

March 2023 – December 2023

## **Examiners' report**

# Undermanager of underground coal mines

Examiners' report 2023

## **Written examination**

### UB1 - Legislation

#### **Summary of results and general comments**

Exam date: 29 Mar 2023

Number of candidates: 20

Number who passed: 9

Highest mark: 79

Average mark: 57.88

Lowest mark: 38

#### **Question 1 (total of 20 marks) Essential Question**

Highest mark: 18.5

Average mark: 11.85

Lowest mark: 2.5

Examiners' comments: A working understanding of the legislated responsibilities relating to primary duty of care is critical to the function of an undermanager. This question was an essential question, requiring a minimum of 12/20 to pass. 8 of 20 candidates did not meet the required standard to pass this question.

#### **Question 2 (total of 20 marks) Essential Question**

Highest mark: 17.5

Average mark: 11.5

Lowest mark: 2.5

Examiners' comments: This question was for candidates to demonstrate their working knowledge of belt conveyor inspections and maintenance, along with legislated requirements following smouldering of coal. This question was an essential question, requiring a minimum of 12/20 to pass. 6 of 20 candidates did not meet the required standard to pass this question.

### **Question 3 (total of 20 marks)**

Highest mark: 19.5

Average mark: 15.7

Lowest mark: 12

Examiners' comments:

This question was for candidates to demonstrate their working knowledge of the actions to be taken when requirements for air quality and air safety standards are not met. This was answered generally well by the cohort of candidates. All 20 candidates met the required standard to pass this question.

### **Question 4 (total of 20 marks)**

Highest mark: 19

Average mark: 9.89

Lowest mark: 2.5

Examiners' comments:

This question was for candidates to demonstrate their understanding of the prescribed circumstances for when a review of control measures is required to be undertaken, who may request a review to be undertaken, and the responsibilities of mine operators following a review. Undermanagers are involved throughout these processes, and often have direct responsibilities for implementing changes following a review, communicating with work crews, and implementing verification processes relating to changes made following a review of control measures. This question was answered poorly, with 15 of 20 candidates not meeting the required standard to pass this question.

### **Question 5 (total of 20 marks)**

Highest mark: 14

Average mark: 8.93

Lowest mark: 4.5

Examiners' comments:

This question was for candidates to demonstrate their understanding of the statutory functions of certain roles, with an emphasis on health and safety representatives and their respective powers and functions under WHS legislation. Health and safety representatives (HSR's) must be consulted with regarding a range of legislated requirements. Industry leading Undermanagers consult with HSR's regularly, invite them to accompany them in incident investigations, and respond efficiently to matters raised on behalf of the HSR's workgroup. This question was answered poorly, with 16 of 20 candidates not meeting the required standard to pass this question.

## UB2 – Mine ventilation

### Summary of results and general comments

Exam date: 29 Mar 2023

Number of candidates: 20

Number who passed: 10

Highest mark: 146

Average mark: 111.13

Lowest mark: 72

### Question 1 (total of 100 marks)

Highest mark: 75

Average mark: 60.35

Lowest mark: 40

Examiners' comments:

This exam format has been established for several years. Candidates who generally pass the ventilation exam can demonstrate a logical thought process, evidence of preparations i.e. having completed multiple ventilation plans in the lead up to the exam, and are clear in their assumptions and explanations in response to questions. The questions have not changed significantly in this time; however, examiners continue to see similar mistakes made by candidates which will be listed below:

#### *Comments for Q1a: Calculations:*

- Poor assumptions regarding calculations of tonnes, i.e. assuming 90% LW tonnes, 10% development tonnes. This does not demonstrate how the question has been read, understood, and responded to.
- Not considering rider seams in their gas make assumptions. It is not by accident that question referred to a 3m working section of a 9m thick coal seam, yet majority of candidates did not consider the influence of additional gas make that the ventilation network would be impacted by during longwall mining and goaf caving.
- Gas drainage was not considered by several candidates, and thus calculated above legal limits of CH<sub>4</sub>. It is reasonable to assume a gas drainage efficiency rate of 'x%' and include this upfront in their calculations. On this note, it is recommended that candidates do not impose a blanket '50%' or '75%' efficiency rate of gas drainage without relevant content supporting these assumptions.

