that the products of their combustion would be likely to enter the mine. (Some personal protective equipment contains small amounts of polyurethane and is not affected by this rule).

Model Rules

Fire hose

28 Fire hose shall be:

(a) a minimum of 64 mm internal diameter and designed to withstand working pressure of 10 bar;
(b) fitted with instantaneous male and female couplings with an internal diameter of at least 64 mm;
(c) manufactured to an appropriate standard (eg British Coal Specification No 274); and
(d) stored in containers, recesses or compartments specially provided for that purpose.

Fire points

29 Fire points shall be set up in close proximity to the hydrants stipulated in paragraph 15(a) and (c) of these rules and also at the hydrant nearest to the mid-point of all belt conveyor systems. Their locations shall be identified with a suitable reflective sign.

30 Each fire point shall be provided with a nozzle having an outlet of at least 12 mm internal diameter.

31 Each fire point shall have lengths of fire hose stored in suitable containers appropriate to their locations as listed below:

(a) at least 230 metres of hose for fire points 20 to 25 metres upstream of all conveyor loading and transfer points and main junctions;
(b) at least 115 metres of hose for fire points 20 to 25 metres upstream of all engine rooms, fan houses and fixed electrical sub-stations;
(c) sufficient lengths of hose to reach the extremities of the working face for fire points closest to each longwall working face and at suitable central points in bord and pillar workings;
(d) at least 230 metres of hose at fire points adjacent to the nearest hydrant to the mid-point of all conveyor systems exceeding 400 metres in length; and
(e) at least 115 metres of hose upstream of all hydrants in fire mains laid alongside conveyor systems which are not covered by the above provisions.

Periodic tests

32 Regulation 9(1) of the Coal and Other Mines (Fire and Rescue) Regulations 1956 states that:

> *"9(1) It shall be the duty of the manager of every mine to make and ensure the efficient carrying out of arrangements:-*
>
> *(i) whereby all equipment provided in pursuance of this Part of these Regulations is inspected by competent persons appointed by him at intervals not exceeding thirty days; and*
> *(ii) for the discharge and refilling of each fire extinguisher to ensure that it is maintained in good working order".*

Model Rules

Without prejudice to the requirements of this Regulation, the following tests and examinations shall be made at intervals not exceeding 30 days:

(a) all hydrants must be tested to ensure that there is an adequate water supply;
(b) fire hoses, couplings and nozzles must be examined;
(c) external parts of portable fire extinguishers must be checked for leakage, corrosion, blocked discharge hose or other signs of damage;
(d) in the case of stored pressure extinguishers, the pressure gauge shall be visually checked for an indication of adequate discharge pressure; and
(e) the external parts of any fixed automatic or manually operated fire-quenching system to be examined for signs of damage.

33 The following examinations and tests shall be carried out at intervals not exceeding 12 months:

(a) all CO_2 gas cartridges for use as the activating medium for fire extinguishers to be weighed and the cartridge changed if there has been a weight loss exceeding 10%;
(b) all portable liquid CO_2 extinguishers must be weighed and the extinguisher recharged if there has been a weight loss exceeding 10%;
(c) all underground hydrants must be tested for water pressure and flow;
(d) all total discharge dry powder extinguishers shall be checked by shaking to ensure that the powder is not consolidated. Controlled discharge dry chemical powder extinguishers should be checked by reading the pressure gauge. The gauge operation should be checked by reverse pressurisation to ensure that the needle is not stuck.

Recording of tests and examinations

34 Regulation 9(2) of the Coal and Other Mines (Fire and Rescue) Regulations 1956 states that:

> *"(2) Every person making an inspection shall make a full and accurate report thereon to the manager in writing".*

A full and accurate report of all tests and examinations required under these Regulations and paragraphs 32 and 33 of these rules shall be made in writing by the person who carried them out. The reports shall be read and counter¬signed by the manager or the person appointed under regulation 13(1)(d) of the Management and Administration of Safety and Health at Mines Regulations 1993 to read the reports on his behalf and by the appropriate supervisor in the command structure and mechanical engineer.

35 These reports and the report required by regulation 9(2) of The Coal and Other Mines (Fire and Rescue) Regulations 1956 shall be made in a suitable form.

Fire-fighting plan

36 A surface fire-fighting plan shall be kept in accordance with the terms of the Fire Certificates (Special Premises) Regulations 1976. The surface fire-fighting plan shall contain a clear policy statement and arrangements for summoning the local authority fire service in the event of an incident. The manager shall consult the local authority fire service on the plan and establish appropriate liaison arrangements.

