



## EXAMINATION REPORT | CERTIFICATE OF COMPETENCE

# Mine Mechanical Engineer

16 February 2015

*Examination panel report for exam held on 21 August 2014*

### Summary of results and general comments

	Total candidates	Underground candidates	Surface candidates
Number applied	22	15	7
Number approved	22	15	7

#### Overall comments:

- Candidates are not using the ten minutes of reading time wisely. An opportunity to highlight the important elements within the questions is not being used, therefore the items of importance within the question are not being answered fully.
- Hand writing and answer eligibility are becoming a real issue. Far too much of the examiners time is being use to try and interpret what is written down.
- Candidates need to be aware there answers need to reflect the role for which they are being examined on i.e. "Manager of Mechanical Engineering".

### Written examination

#### Data

Location: Kurri Kurri TAFE	Total candidates	Underground candidates	Surface candidates
Date: 21 August	21	14	7

#### Examination Papers:

- CME1 Underground Mechanical practices
- CME2 Underground legislation
- CME3 Surface Coal Mechanical practices

### Results

	Passed	Highest Mark	Average Mark
CME1	6	205.5 marks	174 marks
CME2	10	82 marks	69 marks
CME3	7	160.5marks	140.5 marks

## CME1 Underground mechanical practices

CME1 paper required five out of eight questions to be answered. Q1 to Q4 were compulsory with the remaining question to be selected from Q5 to Q8. All questions are worth a total of sixty marks.

### Question 1 - Compulsory

#### Comments:

Question 1 involved the process to undertake repairs to a major conveyor structure which has sustained damage to a gantry leg. Candidates were asked a series of questions as to how they intend on managing the repairs, firstly in the short term, then through to completion.

The situation was made more complex with the structure being vital to the operation with the repair process not causing an impact to the operation

Candidates were also asked to provide engineering controls to help prevent further contact of the gantry legs by the push dozer

#### Recommendations:

Candidates need to be able to develop short term and long term strategies when undertaking non-scheduled works.

A short term plan would be undertake temporary repairs/works so as to return the structure back into service coupled by a long term plan to make schedule repairs together with engineering controls to prevent a reoccurrence.

CME1	Highest mark	Lowest mark	Average mark
Question 1	43	26	34.5

### Question 2 - compulsory

#### Comments:

This question asked candidates to manage the recoding of the mines diesel fleet. To add complexity to the situation the original equipment manufacturers (OEM) of two of the mines diesel fleet are no longer in business.

#### Recommendations:

Candidates need to understand the requirements of having a diesel engine system (DES) recoded, together with the requirements for a recognised service facility (RSF) to be able to undertake the recoding for all the different diesel fleet in use at the mine.

A facility review by a mines representative before commencement of works would be a must.

CME1	Highest mark	Lowest mark	Average mark
Question 2	48	20	33

### Question 3 - compulsory

#### Comments:

A series of short questions (twelve in all) around different elements in use on a friction winder.

This question looked at rope construction for the different applications within the system, types of rope attachments, factor of safety for newly install guide ropes, discard criteria for a guide rope, methods of guide rope anchoring and tensioning, and areas within the shaft which would led to a reduction rope life expectancy. In general this question was not well answered

#### Recommendations:

Candidates require a good (and improved) general understanding of the basic components, uses and procedures for the safe operation of a friction winder.

CME1	Highest mark	Lowest mark	Average mark
Question 3	37	15.5	27.5

#### Question 4 - compulsory

##### Comments:

Question 4 required the candidates to provide short answers and an example for twenty abbreviations/acronyms.

This question is designed to test the candidate's general mechanical/ mining industry knowledge.

##### Recommendations:

Candidates need to develop a sound general knowledge base as part of their study program and gain more experience.

CME1	Highest mark	Lowest mark	Average mark
Question 4	48.5	22	38

#### Question 5 – elective

Attempted by two candidates

##### Comments:

Candidates were provided with a scenario to replace a section of fixed guide within the shaft. This required the candidate to identify a list of foreseeable hazards, develop a series of risk controls from the identified hazards and develop a plan to complete the works

##### Recommendations:

Candidates require a good understand of hazard identification and risk management as part of their study program.

CME1	Highest mark	Lowest mark	Average mark
Question 5	40	30	35

#### Question 6 – elective

Attempted by seven candidates

##### Comments:

Candidates were provided with a scenario to replace a structural cross member at the top to the run of mine (ROM) bin, this scenario involved hot works.

