

THE MINING QUALIFICATIONS BOARD
THE EXAMINATION IN MINING LAW RELATING TO
HEALTH AND SAFETY 2005

Wednesday, 15 June 2005 - 10.00am - 12.30am

SECTION A

(‘Open Book’) - Mining Legislation and its Application

{ **Candidates are allowed to use, for reference, any of the permitted books, copies of Acts, Regulations and Approved Codes of Practice - any of which may be annotated - to answer questions in this Section.**

{ This section carries 60 marks and comprises four (4) questions from which **TWO (2)** should be attempted. All questions carry equal marks.

{ Candidates should note that in answering any question, reference to more than one set of Regulations and any associated ACOP is required.

{ In order to pass the Examination, candidates are required to obtain not less than 50% of the marks in each of Section A and Section B.

Time Allowed: 2 hours 30 minutes

SECTION A

QUESTION A1

A retreat longwall face at a large underground coal mine prematurely ceased production due to deteriorating fault conditions on the face. Production was immediately transferred to a replacement retreat longwall. Ventilation quantities were reduced on the old longwall in order to ensure sufficient ventilation on the new longwall, there being only a single intake and single return airway into the district.

Salvage of the old retreat face eventually commenced some 6 months later, by which time an increasing trend was noticed in carbon monoxide levels in the tailgate. Whilst salvage work continued, preparations were made in both gates for stoppings to be built. Eventually the Mine Manager decided the salvage face should be sealed off as quickly as possible. Both stoppings were progressed with teams working continuously.

Unfortunately, with the stoppings nearing completion, the mine received warning of an impending rapid fall in barometer. A few hours later, the Official supervising the stopping work noticed a significant change in both methane and carbon monoxide levels at the tailgate stopping site. Whilst giving instructions to the workmen to leave the tailgate, there was a sudden blast of “hot air” from the salvage face, through the partly completed stopping. Several men were knocked over by the blast but were uninjured, and there was severe damage to the ventilation doors associated with the air crossing at the tailgate entrance. Visibility was also severely affected. The Official realised that an explosion had occurred. He immediately located the tannoy in order to warn the inbye districts and the Surface Control.

Some 68 men were working inbye of the explosion. All attempted to put on their Filter Self Rescuers. Some had difficulty in doing this, whilst others found it difficult to breathe whilst wearing their self rescuer and became distressed. All were able to travel out safely via the return airway to a point where they could safely access the intake airway, a distance of some 4000 metres for some. Those distressed persons received first aid at this point before being removed from the mine.

Surface Control had initiated the Mine’s Emergency Plan as soon as they were made aware of the circumstances.

In answering the following questions:-

- state precise statutory references to **Regulations** quoted
 - **précis** the main points of the **Regulations** used
 - state the paragraph number of any **Approved Code of Practice (ACOP)** quoted
 - **précis** the content of the **ACOP** paragraph used
- i The Owner has a duty in **Regulations** that no work is carried out at the mine unless a particular “document” has been prepared.

- a) What is this document?
 - b) What should this document demonstrate?
 - c) Given the circumstances arising in the salvage face, what in particular should the document include?

- ii Identify the appropriate **Regulation**, supported by reference to the content of an **ACOP**, that enabled the Manager to employ the number of men who were in the overall District when the explosion occurred.

- iii The Manager thought there may have been several Dangerous Occurrences. What are they?

- iv All persons were eventually able to leave their places of work and find their way to safety, despite poor visibility. Identify **two (2) Regulations** supported by reference to **two (2) ACOPs** which the Manager is required to comply with in order to ensure this can happen.

- v **Regulations** require the Owner/Manager to ensure all persons going below ground have and are able to use equipment to enable them to escape should an explosion occur.
 - a) What is the **Regulation** that places a duty on the Owner to provide suitable equipment to facilitate escape in this instance?
 - b) What is the **ACOP** that provides the Manager with advice when selecting equipment for his particular circumstance?
 - c) Which **Regulation** supported by an **ACOP** places a responsibility on the workman when issued with this equipment?

- vi What do **Regulations** require of the Manager with regard to Barometric Pressure and its effect. Support your answer with an **ACOP** reference.

QUESTION A2

At a coal mine with 2 shafts, both equipped with friction winders, several persons were injured while travelling in a shaft cage. One shaft is normally used for mineral winding and the other for men and materials winding.

Approximately two hours after the start of an afternoon shift, six persons were ascending the men and materials shaft when the onsetter decided to move a locomotive (which had been parked close to the shaft inset) further away as it was obstructing the normal exit route from the shaft.

The locomotive had not moved since the previous afternoon shift. Upon release of the parking brake the locomotive began to move towards the shaft gathering speed, and application of the service brakes did not slow its progress.