37 The position of all fire mains, hydrants, valves, fire stations and fire points underground shall be shown on a plan required by regulation 28 of the Coal and Other Mines (Fire and Rescue) Regulations 1956 (The Rescue Plan).

Model Rules

38 All standard mine plans, survey records and working papers should be stored and preserved securely in fire-resistant accommodation.

39 Rescue/fire-fighting plans should be maintained as follows:

(a) Rescue room - three copies of a plan drawn to the standard scale or one key plan and three sets of each district or sectional plan;
(b) Manager's office - one standard scale plan or key plan;
(c) Underground office - one standard scale plan or key plan.

Burning and welding

40 Burning and welding underground may only be undertaken in accordance with the conditions of authorisation granted by HSE. Surface burning and welding should be undertaken in accordance with published guidance.

Note: Published guidance includes British Standards BS 5741 and BS 5120, Codes of Practice CP4, CP5, CP6 and CP7 issued by the British Compressed Gases Association and approved by HSE and HSE's guidance (HSE 8) *Oxygen: Fire and explosion hazards in the use and misuse of oxygen.*

Part 2: Underground belt conveyors

This part sets out the requirements relating to underground belt conveying systems.

Fire-resistant conveyor belting

41 All conveyor belts for use underground shall be fire resistant as defined by BS 3289 or British Coal Specification 730 until a British Standard implementing a CEN standard for such belts is introduced.

The housing of conveyor units

42 Any roadway housing a conveyor drive, belt tensioning facility, delivery point or return end tension system (other than those which are moved regularly for coal face or development drivage advancement), shall be constructed of non-combustible materials such as steel, concrete or timber which has been treated to be fire retardant. The continuous length of roadway so constructed shall extend for a minimum distance of five metres upstream of the conveyor drive, tension arrangement, delivery head or return end roller, to a distance not less than 10 metres downstream of the installed components.

Clearances

43 A minimum clearance shall be maintained at all times around the bottom rollers and pulleys of roadway conveyors so that there is no contact between the rollers and any spillage or anything else in the roadway. The belt conveyor support structure shall be installed in such manner as to readily permit the cleaning up of combustible material. All support structures shall be constructed of non-combustible materials.

Model Rules

Fire detection

44 Strategically-placed smoke detectors or other suitable means of indicating fire or excessive heat shall be installed downstream from any conveyor drive, tension arrangement, delivery head roller and return end roller. The detectors shall be checked for effectiveness immediately following installation and at intervals not exceeding 30 days thereafter. Fire detection equipment shall be selected, installed, used and maintained in compliance with the Mining Industry Guidance Note *Fire detection equipment: Selection, installation, use and maintenance.*

Patrolling and examination of belt conveyors

45 The manager of the mine shall appoint in writing persons to be responsible for patrolling and examining conveyors. Such persons may be competent workmen or craftsmen, or a person appointed under regulations 10 and 12(2) of the Management and Administration of Safety and Health at Mines Regulations 1993. The manager shall ensure that all persons responsible for patrolling and examining conveyors are given clear instructions as to the nature of their duties and the matters to which special attention is to be given.

46 Every belt conveyor operating underground shall be patrolled and examined throughout its full length, with particular attention to return idlers on the non-walking side of the conveyor, at the following times:

(a) once in each 24 hours in which the conveyor has been run; and
(b) after major repairs or alterations have been carried out to the conveyor system.

47 Immediately before holidays, weekends or any non-working shift, any underground conveyor which has run in the shift immediately preceding such stands shall be examined thoroughly along its whole length not sooner than one hour and not later than three hours after it has ceased to be run.

48 The person making the examination shall on a written report indicate the condition of the conveyor to his supervisor or a person appointed by the manager of the mine. Any signs of heating or other defects shall be dealt with or reported at once.

49 Reference to these examination reports shall be made in a statutory report.

50 Where automatic means of monitoring heat or products of combustion are installed on a conveying system indicating to a continuously-manned location, then a relaxation may be granted from the requirements of paragraph 47 by a person who has instructions for the management of that mine in accordance with regulation 6 of the Management and Administration of Safety and Health at Mines Regulations 1993. The terms of any such relaxation will require the manager of the mine to observe rules drawn up by the owner for each separate system which will include the following:

(a) a plan of the area containing the conveyors involved;
(b) the conditions covering the monitoring and physical inspection of the conveyors;
(c) the maintenance and test procedures; and
(d) any other conditions considered necessary.