Candidates were required to identify a list of foreseeable hazards for the hot works and list of control measures for the hazards identified.

##### Recommendations:

Candidates require a good understand of hazard identification and risk management as part of their study program.

CME1	Highest mark	Lowest mark	Average mark
Question 6	60	30	44

**Question 7 – elective**

Attempted by four candidates

**Comments:**

Candidates were asked to list five types of condition monitoring process which can be effectively used on plant and equipment operating at the mine, together with examples of use as well as their advantages and limitations.

**Recommendations:**

Candidates need a sound knowledge of the types of predictive maintenance tools available, together with the advantages and limits of use.

CME1	Highest mark	Lowest mark	Average mark
Question 7	48	35	41

**Question 8 – elective**

Attempted by one candidate

**Comments:**

Candidates were provided with a scenario of a contract drill installing a bore hole, remote from the mining operation for the purpose of dewatering the longwall goafs.

An equipment list was provided and candidates were asked to list the major hazards and risks associated with each piece of plant listed, together with qualifications needed to operate plant.

**Recommendations:**

Candidates need to familiarise themselves with the requirements of managing a project off site and remote from the coal operation.

**CME2 Underground legislation**

All questions were to be attempted and all were worth a total of twenty marks. Open book

**Question 1****Comments:**

Candidates were asked a series of questions around their understanding of WH&S Reg 2011 CL 36 "Hierarchy of control".

**Recommendations:**

Candidates need to understand the application of the of CL 36 "Hierarchy of control".

CME2	Highest mark	Lowest mark	Average mark
Question 1	18	8	14.5

**Question 2****Comments:**

Candidates were asked a series of questions around their understanding of WH&S Reg 2011 CL 214 "Powered mobile plant - general control of risks".

**Recommendations:**

Candidates need to understand the application of the of CL 214 "Powered mobile plant - general control of risks".

CME2	Highest mark	Lowest mark	Average mark
Question 2	20	0	16

### Question 3

**Comments:**

Candidates were asked a series of questions around their understanding of CMH&S Reg 2006 CL 20 "Mechanical Engineering Management Plan".

**Recommendations:**

Candidates need to understand the application of the of CL 20 "Mechanical Engineering Management Plan".

CME2	Highest mark	Lowest mark	Average mark
Question 3	17	4	12.5

### Question 4

**Comments:**

Candidates were asked a series of questions around their understanding of CMH&S Reg 2006 CL 66 "Aluminium or light alloy".

**Recommendations:**

Candidates need to understand the application of the CMH&S Reg 2006 CL 66 "Aluminium or light alloy".

CME2	Highest mark	Lowest mark	Average mark
Question 4	17	7	13

### Question 5

**Comments:**

Candidates were asked a series of questions around there understanding of Gazettal No 24 dated 2 February 2007 "Requirement for design registration of powered winding systems"

**Recommendations:**

Candidates need to understand how Gazettal's form part of the legislative process and possess the ability to interpret the requirements from the document.

CME2	Highest mark	Lowest mark	Average mark
Question 5	18	6.5	13

## CME3 Surface coal mechanical practices

CME3 contained two parts; Part A was open book while Part B was closed book. Each question was worth 25 marks. Part A contained questions 1 through to 3. Part B contained questions 4 through to 8.

### Part A: Open Book

#### Question 1

**Comments:**

Candidates were asked a series of questions around there understanding of WH&S Reg 2011 CL 36 "Hierarchy of control".

**Recommendations:**

Candidates need to understand the application of the of CL 36 "Hierarchy of control".

CME3	Highest mark	Lowest mark	Average mark
Question 1	25	20	22.5

## Question 2

### Comments:

Candidates were asked a series of questions around their understanding of WH&S Reg 2011 CL 214 "Powered mobile plant - general control of risks".

### Recommendations:

Candidates need to understand the application of the of CL 214 "Powered mobile plant - general control of risks".

CME3 Part A	Highest mark	Lowest mark	Average mark
Question 2	20	20	20

## Question 3

### Comments:

Candidates were asked a series of questions around their understanding of CMH&S Reg 2006 CL 20 "Mechanical Engineering Management Plan".

### Recommendations:

Candidates need to understand the application of the of CL 20 "Mechanical Engineering Management Plan".

