2013 Examination Panel report for Mine Electrical Engineer certificate of competence

APPLICATIONS

Number applied: 9	**Number approved: 8**
Overall comments:	

The underground candidates need to have a better overall practical understanding of the ventilation systems and necessary controls as the primary mitigation of explosions.

Candidates should have experience and understanding of ventilation systems, gas management and be able to provide the necessary electrical engineering controls that are used when these systems are under capacity. Eg when an exemption is required when % of methane at commencement of the hazardous zone cannot be maintained as per regulations.

Candidates did not demonstrate a set process for the given scenarios that were practical, as well as providing a scatter gun approach by using known references such as Broad Brush, Risk Assessment, Hierarchy of controls etc.

Candidates were unable to apply the practical principles to the questions, application of the words from standards or regulations

Candidates did not demonstrate knowledge of the required terminology such as Certificates of Conformity versus MDA approvals

Candidates appear to be telling us what they think we want hear rather than the process they would follow from their practical experience at their respective sites. Such an example is restoration of power procedures utilised at their sites

Candidates did not fully understand all the requirements that a Manager of Electrical Engineering / QEE would face at a variety of sites and the types of equipment or environment they may face i.e. Gas, Flameproof Equipment, Draglines, Electric Drive mobile plant etc.

The examiners explore areas during the oral where they think the candidate has had minimum experience or exposure, eg those that work at mine with no gas will be expected to know about challenges engineers face at very gassy mine. Those working at small surface mines, how the role changes at large surface mines.

Candidates are still having problems understanding the earthing requirements for mobile generators and the reasons behind these systems. Ref ESS 014 *Technical principle for the use of stand-alone generators*

Confidence was lacking in the knowledge of the required legislation and Australian Standards in relation to the specific requirements for the ongoing day to day functions of the mine. Such an example is the use of only qualified electrical tradespersons or engineers to undertake electrical work.

Candidates did not understand the reference to the management structure in their responsibilities as far as understanding the situation and how to approach the task at end. I.e. having to actually go to site, after all avenues are exhausted, and lead the fault finding process in a professional manner to the sites standards. Site standards were not part of the initial process or thoughts at the start of the scenario.

WRITTEN EXAMINATION

Date/s:	7 March 2013
Number of candidates examined:	4 (2 candidates sat CEE1 and all 4 candidates sat CEE2)
Passed: CEE 1	1 of 2
Passed: CEE 2	2 of 4
Total marks: CEE 1	60
Total marks: CEE 2	120
Lowest mark CEE1:	34 out of 60
Lowest mark CEE2:	63.5 out of 120
Highest mark CEE1:	44 out of 60
Highest mark CEE2:	75.5 out of 120
Average mark CEE1:	38.75 out of 60 (64.5 %)
Average mark CEE2:	75.5 out of 120 (63 %)
Post written:	3 candidates were on the 2nd attempt - 1 passed CEE1, (2 had passed from Aug 2012) 2 passed CEE2, 1 failed CEE2 1 candidate was 1st attempt and failed both
Examination Papers: 3	
CEE1 - Application of Electrical Engineering to Mining	
CEE2 - Legislation and Standards applicable to Underground Coal Mines	
CEE3 Legislation and Standards applicable to Surface Coal Mines	
Overall comments:	
No candidates applied to sit CEE3 this round	

General Statistics

Underground Candidates (Papers CEE1 & CEE2)	
Number of candidates examined:	4
Number of candidates that passed:	2
Number of candidates that received partial pass:	0 - this round

Surface (Paper CEE3)	
Number of candidates examined:	0
Number of candidates that passed:	0
Number of candidates that received partial pass:	0

PAPER CEE1 statistics

Paper CEE1 is marked out of:	60
Minimum mark obtained:	34
Maximum mark obtained:	44
Average mark obtained:	38.75
Mark required to receive a pass:	36

Breakdown of questions

Question 1 is marked out of:	10
Minimum mark obtained:	5
Maximum mark obtained:	8
Average mark obtained:	6.5

Comments from Examiners

This was a new question and reasonably well answered. One area that was missing was a Design Review once a Risk Assessment had been completed.

Question 2 is marked out of:	10
Minimum mark obtained:	6.5
Maximum mark obtained:	7.5
Average mark obtained:	7

Comments from Examiners

Question answered resonably well however the requirements for management of protection settings still not “ingrained”.