Model Rules

Dealing with alarms and defects

51 If any defects in the conveyor system are suspected or found which could cause immediate danger, the person making the examination shall stop the conveyor if it is running and remedy the defect if he is able to do so within the scope of his duties. If he cannot remedy the defect he shall, without delay, notify an appropriate supervisor.

52 Suitable fire-detection alarm levels shall be determined, and when such levels are reached activating an alarm, the person receiving that alarm shall immediately notify the person in charge of the mine, who shall promptly arrange for an examination to be made and any defects remedied.

53 The power supply to locally-controlled belt conveyors shall be isolated when the conveyor control is not manned, unless it is deemed necessary, for safety, not to do so.

Maintenance

54 All parts of the conveying system shall be maintained in an efficient state, in effective working order and in good repair. The Manager's Scheme for the mine should include provision for examination, testing and maintenance. Where fire-resistant lubricants have been developed and proven not to reduce the reliability of mechanical components, those lubricants shall where practical be used in the appropriate part of the conveyor system.

Safety devices

55 All drive units incorporating scoop control fluid couplings and drive units incorporating acceleration torque-limiting fluid coupling, traction couplings or solid drives shall be installed, used and maintained in accordance with the Mining Industry Guidance Note *Protection of underground roadway belt conveyor drive units.*

Manless transfer points

56 All transfer points between conveyors which are not continuously manned shall be installed, operated and maintained in accordance with the Mining Industry Guidance Notes on the *Minimum requirements for manless transfer points*. If the remote controls are to be left unattended, the operator shall ensure before he leaves that all conveyor indicators are showing stop except where it is deemed necessary to leave any conveyor running for safety.

Part 3: Fire precautions in winding engine houses

General

57 No flammable material which is likely to cause danger from fire shall be used in the construction of any winding engine house. This does not include doors and door frames, brake blocks with friction lining, taper guides, drum lagging, rope groove blocks or bumper beams provided that these articles are made of a material that will not support combustion, or rendered to make them fire resistant.

58 Winding engine house floors shall be kept free from oil and grease. Sawdust shall not be used or stored in the engine house, and no flammable material stored anywhere within the engine house.

Model Rules

59 Any piece of apparatus other than the main gearbox of the winding engine containing more than 25 litres of oil shall be surrounded by a wall or enclosure so as to form a well to contain the spread of oil in the event of leakage. The well shall be capable of holding 10% more than the maximum amount of oil contained in the apparatus. The use of a common enclosure for groups of apparatus is permitted provided that the enclosure capacity is sufficient for all the apparatus contained therein. The selection and operation of transformers and other appropriate equipment which are air cooled (dry type) or contain fire resistant fluid is advisable. Such equipment need not comply with the requirements for a well.

Ground-mounted winding engine houses

60 Drum pits shall be kept clean and a permanent steel ladder or ladders installed, where necessary, to provide access to the drum pit. Facilities should be made available for adequate lighting to drum pits.

61 There shall be provided and kept ready for immediate use at least six suitable portable fire extinguishers.

62 A fire-fighting hydrant shall be sited, wherever practical, between 30 and 50 metres from the engine house. A fire point shall be maintained at the hydrant containing a branch nozzle and sufficient number of hoses to reach the engine house.

63 Where there is considered to be a special risk, there shall be provided a fixed fire extinguishing system with automatic or independent manual control and which utilises a suitable extinguishing medium.

Tower-mounted winding engine house

64 A dry rising main of not less than 75 mm internal diameter shall be provided from ground level to the highest floor or stage. Landing valves with outlets shall be provided at each floor or stage, together with sufficient lengths of suitable fire-fighting hose. A fire-fighting hydrant should be sited, wherever practicable, within a distance of 30 to 50 metres from the engine house. A fire point shall be maintained at the hydrant containing a nozzle and a sufficient number of hoses to reach the engine house.

65 Where any cable, pipe or duct passes through a wall floor or stage level, it shall be surrounded with a fire-resistant material in such a manner as to prevent flames from passing from one room, floor or stage level to another.

66 Where applicable and practical, a self-closing one hour rated fire door shall be provided between the engine house and the lift compartment.

67 Cables, pipes or ducts shall not pass through the floor or stage within the lift compartment.

68 On any floor or stage where there is considered to be a special fire risk, there shall be provided a fixed fire extinguishing installation with automatic or independent manual control and which utilises a suitable extinguishing medium.

