

# EXAMINER'S REPORT

## Electrical engineering manager of underground coal mines certificate of competence

July – October 2019

### Written examination

#### Summary of results and general comments

Examination date:	24 July 2019
Number candidates:	5
Number who passed:	3
Highest overall mark:	90.83 %
Average overall mark:	77.52 %
Lowest overall mark:	61.59 %

#### General Comments

The results of the written were mixed throughout both papers. Candidate should review the comments against their results for each question to see where they can develop.

## CEE1 – Application of electrical engineering to mining

### Summary of results and general comments

Exam date:	24 July 2019
Number of candidates:	5
Number who passed:	4
Highest mark:	90.83 %
Average mark:	76.33 %
Lowest mark:	57.5 %

#### Question 1 (total of 10 marks)

Highest mark:	10
Average mark:	7.9
Lowest mark:	6.5

##### Examiner's comments

Candidates generally focused on identifying administrative controls, not engineering controls. Some candidates struggled to develop an investigation plan to identify the voltage.

The electric shock question was generally handled well by candidates.

#### Question 2 (total of 10 marks)

Highest mark:	10
Average mark:	8.1
Lowest mark:	6

##### Examiner's comments

Answered well. Most candidates did not mention how to document arrangements between energy authority in HVMP or EECF.

#### Question 3 (total of 10 marks)

Highest mark:	10
Average mark:	9.4

Lowest mark: 8

**Examiner's comments**

A number of candidates didn't identify the 'Contractor Management Plan' or show understanding of its functions.

Equipment acceptance to site was handled reasonably well.

**Question 4 (total of 10 marks)**

Highest mark: 10

Average mark: 6.6

Lowest mark: 4

**Examiner's comments**

Answered well. Some candidates did not interpret the log scale correctly. The key objectives as listed in standard were not well known.

**Question 5 (total of 10 marks)**

Highest mark: 10

Average mark: 8.3

Lowest mark: 4.5

**Examiner's comments**

Overall the question was answered well.

**Question 6 (total of 10 marks)**

Highest mark: 10

Average mark: 5.5

Lowest mark: 0.5

**Examiner's comments**

Mixed results for a question that involved calculations. Some got all sections correct, others confused MVA and MW in their calculations.

## CEE2 – Legislation and standards applicable to underground coal mines

### Summary of results and general comments

Exam date:	24 July 2019
Number of candidates:	2
Number who passed:	0
Highest mark:	57.92 %
Average mark:	54.58 %
Lowest mark:	51.25 %

#### Question 1 (total of 10 marks)

Highest mark:	7
Average mark:	6.25
Lowest mark:	5.5

##### Examiner's comments

Insufficient knowledge of AS1674.2 and the classification of welding environments.

#### Question 2 (total of 10 marks)

Highest mark:	4
Average mark:	2
Lowest mark:	3

##### Examiner's comments

Poor knowledge of the detailed requirements for the electrical engineering control plan.

#### Question 3 (total of 10 marks)

Highest mark:	6
Average mark:	3.5
Lowest mark:	1

**Examiner's comments**

Key principles of the standard were not well understood.

Understanding the principles of explosion protected electrical equipment, including intrinsic safety, is key to the role of electrical engineering manager in an underground mine.

**Question 4 (total of 10 marks)**

Highest mark: 6

Average mark: 5.5

Lowest mark: 5

**Examiner's comments**

Managing the purchase of significant electrical plant should follow a structured process regardless of the type of plant. Candidates failed to recognise all opportunities to ensure safe plant at each of the lifecycle stages.

**Question 5 (total of 10 marks)**

Highest mark: 6

Average mark: 4

Lowest mark: 2

**Examiner's comments**

Identifying the key attributes of mining cable design is still not handled well across all candidates. Electrical engineering managers are routinely required to make decisions on the types and attributes of cables to be used in underground situations.

**Question 6 (total of 10 marks)**

Highest mark: 6

Average mark: 5.75

Lowest mark: 5.5

**Examiner's comments**

AS2290.3 is a standard which falls into the must know and understand category.

Average results across the candidates.

**Question 7 (total of 10 marks)**

Highest mark: 6

Average mark: 5.75

Lowest mark: 5.5

**Examiner's comments**

Simple question straight out of the Regulations.