**General:**

- Not including a legend on the mine plan
- Having a ventilation efficiency of 80% on a mine plan that is **significantly restricted** due to poor mine design. Candidates must demonstrate how they will address these issues, and not simply accept the mine plan for what it is, again, it is no accident the mine plan is designed to be challenging.
- 15 of 20 candidates achieved <12/20 relating to the locations and type of required atmospheric monitoring. Whilst 10/20 candidates passed the exam overall, the fact majority of candidates did not identify the requirement of face monitoring, tube bundle monitoring, or main fan monitoring is concerning.

**Excerpt from examiner's notes marking Q1(b):**

- *Incorrect symbols used at times, very basic layout*
- *Missing regulators & VCD's*
- *Missing a lot of information relating to the question*
- *Regulator has both intake and return reporting to it?*
- *Limited returns, blocked off bleeder, no legend*

**Question 2 (total of 70 marks)**

Highest mark: 50

Average mark: 32.25

Lowest mark: 10

Examiners' comments:

17 of 20 candidates achieved <60% in this question. Candidates need to understand that this question is worth 70 marks, which equates to 35% of the **overall** ventilation exam mark. The following excerpt from examiners' notes clearly demonstrate that the cohort of candidates in 2023 did not meet the required standard relating to ventilation knowledge, and appropriate controls to be implemented to manage the relevant hazards in the question.

***Excerpt from examiner's notes marking Q2(a):***

- *Candidate identified the need for additional ventilation shafts, and use of balance chambers, however overall, very limited content in this answer.*
- *Motherhood statements, very little detail with what controls would be implemented.*
- *Candidate clearly prioritised time on Q1*
- *Not enough in the answer to demonstrate competency from the perspective of an Undermanager.*
- *General concepts, few relating to the question. No mention of booster fans, high velocities, fan shafts required etc.*

### Question 3 (total of 30 marks) Essential Question

Highest mark: 26

Average mark: 18.53

Lowest mark: 10

Examiners' comments:

This question was broken into several categories relating to recirculation. What causes it, what actions the deputy should take, and what actions an Undermanager should take. 10 of 20 candidates did not meet the 21/30 pass mark for this question. Whilst knowledge of recirculation is generally well understood, candidates who performed poorly in this question:

- Did not clearly articulate what actions the deputy should take in the first instance – with 6 of 20 candidates not identifying that the deputy should have completed a ventilation survey **before** attempting to fix the problem.
- 5 of 20 candidates did not utilise resources such as an Outbye deputy to assist with investigating the cause of the problem.

It is critical that Undermanager's **first understand** the issues that are reported to them **before** attempting to solve the problem.

## MB3 – Coal mining practices

### Summary of results and general comments

Exam date: 30 Mar 2023

Number of candidates: 16

Number who passed: 13

Highest mark: 91.5

Average mark: 74.09

Lowest mark: 41.5

### Question 1 (total of 20 marks)

Highest mark: 20

Average mark: 13.1

Lowest mark: 6.5

Examiners' comments:

11 of 16 attempted this question, with 7 of 11 achieving >60% of available marks. Undermanager's are often requested to lead projects at a site level, and an understanding of high risk activities requirements, explosive licencing requirements and trained and appointed shotfirers were critical elements in this question.

### **Question 2 (total of 20 marks)**

Highest mark: 19.5

Average mark: 11.94

Lowest mark: 7

Examiners' comments:

9 of 16 attempted this question, with 3 of 9 achieving >60% of available marks. Undermanager candidates who are not familiar with using polymeric chemical products and phenolic foam for strata consolidation are strongly encouraged to seek to expand their knowledge in this area.

### **Question 3 (total of 20 marks)**

Highest mark: 17

Average mark: 11.9

Lowest mark: 6

Examiners' comments:

10 of 16 attempted this question, with 5 of 10 achieving >60% of available marks. A working knowledge of gas drainage plans, in both development and longwall mining is crucial to the role of an Undermanager. Candidates who performed well in this question could articulate a sound understanding of the influence geological structures can have relating to gas management, combined with an overall understanding of how gas drainage plans are developed.

### **Question 4 (total of 20 marks)**

Highest mark: 18.5

Average mark: 13.92

Lowest mark: 6

Examiners' comments:

6 of 16 attempted this question, with 5 of 6 achieving >60% of available marks. This question related to spontaneous combustion risk controls and technical understanding of gas mixtures. Overall, this question relates to a working knowledge of gas drainage plans, in both development and longwall mining is crucial to the role of an Undermanager. Candidates who performed well in this question could articulate a sound understanding.

### **Question 5 (total of 20 marks)**

Highest mark: 20

Average mark: 15.43

Lowest mark: 11

Examiners' comments:

15 of 16 attempted this question, with 13 of 15 achieving >60% of available marks. This question was relating to on-shift management of resources and incident investigation processes. Overall, this question was answered well by majority of candidates.