Model Rules

69 There shall be provided and kept ready for immediate use, the following portable fire extinguishers:

(a) on the winding engine floor or stage - not less than six portable extinguishers suitable for that duty;
(b) on the intermediate floors or stages - not less than four portable fire extinguishers suitable for that duty.

70 A water inlet point shall be provided to the dry rising main and shall be clearly marked. This inlet shall comply with the local authority fire service connector requirements.

Protection of unattended winding engines

71 Where the winding engineman is allowed to leave the winding engine room in accordance with rules made by the manager, the following additional protective and monitoring equipment should be provided and, where appropriate, warning given at the place where the operations are being supervised:

(a) thermal protection of all main bearings, winding engine brake paths and winder motor windings (and motor/generator sets where applicable);
(b) means of giving adequate warning of the outbreak of fire in the winding engine room.

Part 4: Training in the use of a self-rescuer

This part applies to all coal mines where self-rescuers were in use on 1 January 1994 or are subsequently introduced into use.

72 No-one shall go underground unless they are carrying a suitable self-rescuer and have received suitable training in its use.

73 A suitable training scheme in the use of self-rescuers shall include the following categories of persons and training. The specification for the training shall be in accordance with Appendix 1.

Initial training for persons who are to be employed underground at coal mines

74 Each new entrant recruited for work underground at a coal mine shall be given comprehensive instruction in the use of the self-rescuer including hot air experience during their induction/basic training.

Note: Hot air experience may be obtained by either the wearing of a hot air training model or by extended wearing of a normal self-rescuer resulting in an increase of temperature and resistance.

Model Rules

Retraining of persons employed underground at coal mines

75 All persons employed underground at coal mines are also required to be given retraining annually. Managers shall make arrangements for the retraining of persons in accordance with the following:

(a) annual wearing test:

- all underground employees are required to undertake a suitable wearing test at intervals not exceeding 12 months. A continuous programme of testing shall be maintained at each coal mine. The programme should cater for a mix of persons from different districts of the mine to ensure that there is a wide coverage of the mine workings by persons who have recently been retrained and who could be expected to take the initiative, if required, in putting on their self-rescuers and 'leading' others to do likewise.

(b) five-yearly refresher training:

- all underground employees shall be given the option at five-yearly intervals of taking refresher training instead of their annual wearing test that year. Refresher training is a modified form of the initial training and is more extensive than the wearing test. If the five yearly refresher training is not opted for, then the annual wearing test shall be taken.

(c) hot air experience:

- all underground employees as part of their five-yearly refresher training should be given the option to experience breathing hot air. Since breathing hot air is expected to be a once and for all experience, the option should normally be extended only to those employees who have not previously had experience of it. However, an employee should not be precluded from repeating the experience if he requests it.

(d) Re-entrants:

- all re-entrants intending to go or work underground shall be given five-yearly refresher training if they have been out of the industry for more than 12 months.

Employees permanently employed by the mine owner who regularly but do not routinely work below ground

76 All employees who are permanently employed by the mine owner and who are expected to go below ground regularly (but not routinely) in the course of their duties must receive initial training and a minimum of five-yearly refresher training thereafter.

Other persons not in the mine owner's direct employ who regularly work below ground

77 Other persons (eg contractors' employees) who regularly go underground in the course of their work shall receive initial training and shall be given refresher training including the annual wearing test and five-yearly refresher training where appropriate. It shall be the responsibility of the direct employer of those persons to ensure that such training has been undertaken before such persons are employed below ground.

Model Rules

Persons who do not regularly go underground, including 'visitors'

78 Managers shall arrange for persons who do not go regularly underground and who are not covered by any of the previous categories to be given visitor training. Visitors shall not go underground except when accompanied by a person fully competent in the use of self-rescuers.

Trainers

79 Persons who give instruction in the use of self-rescuers shall be trained and appointed for this task.

Certification and documentation

80 All self-rescuer training for persons who work or are to be engaged in work below ground shall be documented in training records and all such persons shall be issued with a certificate. The mine manager shall ensure that a register is kept of the names of persons who receive visitor training at the mine and the date on which such visitor training was given.

Appendix

Training specifications

1 This appendix details the scope of the training to be given in initial training, the annual wearing test, the five-yearly refresher training and visitor training.

Initial training

2 Initial training consists of three parts, namely: drill, wearing activity and hot air experience.

Drill

3 This is designed to give the trainee sufficient practice in donning a training model from the 'on-the-belt' position to the wearing position. The trainee is required to carry out this activity three times to ensure that he is proficient.