Realising what was about to occur, the onsetter panicked, jumped off the locomotive and ran away.

The locomotive smashed through the shaft side barrier and struck the descending cage just as the ascending cage containing the persons came to the surface. The winding engine safety circuit tripped and, almost instantly, the cages became stationary.

The winding engineman and banksman immediately reported the incident to the manager.

Persons in the ascending cage were badly shaken, but they were able to leave the cage with assistance from shaftsmen that had been called to the incident.

Following removal of the locomotive and repairs to the cage and shaft, winding of persons was resumed on the following day, when the Health and Safety Executive were informed of the incident.

As the mineral winding shaft had been used for winding persons after the incident, no disruption was caused and the mine was able to continue working normally.

Subsequent investigations by HM Inspectors revealed amongst other things the following:

- 1) The shaft side barrier (manually operated) had not been closed correctly.
- 2) Barrier “in position” proving switches had been left out of circuit due to intermittent operation following modifications to the brake locking system some two months previously.
- 3) The above modifications were not reported upon.
- 4) Repairs to the compressed air braking system on the locomotive had been

carried out on the day shift preceding the incident.

- 5) The manager's scheme of action, in case of an accident or dangerous occurrence, was not posted in the covered accommodation.
- 6) The rules for the use of auxiliary apparatus provided for persons to gain exit from the mine were only posted in the winding engine house.
- 7) The winding ropes had a 3 year life as specified by the manager and were found undamaged.
- 8) The onsetter had never driven a locomotive before, and when interviewed stated that he operated the locomotive using the isolation/starter key that he found in the control panel.
- 9) The shaft side brake interlock switches had all been omitted from the manager's maintenance scheme for the mine.

In answering question i:

- State precise statutory references to **Acts and Regulations** quoted
 - **Précis** the main points of the **Acts and Regulations** used
 - State the paragraph number of any **Approved Code of Practice (ACOP)** quoted
 - **Précis** the content of the **ACOP** paragraph used
- i** Outline **fourteen (14)** examples of legal requirements of Sections of **Acts** or **Regulations** which have been apparently contravened in this incident, **including six (6)** examples of the content of **Approved Codes of Practice** supporting the above **Regulations**.
- ii** Describe briefly **six (6)** ways of preventing a recurrence of the incident.

QUESTION A3

The development of a new area of reserves at an underground coal mine, in which 500 men work, had led to the redesign of certain roadways in the existing shaft pillar. Key parts of this exercise were:-

- the formation of a new locomotive haulage system in the main return roadway with an outbye manriding station incorporating a run-round loop in the shaft pillar,
- the re-organisation of ventilation in the pit bottom area, and
- the enlargement of existing shaft pillar roadways to service these new requirements.

The Manager and the planning team met to consider the statutory implications of the redevelopment scheme. They reviewed the following factors.

- a) Prior to this installation, rail transport at the mine had been by rope haulage.
- b) The ventilation network was to be re-organised to route all of the intake air to the new working area through a straight length of roadway in the shaft pillar that ran parallel with, and some 30 metres away from, the main return.
- c) The roadways chosen to form the new main intake and return roadways were originally driven in the shaft pillar with a rectangular cross section, 2.5 metres in height by 3.5 metres wide. The sides of these roadways were lined by brickwork over which steel beams had been set for roof support. At this height, it was thought that both roadways required to be made wider to allow sufficient air quantities to pass to workings in the new reserves and also to accommodate the locomotive haulage system.

In answering the following questions:

- state precise statutory references to **Acts** and **Regulations** quoted
 - précis the main points of the **Acts** and **Regulations** used
 - state the paragraph number of any **Approved Code of Practice (ACOP)** quoted
 - précis the content of the **ACOP** paragraph used
- i Identify the content of **eight (8)** parts of **Acts** and/or **Regulations** that should have been taken into account by the management team as they planned the redevelopment scheme, with respect to the installation of the manriding station.
 - ii Identify the content of **two (2)** parts of **Acts** and/or **Regulations** and **one (1)** **ACOP** that should have been taken into account by the management team as they planned the redevelopment scheme, with respect to the ventilation re-organisation
 - iii Identify the content of **nine (9)** **ACOPs** that should have been taken into account by the management team as they planned the redevelopment scheme, with respect to the enlargement of the roadways.
 - iv Near to the outbye manriding station, there was a roadway linking intake and

return that was no longer required. What do **Regulations** specify with regard to the treatment of the roadway as part of this scheme?

QUESTION A4

At a coal mine it is planned to undertake an audit of a recently installed longwall face to ensure that all current requirements with respect to relevant Regulations are complied with. The audit will consider both equipment design and the operational requirements of the system.

