

EXAM PAPER | CERTIFICATE OF COMPETENCE

Mining engineering manager of coal mines other than underground

Examination Date: 2 June 2016

OCM1 – Mining Legislation

This exam consists of only 4 questions
All four (4) questions are to be attempted

Question 1 (20 marks)

In regards to managing risk;

- What is meant by “reasonably practical”? (5 marks)
- What is a duty holder? (5 marks)
- What must a duty holder do in relation to managing risks to health and safety? (5 marks)
- What must a duty holder do if risks to health and safety cannot be eliminated? (5 marks)

Question 2 (40 marks)

As the Mining Engineering Manager of a new open cut mine you are required to develop and implement a Principal Hazard management Plan for Roads or other vehicle operating areas.

Summarise the **key points** in legislation that you would reference to develop and implement the plan. (40 marks)

Question 3 (20 marks)

You are informed by one of your OCE’s on shift that a Health and Safety Representative (HSR) has suddenly told the mining operators over the 2-way to pull up and stop work due to a safety issue.

- When can a HSR direct a worker to cease work? (10 marks)
- The safety issue that the HSR is concerned about is in regards to rough road conditions in a part of the mine where he is driving a truck. What are your actions? (5 marks)
- The HSR requests that the District Union Official attend site to resolve the matter. Is this permitted? (5 marks)

Question 4 (20 marks)

- Who is the regulatory authority for your mine in relation to explosives and shotfiring at an open cut mine? (5 marks)
- A production operator approaches you to enquire about the requirements in becoming a shotfirer at the mine? What are those requirements? (15 marks)

OCM2 – Coal Mining Practice

Only five (5) of the eight (8) questions are to be attempted
Questions 6 & 7 are compulsory

Question 1 (60 marks)

The clean coal stockpile at your mine is being upgraded to introduce underground valves for a new train loadout system. The upgrade works will be carried out by a contractor and will take approximately 6 months to complete.

While the clean coal stockpile is being upgraded, product coal is loaded into the mines 777 haul trucks via a temporary product coal bin and then dumped on a pad before being loaded into road trucks using a 992 loader.

The coal is trucked to a nearby train loader via a public road.

- Describe how you would implement the construction of the valves into your existing operations. (30 marks)
- List the hazards associated with the upgrade and what controls you would use to address those hazards (20 marks)
- What regulatory requirements would you need to consider for this project? (10 marks)

Question 2 (60 marks)

You are the Mining Engineering Manager for a large open cut operation.

The technical services team has forecasted a spike in strip ratio lasting approximately 6 months. Whilst your production fleet can handle the increase in overburden, your blast crew will require extra assistance.

It has been decided to bring in a temporary contracted blasting services contractor onto site to meet blasting demands. Your current blasting operations includes company owned infrastructure (reload facility, magazine, mobile processing units, and delivery augers). You will need to contract 2 extra mobile processing units, 6 shot crew, 1 stemming truck and operator.

- How will you introduce these contractors to your operations? (30 marks)
- What are the hazards associated with this change and how would you control them? (15 marks)
- What regulatory requirements do you need to consider when introducing this change? (15 marks)

Question 3 (60 marks)

The mine drill and blast engineer with limited experience has recently started at your mine. The drill and blast engineer has approached you to check some of his calculations and assumptions for this shot. Show all workings/formulas for calculations.

Blast Parameters:

- ANFO density 0.8t/m³ @ \$700/t
- Heavy ANFO density 1.2t/m³ @ \$1,200/t
- Blast holes 229mm diameter
- Hole Depth 20m
- Subdrill 1.5m
- Burden x Spacing: 6.5m x 7.0m
- Number of holes: 300

Stating all assumptions:

- Calculate charge weight per metre. What is the difference in total charge for 300 holes using ANFO and Heavy ANFO? (20 marks)

- b) What are the advantages and disadvantages of using Heavy ANFO (10 marks)
- c) The shot was designed for ANFO only. It has since rained and you must use Heavy ANFO. What is the difference in the cost of the shot now you have to use Heavy ANFO? (15 marks)
- d) Upon the final check, the shotfirers report to you that the booster count does not add up and it is showing 2 missing boosters. How do you respond? (15 marks)