4 The drill requires trainees to carry out three practices in donning a self-rescuer, ie:

(a) first, in two stages - removing it from the belt and extracting it from its container and after a pause fitting it to the head;
(b) secondly, repeating (a) without a pause;
(c) thirdly, repeating (a) in dark conditions without a pause.

5 During the drill, information is provided on the need for a personal self-rescuer underground to provide protection, in the event of fire or explosion, from the harmful products of combustion (ie carbon monoxide) and to ensure that the trainee knows:

(a) when to put the self-rescuer on;
(b) how to behave when wearing it; and
(c) when to take it off.

Wearing activity

6 The trainee will undertake a continuous wearing period of about 20 minutes, which is intended to satisfy him that he has fitted the self-rescuer satisfactorily. The wearing period should include some activity on the part of the trainee such as walking and crawling. The wearing activity period can either follow immediately after the drill whilst the trainee is still wearing the self-rescuer which was fitted in dark conditions, or carried out as a separate exercise.

Hot air experience

7 The trainee is provided with an opportunity to experience breathing hot air either by wearing a hot air training model of the self-rescuer for about 15 minutes or by extended wearing of a normal self-rescuer resulting in an increase of temperature and resistance. The aim of this experience is to simulate the breathing conditions that would exist when wearing a self-rescuer in real emergency conditions underground. Training should conclude with a summary of the main training points and discussion with the trainee to reinforce his understanding and prove his knowledge gain.

Annual wearing test

8 The annual wearing test is designed to assist the person to recall the salient points of his initial training. Instruction should:

(a) remind the trainee of the circumstances under which the self-rescuer should be worn;
(b) give the trainee an opportunity to don a self-rescuer (training model) starting from the 'on-the-belt' position to the wearing position on the head under the supervision of an instructor; and
(c) remind the trainee how to behave whilst wearing the self-rescuer, and of the circumstances in which he may safely remove it after wearing it underground in an emergency.

Five-yearly refresher training

9 The five-yearly refresher training is designed to provide a modified form of initial training. Drill similar to initial training (see paragraphs 3 to 5) should be carried out and include:

(a) the importance of wearing the self-rescuer;
(b) when to put it on;
(c) how to put it on;
(d) how to behave when wearing it; and
(e) when to take it off.

10 Drill should be followed by a period of wearing activity whilst continuing to wear the self-rescuer. Five-yearly refresher training should include the opportunity, if the trainee opts for it, to have hot air experience. The trainee may already have had this experience and may wish to repeat it; or he may not previously have had the opportunity to wear the hot air training model self-rescuer.

Visitor training

11 The visitor shall be instructed by demonstration, to show the procedure for donning a self-rescuer from the 'on-the-belt' position to wearing it on the head.

12 The visitor will not be asked to practise this procedure by donning a self-rescuer. The visitor shall be informed of the need for the personal self-rescuer underground to give protection from carbon monoxide which can be the result of fire or explosions and, in particular, be told when to put on a self-rescuer, how to behave when wearing it and when to take it off.

Owner's operating rules on frictional ignition

Model Rules for the purposes of regulation 4 of, and sub-paragraph (c) of the Schedule to the Coal Mines (Owner's Operating Rules) Regulations 1993

These model rules which apply to all coal mines, have been drawn up by the Health and Safety Executive for the purpose of regulation 4, and sub-paragraph (c) of the Schedule to, the Coal Mines (Owner's Operating Rules) Regulations 1993 relating to frictional ignition. Rules must be suitable for each mine and notified to HSE. If the owner of a coal mine adopts these rules they will normally be accepted by the Executive for the purpose of the Regulations. The advice of HSE's Mines Inspectors should be sought in cases where owners believe that it is necessary to vary the model rules in order to ensure that the rules are suitable to the mine as required by regulation 3(1).

1 These rules are additional to the relevant statutory provisions which remain unchanged.

Model Rules

Application

2 Part 1 applies to each coal face and drivage where machinery is used to cut mineral. Nothing in this Part applies to the use of a simple coal-cutter where provision is made for efficient wet cutting to minimise the risk of ignitions in the cut.

3 Part 2 applies to all places underground.

Part 1

This Part sets out the requirements relating to each coal face and drivage where machinery is used to cut mineral.

Interpretation

4 'Frictional ignition risk' means the risk of a concentration of firedamp in the explosive range coinciding with an igniting source caused by frictional heat or sparks from cutting picks.

5 'Coal faces' include all longwall and short-wall and bord and pillar operations. 'Drivages' include all narrow workings whether or not in coal seams.