**Question 8 (total of 10 marks)**

Highest mark: 7

Average mark: 6

Lowest mark: 5

**Examiner's comments**

Most candidates identified the Safety File in question (a), however there was only a basic knowledge of the contents.

**Question 9 (total of 10 marks)**

Highest mark: 6

Average mark: 6

Lowest mark: 6

**Examiner's comments**

This question on Exe equipment was handled reasonably well across the candidates but very few understood what glands were required.

**Question 10 (total of 10 marks)**

Highest mark: 7.5

Average mark: 5.75

Lowest mark: 4

**Examiner's comments**

The flameproof equipment standard should be well understood by electrical engineering managers for underground coal mines.

**Question 11 (total of 10 marks)**

Highest mark: 9

Average mark: 8.5

Lowest mark: 8

**Examiner's comments**

Generally, well answered.

**Question 12 (total of 10 marks)**

Highest mark: 6

Average mark: 5.5

Lowest mark: 5

**Examiner's comments**

Candidates generally focused on describing what lifecycle management was rather than identifying potential hazards associated with the introduction of the batteries and at what point in the 'lifecycle' they should be addressed.

Candidates should also answer questions in an engineering manner and not make general comments about ensuring it is safe.

**Oral examination**

Date: 17 October 2019

Number of candidates: 5

Number deemed competent: 2

**General comments**

For the oral examination the examiners asked four questions:

The first question involved reviewing a series of photographs of electrical installations. The candidates were asked to identify potential hazards they saw as the electrical engineering manager. All candidates were able to identify obvious visible hazards and non-conformances. However most struggled to recognise these as visual cues for significant underlying engineering issues that may pose a risk to workers.

The second question involved a scenario based on an expansion project that was taking place at a mine that you had recently been employed at as the electrical engineering manager. The expansion was in relation to infrastructure upgrades to the office block, maintenance workshop and bath house and included the installation of a VSD pump to maintain water pressure and the installation of a large UPS. The examiners were looking at the candidates' approach to assuring themselves that the project risks had been identified and treatment plans were in place. All candidates acknowledged the design risk assessment, power system and scope of work. However, some candidates struggled to acknowledge all the tools available to them for tracking and auditing the project plan and addressing issues associated with the VSD and UPS.

The third question involved the recent electric shock incidents involving test equipment that were reported in the weekly summary updates. The question involved, the candidates previously reviewing the incidents and what they would do as the electrical engineering manager to review and develop their systems to complete similar tasks. All candidates reported that they received the weekly summaries and gave responses. A percentage of the candidates answered the question from a lower level. They did not structure a response from an electrical engineering managers' perspective. Some answered this question with a structured approach and to a satisfactory level.

The fourth question asked the candidates about reporting certain types of incidents from the photograph used in question one. The question developed into asking the differences between reporting incidents under WHS (MPS) Regulation 2014 under clause 128 v clause 179. Overall this question was answered by all candidates to a satisfactory level.

## Overall

The results of the oral exams were generally a reflection of the written exam results, with many candidates failing to demonstrate a structured approach to addressing the scenarios presented or display a sound understanding of key engineering principles associated with electrical protection and earthing.

Candidates presenting for the oral exam should review their written exam results, identify and address any areas of weakness. When responding to questions, candidates should pitch their responses as an electrical engineering manager and not as a tradesperson.

## More information

NSW Department of Planning, Industry and Environment

Resources Regulator

T: 4063 6461

Email: [mca@planning.nsw.gov.au](mailto:mca@planning.nsw.gov.au)



## Acknowledgments

### Electrical engineering manager of underground coal mines examination panel

© State of New South Wales through the NSW Department of Planning, Industry and Environment 2019.

This publication is copyright. You may download, display, print and reproduce this material in an unaltered form only (retaining this notice) for your personal use or for non-commercial use within your organisation. To copy, adapt, publish, distribute or commercialise any of this publication you will need to seek permission from the NSW Department of Planning, Industry and Environment.

Disclaimer: The information contained in this publication is based on knowledge and understanding at the time of writing (December 2019). However, because of advances in knowledge, users are reminded of the need to ensure that information upon which they rely is up to date and to check currency of the information with the appropriate officer of the NSW Department of Planning, Industry and Environment or the user's independent advisor.

DOC19/928066