Question 4 (60 marks)

Your mine has had a recent increase in tyre related incidents including the following:

- Tyre burst under pos 1 due to heat separation
 - Pos 3 tyre and rim coming completely off the hub during operation
 - Smoke coming from Pos 6 requiring emergency response
 - Tyre coming loose from tyre handler, nearly striking a nearby tyre fitter
- a) List the hazards associated with heavy earthmoving tyres and controls to minimise risk (25 marks)
 - b) How would you address the increase in these incidents to prevent reoccurrence (25 marks)
 - c) How would validate the effectiveness of your actions taken to prevent reoccurrence? (10 marks)

Question 5 (60 marks)

You are the Mining Engineering Manager of a large open cut mine operating on a rotating 4 panel, 7 day roster. The mine employs 600 employees and contractors utilising multiple hydraulic face shovels and excavators, large mechanical rear dump trucks and associated ancillary equipment.

The mine is situated in an area within close proximity to numerous rural residents and hobby farmers with a small village located 3km South West of the lease boundary.

- a) Describe the top 5 hazards that the operation imposes on the environment and community and the control measures required to effectively manage these hazards to an acceptable level. (30 marks)
- b) What strategies would you use to engage and educate the mining team employees in managing environmental impacts to the environment and community? (15 marks)
- c) Describe how you would review and validate the effectiveness of controls introduced? (15 marks)

Question 6 (60 marks)

You are the manager of mining engineering at an Open Cut Coal Mine that has recently constructed a 3 GL dam to hold excess mine water that is used to feed the CHPP. This prescribed dam has an offsite water discharge facility built at the base of the 20m earthen dam wall.

Due to a significant rainfall event, the dam is at maximum capacity with more rain forecast. The mine does not have approval to discharge.

You receive a call from the CHPP supervisor advising you that he has observed some water which appears to be piping through the base of the wall adjacent to the discharge facility.

- a) How would you respond and what immediate actions would you take? State your assumptions and key considerations. (20 marks)
- b) Is this incident reportable? (5 marks)
- c) What are the most likely causes of this incident? (15 marks)

- d) What recommendations would you make to prevent a recurrence of this type of incident and how would you ensure their effectiveness? (20 marks)

Question 7 (60 marks)

You are the Mining Engineering Manager of a site that has just purchased a neighbouring mine that was in 'care and maintenance' with no production being undertaken.

Your current site uses hydraulic excavators to mine waste and front end loaders to mine coal. You also have a CHPP and train loading facility on site which are under your control.

The purchase of the neighbouring site included all assets consisting of a large excavator, rear dump trucks, bulldozers, watercarts, graders and drills as well as a CHPP, workshop and other surface infrastructure.

You are expanding your current operations to start up an excavator with associated fleet on the new site. Coal will be washed at the newly purchased washing plant. You are responsible for ensuring all approvals are in place before conducting any mining operations.

- a) List the main approval and notification processes required before conducting production operations (20 marks)
b) What processes do you put in place, before operations begin, to secure and promote the health and safety of persons on site. Include a brief description of each activity (40 marks)

Question 8 (60 marks)

You are the Mining Engineering Manager of a site that has a 1000tph single stage washing plant washing approximately 5Mtpa of Run of Mine coal. The washing plant consists of dense medium cyclones, spirals and froth flotation. Clean coal is handled by using a skyline gantry conveyor and a reclaim tunnel with bulldozers pushing into valves for train loading.

- a) Explain the processing principals for:
i. Dense Medium Cyclones (5 marks)
ii. Spirals (5 marks)
iii. Froth Flotation (5 marks)
b) List 3 controls to control the risk of bulldozer engulfment (10 marks)
c) List 3 controls to control the risk of a fire in the reclaim tunnel (10 marks)
d) List 5 major hazards associated with CHPP's and the controls for each hazard (25 marks)

More information

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Acknowledgments

The mining engineering manager coal mines other than underground examination panel

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