6 'Upstream' and 'downstream' refer to the direction, relative to a place, of the movement of air. 'Upstream' meaning against the direction of movement and towards the source of air reaching that place. 'Downstream' means in the direction of movement of air leaving that place.

The assessment of frictional ignition risk at coal faces and drivages

7 Prior to working any coal face or drivage to which these rules apply, an assessment shall be made by competent person(s) of the frictional ignition risk.

Model Rules

8 The frictional ignition risk assessment shall be directed at determining:

(a) the likelihood of there being an igniting source caused by frictional heat or sparks from cutting picks; and
(b) the likelihood of:

(i) a concentration of firedamp in the explosive range in the cutting zone either at the coal face or the drivage;
(ii) an abnormal level of firedamp (in excess of 1%) reaching the coal face or drivage from another source on the upstream side.

9 Where there is reason to believe that an assessment is no longer valid because of new or changed circumstances, the assessment shall be revised.

Igniting source

10 In relation to paragraph 8(a), the assessment of the likelihood of an igniting source caused by frictional heat or sparks from cutting picks shall include classification of the Incendive Temperature Potential (ITP) of any strata likely to be encountered in the working of the coal face or drivage. The classification shall be made by a person competent to do so and shall, in particular, take into account the percentage of quartz in any relevant strata and the existence of any pyrites.

11 Where relevant strata contains quartz, the ITP should be related to the quartz content as follows:

Rocks containing over 50% quartz - High ITP

Rocks containing 30% to 50% quartz - Medium ITP

Rocks containing under 30% quartz - Low ITP

12 Where relevant strata contains pyrites then an assessment should be made to determine whether its form and presentation qualify it to be assigned either a medium or high ITP. Massive pyrites, strong highly pyritic bands and ironstone with pyrites probably have a medium ITP. Pyritic sandstones or siltstones including siltstone-seatearths should be assigned high ITP. The combination of a high quartz content rock and pyrites, such as pyritic sandstone, is the most incendive type of rock likely to be encountered in coal mines. The relative ITPs of pyrites and related minerals can sometimes be difficult to determine. Doubtful cases should be classified as high ITP.

13 Rocks classified as either medium or high ITP shall be regarded as having the potential to ignite firedamp as a result of the action of cutting picks.

14 Nothing in paragraph 10 shall require an ITP classification to be made if the owner of the mine elects to classify a coal face or drivage as having medium or high ITP for the purposes of a risk assessment.

Model Rules

Firedamp

15 In relation to paragraph 8(b), the assessment of the likelihood of a concentration of firedamp in the explosive range being in the cutting zone either at the coal face or drivage (or of an abnormal level of firedamp in excess of 1% reaching the coal face or drivage) shall be made by a person competent to do so and shall include an evaluation of:

(a) the expected release of firedamp at the face or drivage as a result of mining operations with particular regard to the history of sudden emissions or bleeders;
(b) the minimum quantity and velocity of air required to ensure compliance with statutory ventilation requirements both in the general body of the air and in the cutting zone. The evaluation must include the prevention of the formation of firedamp layering at any point and the prevention of firedamp in the explosive range accumulating near cutting picks. Attention should be paid to firedamp emission from the goaf and in particular at the downstream end of the face;
(c) the need to introduce firedamp drainage to secure compliance with (b) above;
(d) the likelihood of firedamp from the upstream side reaching the face or drivage.

Assessment report

16 The person(s) making the frictional ignition risk assessment shall prepare a written report which shall include:

(a) the methodology of the assessment and the detail of the results;
(b) a statement as to whether or not any hazard was identified and the nature of the hazard;
(c) for any hazard identified, the location of the hazard and any group of employees especially at risk;
(d) the signature(s) of the person(s) who carried out the assessment and the counter-signature of the manager to confirm his agreement with the assessment.

Frictional ignition rules

17 Where the frictional ignition risk assessment determines that the risk exists, preventive and protective measures should be identified and the manager of the mine shall make written rules to reduce the risk of a frictional ignition of firedamp. These frictional ignition rules shall include, as necessary to maintain safety:

(a) a statement of the designated minimum air quantity and velocity at suitably selected locations for the district or drivage including the cutting zone;
(b) a requirement to use portable automatic firedamp detectors at suitable places and, where practical, to use continuous firedamp monitoring systems with automatic electrical cut-off facility to the mineral-winning machine;
(c) the provision of devices or equipment on board any mineral-winning machine to provide a stipulated minimum air flow to the cutting zone. Where such devices are water-powered, the minimum water pressure and flow necessary to achieve the required minimum air flow should be stated and the equipment should give indication to the operator when the minimum pressures and flows are not being attained;
(d) as far as is practical, the provision of interlock devices on mineral-winning machines to prevent operation of the cutting element in the event of a shortfall in the air flow at any local ventilation device or a shortfall in the water pressure or flow where such devices are water-powered;