The coalface is a modern heavy-duty installation consisting of:

- a) 2000kW power loader equipped with RAC cutting drums.
- b) A 1000mm wide AFC with interlaced head frame powered by 2 x 855kW single speed motors.
- c) A 1200mm wide Stage Loader powered by a single 375 kW motor.
- d) A heavy-duty impact crusher, mounted on the stage loader powered by a single 375kW motor.

All of the coalface equipment is powered from 2 x 4.5 MVa transformers at 3300 volts

In answering the following questions: -

- state precise statutory references to **Regulations** quoted
 - **précis** the main points of the **Regulations** used
 - state the paragraph number of any **Approved Code of Practice (ACOP)** quoted
 - **précis** the content of the **ACOP** paragraph used
- i The construction and operation of coalface equipment powered by 3300 volts is defined by **Regulations**. With respect to the power loader indicate, using specific **Regulations and ACOPs**, what those requirements are.
 - ii Which **Regulation** relates to the frictional ignition risk presented by the power loader when cutting coal? How are the requirements interpreted?
 - iii The stage loader mounted impact crusher unit presents a particularly high risk situation within the working environment of the coalface. Regulations require the employer to carry out particular assessments. Which **Regulations**, supported by **ACOPs**, define the employer's responsibilities with respect to the use of this equipment?
 - iv Which **Regulations** define the steps and procedures that need to be taken, with respect to the dangerous parts of the impact crusher unit, to ensure the suitability of the equipment for use?
 - v List any 5 (five) requirements included in frictional ignition rules associated with the operation of the coalface.

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Wednesday, 15 June 2005 - 2.00pm - 3.30pm

SECTION B

(Closed Book) - 'Mining Legislation'

{ **CANDIDATES ARE NOT PERMITTED TO USE ANY BOOKS OR NOTES IN ANSWERING THIS SECTION.**

{ This Section carries 40 marks and comprises six questions from which **FOUR (4)** should be attempted.

{ **In answering this Section, no reference from the content of any Approved Codes of Practice (ACOPs) is required.**

{ In order to pass the Examination, candidates are required to obtain not less than 50% of the marks in each of Section A and Section B.

Time Allowed: 1 hour 30 minutes

QUESTION B1

In respect of **The Mines and Quarries (Tips) Act 1969** and **The Mines and Quarries (Tips) Regulations 1971**:-

- i What are the requirements of the **Act** regarding the duty of a mine owner to give notification of the beginning or resumption of tipping operations?
- ii What are the requirements of the **Regulations** regarding the duty of the manager to make tipping rules?

QUESTION B2

Part I of the **Health and Safety at Work etc Act 1974** specifies the general duties of employers to persons other than their employees.

- i What are these duties?

The Management and Administration of Safety and Health at Mines Regulations 1993 list the duties of employees at work in a mine.

- ii What are these duties?

QUESTION B3

The Electricity at Work Regulations 1989 specify procedures for the introduction of electrical equipment into mines and restrictions on the use of this equipment.

- i What are the duties of the manager of a mine with respect to the initial introduction of electrical equipment into any underground part of a safety lamp mine? What electrical equipment is excluded from these requirements?
- ii At safety lamp mines containing zones below ground in which firedamp is likely to occur in a sufficient quantity to indicate danger, certain restrictions are placed upon the use of energised electrical equipment in these zones. What are these restrictions?

QUESTION B4

The Coal and Other Mines (Ventilation) Regulations 1956, Part VI, relates to “Ventilating fans below ground”.

- i The manager needs to satisfy himself of two parameters before any auxiliary fan is installed underground. What are these parameters?
- ii
 - a) What must the manager fix with regard to any particular auxiliary fan?
 - b) What arrangements must be put in place by the Manager and Owner?
 - c) State why these arrangements are necessary?
- iii What does the manager need to undertake before two or more auxiliary fans are installed so as to draw air from the same air current?

QUESTION B5

The Coal and Other Safety Lamp Mines (Explosives) Regulations 1993 specify certain requirements with respect to danger zones and the withdrawal of persons.

- i What are these requirements?

The same **Regulations** place restrictions on the drilling and charging of shotholes.

- ii What are these restrictions?

QUESTION B6

The Management and Administration of Safety and Health at Mines Regulations 1993 places a duty on the manager with respect to the installation, inspection and maintenance etc. of plant and equipment.

- i** What specific appointments must be made for suitably qualified and competent persons and what are the requirements for suitable written reports.

The Lifting Operations and Lifting Equipment Regulations (LOLER) 1998 deal with specific hazards/risks associated with lifting equipment and lifting operations.

- ii** What must an employer ensure regarding the **organisation of lifting operations** and what is meant by “lifting operation” in the regulation.