CME3 Part A	Highest mark	Lowest mark	Average mark
Question 3	19	14	16.5

## Part B: Closed Book

### Question 4

#### Comments:

Question 4 was an incident whereby a crane had collapsed during a lift. The causal factors around the crane collapse were failed ground conditions. The collapsed crane boom landed in close proximity to a coal scan.

#### Recommendations:

Candidates need a good understanding of the process for incident investigation, the gathering of evidence to determine mode or modes of failure, as well as the identification of major hazards.

Candidates need the ability to identify hazardous materials and how to safely handle them. In this question the coal scan uses a radioactive isotope to determine ash content of coal.

This question was answered quite well

CME3 Part B	Highest mark	Lowest mark	Average mark
Question 4	17.5	16.5	17

### Question 5

#### Comments:

This question was taken from MDG 15 section 3.7 "Fire control systems".

#### Recommendations:

MDG's form a reference base for sound engineering and control systems. Candidates need to be well versed in the applicable of such MDG's.

This question was not answered as well as expected.

CME3 Part B	Highest mark	Lowest mark	Average mark
Question 5	13	8	10.5

### Question 6

#### Comments:

Question 6 involved the process to undertake repairs to a major conveyor structure which has sustained damage to a gantry leg. Candidates were asked a series of questions as to how they intend on managing the repairs, firstly in the short term, then through to completion.

The situation was made more complex with the structure being vital to the operation with the repair process not causing an impact to the operation.

Candidates were also asked to provide engineering controls to help prevent further contact of the gantry legs by the push dozer.

#### Recommendations:

Candidates need to be able to develop a short term and long term strategies when undertaking non-scheduled works.

A short term plan would be undertake temporary repairs/works so as to return the structure back into service coupled by a long term plans to make schedule repairs together with engineering controls to prevent a reoccurrence.

CME3 Part B	Highest mark	Lowest mark	Average mark
Question 6	23	13	18

### Question 7

#### Comments:

Question 7 required the candidates to provide short answers and an example for 10 abbreviations/acronyms

This question is designed to test the candidate's general mechanical/ mining industry knowledge.

#### Recommendations:

Candidates need to develop a sound general knowledge base as part of their study program and gain more experience.

CME3 Part B	Highest mark	Lowest mark	Average mark
Question 7	15	10	12.5

### Question 8

#### Comments:

Candidates were asked to reproduce a JSA they would expect to see from the persons replacing the damaged roofing material to the mines maintenance workshop; together with a list of competencies/licences for those undertaking the repair works.

#### Recommendations:

Candidates need be familiar with the JSA process; together with any competencies/ licenses which are needed to undertake the specific works. Examples of competencies/ licenses include MEWP licences and mobile crane licences.

CME3 Part B	Highest mark	Lowest mark	Average mark
Question 8	20	4	12

## Oral examination

### Underground

Date	Candidates eligible	Candidates examined	Deemed Competent
7 November 2014	16	8	1

### Surface Operations

Date	Candidates eligible	Candidates examined	Deemed Competent
4 November 2014	8	7	4

## Oral examination: Areas of discussion

### Underground Topics

- Written examination review 1st candidates
- Roles of MME
- Competencies of trade persons
- Safety Alert SA14-03
- Fluid power isolation
- Incident investigation (shaft sinking winder)

### Surface Topics

- Written examination review 1st candidates
- Roles of MME
- Competencies of trade persons
- Drag line ropes
- Safety bulletin SB 10-04
- Incident investigation IIR14-04

## Overall comments

### Underground

General observation was that candidates came to the exam reasonably prepared. Time management is still an issue; this is evident in the unfinished work and scrappy hand writing towards the end of the written exam. Candidates must develop time management skills and must manage their time wisely.

The overall result of candidates being awarded a certificate of competence was disappointing with one of the eight candidates interviewed deemed competent. More work is required by the candidates before attempting the oral process.

### Surface

Again, surface candidates come to the exam reasonably prepared and again time management appears to be a major problem, this was also evident in the unfinished work and scrappy hand writing towards the end of the written exam. Candidates must develop time management skills and must manage their time wisely.

The overall result of candidates being awarded a certificate of competence was quite encouraging with four of the seven candidates interviewed deemed competent.

## More information

Business Processes & Authorisations

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## Acknowledgments

Mine Mechanical Engineer Examination Panel

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