Model Rules

(e) the type and position of local ventilation devices to be fitted to the mineral-winning machine with details of the minimum water pressure and flow requirements;
(f) the type of picks to be used on the mineral-winning machine which, in the circumstances, are best suited to limit frictional ignition risk;
(g) the provision, where practical, of on-board fire-fighting arrangements on the mineral-winning machine, or the provision of other fire-fighting facilities that are readily available and in close proximity to such a machine at all times;
(h) the type and location of any other device to be used either on any mineral-winning machine or at any strategic points where such a machine might operate, to assist with the dilution of firedamp in or around the cutting zone, eg compressed air venturis, on-board fans, air curtains etc;
(i) the provision of equipment to cut off the electricity supply - installed so as to secure the automatic cut-off of electricity on the coal-face or drivage concerned before a concentration of firedamp from upstream which exceeds 1.25% reaches a source of frictional ignition risk;
(j) the provision of a suitable plan or sketch illustrating and/or tabulating the arrangements, equipment and stipulations referred to in (a) to (i);
(k) a statement of any operational precautions to be taken by any relevant person to reduce the risk of a frictional ignition. This should include the maintenance of the cutting horizon and examination and replacement of blunt, damaged or missing picks;
(l) a statement of the duties of personnel appointed by the manager regarding the planning, organisation, control, monitoring, review and maintenance of the protective and preventive measures introduced to reduce the risk of a frictional ignition;
(m) arrangements which shall be defined to allow any mineral-winning machine to be moved safely to a position where maintenance or repair may be undertaken in safety;
(n) the prohibition of operations where the rules are not properly complied with.

18 Sufficient competent persons shall be appointed to undertake the protective and preventive measures prescribed as a result of the assessment and shall be supplied with a copy of the manager's rules and trained to understand the application of the rules.

Immediate procedures following a frictional ignition incident

19 If an ignition occurs and the flame cannot be readily extinguished, the colliery emergency procedure shall be put into operation forthwith.

20 In addition to the requirements in paragraph 19, in a drivage where a fire cannot be readily extinguished then all persons should be withdrawn and the drivage fenced off. Electrical power should be isolated to all equipment in the drivage. The ventilation of the drivage should be maintained subject to instructions from a senior official who should be the person in charge of the mine if he is readily available.

Model Rules

Notification and investigation of frictional ignition incidents

21 An ignition of firedamp is an incident which is required to be reported to HSE under the Reporting of Injuries, Disease and Dangerous Occurrence Regulations 1985 (RIDDOR). In addition to the investigation normally carried out under RIDDOR by HSE, the manager of the mine shall:

(a) ensure that any person nominated by the owner to be notified of such incidents is informed;
(b) arrange for a competent person to visit the site of the ignition so that rock samples can be taken and a record made of the geological section of the actual location of the incident (or as close as is possible). This person shall:

(i) provide a preliminary geological report based on the record; and
(ii) after the samples have been examined in detail, instrumentally where necessary, prepare a final geological report.

22 The preliminary and final geological reports shall be submitted to the manager of the mine and any other person nominated by the owner to conduct an investigation into the incident.

Part 2

This part sets out the requirements governing the use underground of materials, components and equipment made of light metal or painted or coated with substances containing light metal in metallic form. Light metals should not generally be used below ground except in accordance with the following rules. Paragraphs 24 to 28 relate to the prohibition on the use of light metals and paragraphs 29 to 39 relate to the manner in which the limited use of light metals may be permitted.

Interpretation

23 For the purposes of this Part a light metal is defined as aluminium, magnesium or titanium or alloys which include these metals in such proportions as to exceed the following limits:

(a) total content by weight of the three constituents: 15%;
(b) content by weight of magnesium and titanium together: 6%.

Prohibitions on use

24 Equipment, plant, components, materials or any other item of light metal (including packaging) shall not be used or taken below ground except in accordance with the following paragraphs or Manager's Rules governing its use so as to prevent ignition. Such rules must contain the restriction at paragraph 28.

Fans

25 Auxiliary and booster fans made of light metal or with components made of light metal shall not be used anywhere underground, except that this prohibition does not apply to the internal parts of their electric motors and the internal parts of the cable connections.