### **Question 6 (total of 20 marks) Essential Question**

Highest mark: 20

Average mark: 16.66

Lowest mark: 10

Examiners' comments:

16 of 16 attempted this question, with 15 of 16 achieving >60% of available marks. This question was essential under the blueprinting framework and related to frictional ignition. Overall, this question was answered well by majority of candidates.

### **Question 7 (total of 20 marks)**

Highest mark: 18

Average mark: 13.75

Lowest mark: 6

Examiners' comments:

12 of 16 attempted this question, with 9 of 12 achieving >60% of available marks. This question was essential under the blueprinting framework and related to frictional ignition. Overall, this question was answered well by majority of candidates.

### **Question 8 (total of 20 marks)**

Highest mark: 17

Average mark: 11.5

Lowest mark: 9.5

Examiners' comments:

5 of 16 attempted this question, with 2 of 5 achieving >60% of available marks. This question related to incident investigation on shift as an Undermanager, along with pro-active action plans to be put in place to prevent future reoccurrence of this incident. Scene preservation is a legislated requirement for notifiable incidents. The scene can be disturbed under strict prescribed circumstances.

## **Oral examination**

Date: 5 Jun 2023

Number of candidates: 14

Number deemed competent: 5

Examiners' comments:

The pass rate was a little over 1/3 of eligible candidates, at 35.7%

Candidates who were successful demonstrated the required technical and practical knowledge to perform the statutory functions of an Undermanager.

Candidates who were not successful demonstrated some or all the following:

***Inadequate benchmarking of mines***

If candidates are going to visit a mine to prepare for the exam, they **must** be able to explain the following:

- What the core hazards are at that mine
- How the mine controls those hazards
- What their learnings were from the visit
- Examiners appreciate the fact that candidates go to great lengths to arrange mine visits, and plans can change at the last minute. However, candidates should arrive **prepared** with an agenda of what they want to learn from the visit, and not leave the burden of responsibility on the hosting mine to address this.

***Poorly structured responses***

- 'Clutching at straws' is not a proven and successful strategy when responding to a deteriorating situation. If a candidate hears themselves respond with words to the effect of 'I will turn all the power off, and this will notify the crews that something is wrong, so they will know they need to contact control', candidates are reminded that when responding to situations that warrant the assessment of power underground, localised or whole of mine withdrawal - priorities should be determined, explained, instructed and verified **before** moving to the next stages of their respective action plan. Simply 'turning off power' may seem like a logical response, however candidates may inadvertently cause the situation to deteriorate further as a consequence if done prematurely.
- When an examiner suggests some steps have been missed in determining the problem, it is strongly recommended candidates stop and regroup their thoughts. Often times such as this, it is followed by the comment 'this is not a trick question' to re-assure candidates that there is a genuine gap in their response.
- There is no negative association with saying 'I would like to go back to 'x' part of the question, I should have addressed a, b, c. However, keep in mind – if the examiner prompting the candidate to determine a, and b, then ultimately c – whilst candidates may have said responses that broadly resemble an appropriate answer, candidates need to understand that examiners cannot deem them competent in a particular area if they are excessively prompting for candidates to respond in the way they did. Examiner's will prompt candidates where necessary.
- When examiners refer to a 'structured approach' there is no simple 'right' response to this. Any given scenario will have overlapping elements which can and should be applied in a structured way. For example, candidates are encouraged to:

- **Understand** the scenario – ask follow up questions if necessary, however going back and forth excessively with examiners in a perceived attempt to 'run the clock out' will not benefit the candidate. There are competencies which are being assessed in all questions, and if there is no time left to assess those competencies, then the candidate will be deemed not yet competent. It is worth mentioning again that examiners are not 'trying to catch you out', so when an examiner says words to the effect of "all inspections have been completed or, the main fan is running with no defects, monitoring in the return is normal background levels, so what else should be assessed?" that asking several follow up questions relating to the status of the main fan information is unnecessary.