Fluid couplings

26 Fluid couplings with casings made of light metal shall not be used anywhere underground except on existing approved diesel-powered vehicles.

Model Rules

Coatings and painting

27 Items of equipment or components shall not be coated or painted with substances containing light metals in metallic form except as provided for by paragraph 30 of these rules.

Restriction at the working face

28 Items of equipment made of light metal or with components or materials made of light metal shall not be used, transported, stored or discarded on, or within 300 metres of a coal face or drivage face unless they are so protected that there is no possibility of friction or impact (or except as provided for by paragraphs 29 to 39 of these rules).

Permitted use

General

29 Particular items of equipment made of light metal, or with components made of light metals which are not specifically prohibited, are permitted anywhere underground subject to paragraph 28 of these rules. Permitted use is restricted to the items described in paragraphs 30 to 39 and shall be in accordance with the associated special conditions.

Electrical equipment

30 Electrical equipment containing specific internal components made of light metal, or painted or coated with substances containing light metal in metallic form, are permitted anywhere underground. These internal components shall not be transported, stored or discarded on, or within 300 metres of a coal face unless they are so supervised or protected that there is no possibility of friction or impact.

Electrical cables with aluminium conductors

31 Electrical cables having conductors of aluminium may be used anywhere underground. When jointing them into cable couplers, precautions shall be taken to avoid friction or impact with the exposed conductors and their associated coupler contact tubes. Any resulting aluminium debris shall be removed from the mine.

Portable equipment

32 The following items of equipment made of light metal may be used anywhere underground subject to the conditions in paragraphs 28 and 33:

(a) anemometers and extension handles;
(b) FLP flameproof electronic flash units for underground photography;
(c) methanometers;
(d) survey instruments and their telescopic legs (excluding levelling staves);
(e) rescue apparatus;
(f) scientific apparatus for sampling, measuring and recording.

Model Rules

33 The conditions of use for equipment identified in paragraph 32 are as follows:

(a) existing items may continue to be used to the end of their useful lives;
(b) new items may be requisitioned only where suitable alternatives that contain no light metal are not available;
(c) where practical, all items should be provided with suitable containers or covering to reduce the risk of friction or impact during transit. They shall be handled with due care to avoid friction or impact and shall not be left unattended on, or within 300 metres of, the working face.

Cylinders of gas for chilled-air equipment

34 Some cylinders used for the transport and storage of refrigeration gases (Freon) are fitted with two valves (one to discharge gas and the other to discharge liquid). Labels fitted to the valves, to identify either gas or liquid may be used anywhere underground provided that the conditions stated in this paragraph are complied with:

(a) cylinders taken underground shall be encased in a wooden case prior to being transported and empty cylinders shall be returned to the surface encased in a wooden case immediately after use;
(b) cylinders stored underground shall be retained in a secure purpose-designed container.

Reflective materials

35 Reflective sheeting and tape with a light metal content may be used anywhere underground provided that:

(a) it is made of suitable material (for example, reflective materials granted acceptance under British Coal's Operations Instructions OI/1 *The use of non-metallic materials and substances*);
(b) it forms part of a notice or sign, or a sighting object used for surveying;
(c) it is reflective tape used to make equipment and hazards more conspicuous;
(d) care is taken to minimise the possibility of friction or impact.

Diesel-powered vehicles

36 Certain older types of diesel-powered locomotives and free-steered vehicles contain components (namely fuel-injection pumps, fluid couplings and governors) with light metal content. These are permitted underground provided they are so installed and used that the possibility of friction or impact is minimised.

37 The external light metal surfaces of crankcases, cylinder blocks and sumps of existing and replacement Gardner engines and the external light metal surfaces of rocker covers and lubricating oil filter bodies of any engine are permitted provided that they have been given two coats of sprayed metallic zinc and two coats of zinc silicate paint applied by a contractor approved by the owner for this purpose and that the coatings are renewed if found to be damaged when the equipment is removed for overhaul.

38 All other external components made of light metal are prohibited.

39 As far as possible engine covers shall be kept securely in position. Dismantled parts of light metal shall be carefully transported in suitable containers and not left in the mine.

Further information

HSE priced and free publications can be viewed online or ordered from www.hse.gov.uk or contact HSE Books, PO Box 1999, Sudbury, Suffolk CO10 2WA Tel: 01787 881165 Fax: 01787 313995. HSE priced publications are also available from bookshops.

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