### ***Emergency Management***

- Candidates need to understand that when there *is* an emergency, they **must** declare an emergency. The Undermanager is the statutory supervisor responsible for the mine on their respective shift and should not look to outsource decisions on when to declare an emergency.
- Candidates may or may not be on surface when an emergency is triggered, however the Undermanager has resources at their disposal – control room operators, Outbye deputies, mobile plant, possibly more. Use them to control the situation.
- Establish priorities, identify resources, and focus efforts where they need to be in the first instance. Majority of candidates who were deemed not yet competent were hesitant to declare an emergency and prioritise what actions must be taken in the first instance.
- When a candidate is hesitant to declare an emergency, this demonstrates to the examiners that they are not ready to perform the statutory function of the role and their associated non-technical skills are deemed not yet competent.
- Candidates are reminded that in accordance with the mine sub plan, any rescue related response at a mine-site is under the direction of the NSW police force.

### ***Pre-empting what examiners 'want' to hear***

- When a candidate says words to the effect of "I know you like hearing things like" or "I know I am supposed to say" is evident of a candidate's preparation involving 'trying to appease the examiners'. The oral exam is not about the examiners, it is about the candidate.
- Candidates are reminded that all examiners have sat on their side of the exam table, undergone appropriate preparation and have sound situational awareness of what candidates are experiencing during the exam.

- Exam questions are not guessing games. If a candidate responds with several options that are plausible to address a scenario, this in of itself is not an appropriate answer. For example, if a development panel has an increase in gas make when approaching an in seam borehole, and panel ventilation has remained constant, it is *likely* that this was not caused by an outbye roof fall in the main return. It is appropriate to 'brainstorm' out loud some potential causes of a scenario like this, however simply saying 3 or 4 ways that gas can build up in a development panel is not 'the answer'.
- Candidates are strongly recommended to seek mentorship from candidates who are familiar with the examination process in recent years. Examiners are not trying to 'catch them out' in their response like has been suggested over the years. Some mentors in industry refer to their exams in which examiners would continue to ask candidates 'are you sure you would do that' or 'let's get back on production, we'll fix that later' in an attempt to see if candidates will 'stick to their answer'. This does not happen anymore. Candidates need to stop reading into the question as if there is a hidden 'needle in the haystack' somewhere and examiners are rubbing their hands together to see if the candidate will identify it whilst intentionally asking questions to deter candidates from their process. If candidates are asked 'what else should be considered' it is because there are elements of the scenario that have *not yet considered*, not that the candidate is necessarily on the wrong path.
- Examiners are volunteers in the examination process and take great pride in deeming a candidate as competent to perform the statutory function of an Undermanager. All examiners are familiar with the effort involved in preparing appropriately for an exam, and more often than not – candidates who are deemed competent are confident on the day of the exam and have a logical and practical process for decision making. That said, if candidates appear unsure, sporadic in their responses, talking over examiners when the question is being explained, rushing, not using resources at their disposal, or not understanding what resources are at their disposal, then the result will *likely* be not yet competent.

## Post Oral examination

Date: 6 Dec 2023

Number of candidates: 6

Number deemed competent: 2

Examiners' comments:

As per the above comments, however the following is of particular importance to those candidates who were deemed not yet competent in the post oral:

### *Candidates will be asked:*

- What have you done to prepare since your last exam, and how have you incorporated any feedback into your preparation for today?

- This is the candidate's opportunity to demonstrate *maturity (leadership)* in the exam approach, by explaining how they *sought feedback (consult), reflected (analysed data)* on their previous exam, and *developed a plan* to 'overcome' any real or perceived defects in their approach previously. These concepts are not surprisingly related to the competency framework ANTS – associated non-technical skills.
- The opening question is designed for candidates to demonstrate all the above and overcome any initial nerves by talking about what *they've done*. No-one else in the exam room can explain this better than them. Candidates should take the opportunity to explain to the examiners how they are better prepared for today's exam than they were previously.
- With all of the above said – it is disappointing when a candidate explains the feedback received from the first exam was that they lacked a structured approach and have focussed on addressing this issue in preparation for the post oral, and then continue to respond sporadically throughout the exam in the hopes that 'there is a good answer in there somewhere'. This approach has not increased a candidates success rate in the past, and it will not work into the future either.

This report should assist to better prepare candidates in understanding the process and repeated issues the exam panel is faced with. Candidates are reminded that the examiners do not require perfect answers. They require answers that are coherent and contain a minimum amount of items, as per the marking criteria, to demonstrate competence.

## More information

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## Acknowledgments

Undermanager of underground coal mines examination panel

© State of New South Wales through Regional NSW 2023. The information contained in this publication is based on knowledge and understanding at the time of writing March 2023. However, because of advances in knowledge, users are reminded of the need to ensure that the information upon which they rely is up to date and to check the currency of the information with the appropriate officer of the Regional NSW or the user's independent adviser.

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