Question 3 is marked out of:	10
Minimum mark obtained:	4
Maximum mark obtained:	4.5
Average mark obtained:	4.25

Comments from Examiners

This situation comes from a real life mine. The question was poorly answered.
For example –

- Candidates stated a Tool Box Talk should be developed without saying what would be included in the Tool Box Talk.
- No candidate said Review Electrical Engineer Management Plan.
- No candidate said that an exemption may have been an option to continue to use the cable. Again this was a real situation a few years ago.

Question 4 is marked out of:	10
Minimum mark obtained:	7.5
Maximum mark obtained:	10
Average mark obtained:	8.75

Comments from Examiners

The examination table was not well answered. Candiates should know this standard as the starting point of their maintance scheme.
The bolt hole repair was answered well.

Question 5 is marked out of:	10
Minimum mark obtained:	5
Maximum mark obtained:	9
Average mark obtained:	7

Comments from Examiners

A reasonable understanding of cable design has been displayed. There is still doubt to the “first Principles”.

Question 6 is marked out of:	10
Minimum mark obtained:	0
Maximum mark obtained:	5
Average mark obtained:	2.5

Comments from Examiners

Candidates who understood the concept of how power factor and its correction methods work did well.

Not all questions were answered in the format asked and therefore the correct answers were not given.

PAPER CEE2 statistics

Paper CEE2 is marked out of:	120. (100%)
Minimum mark obtained:	63.5
Maximum mark obtained:	75.5
Average mark obtained:	69.25
Mark required to receive a pass:	72

Breakdown of questions

Question 1 is marked out of:	10
Minimum mark obtained:	6
Maximum mark obtained:	8
Average mark obtained:	7.25

Comments from Examiners

Most of the applicants showed some of the details required for Cable Management but very few stated “Cable Management Standards”.
Limited understanding of the need to “review & Audit” process.

Question 2 is marked out of:	10
Minimum mark obtained:	5.5
Maximum mark obtained:	9
Average mark obtained:	7.63

Comments from Examiners

Reasonable understanding shown. Most did not direct the answer to “Contractor Management Plan” or “Acceptance to Site of Equipment”.
Most people were able to show a flow chart process. Mop.

Question 3 is marked out of:	10
Minimum mark obtained:	7.5
Maximum mark obtained:	10
Average mark obtained:	8.38

Comments from Examiners

Candidates provided requirements for hazardous zones, not steps towards establishing requirements.

Question 4 is marked out of:	10
Minimum mark obtained:	3
Maximum mark obtained:	6
Average mark obtained:	3.88

Comments from Examiners

The question was not answered well with most not achieving a pass mark for the question. Candidates should have a sound understanding of AS/NZS3800 so they can manage explosion protected plant throughtout its life cycle. This includes being able to assess it; a workshop is capable of providing a quality overhaul by understand what a workshop must have.

Question 5 is marked out of:	10
Minimum mark obtained:	6
Maximum mark obtained:	9
Average mark obtained:	8

Comments from Examiners

- Candidates appear to be spending more time understanding requirements of AS2081.
- No caniddate understood the importance of the restriction on maximum trip time for E/C fault, namely to prevent live pins being exposed when disconnecting a plug.

Question 6 is marked out of:	10
Minimum mark obtained:	3.5
Maximum mark obtained:	5
Average mark obtained:	4.25

Comments from Examiners

Candidates failed to understand the requirements of AS3010, AS3000, AS3007 and EES014 and didn't relate their answers back to these standards.

Question 7 is marked out of:	10
Minimum mark obtained:	3
Maximum mark obtained:	4.5
Average mark obtained:	2.63

Comments from Examiners

Candidates did not provide the level of detail of 1674.2 and AS3000 in regards to the electrical requirements/environmental conditions for the welding application described.

Question 8 is marked out of:	10
Minimum mark obtained:	1
Maximum mark obtained:	4
Average mark obtained:	2.63

Comments from Examiners

It would appear that no candidates have spent time familiarising themselves with the Code of Practice.

Question 9 is marked out of:	10
Minimum mark obtained:	4
Maximum mark obtained:	6.5
Average mark obtained:	4.75

Comments from Examiners

Candidates failed to relate to the specific requirements of AS4242, MDG15 and AS3000.

Question 10 is marked out of:	10
Minimum mark obtained:	0.5
Maximum mark obtained:	7.5
Average mark obtained:	4.25

Comments from Examiners

Most people did not have a good understanding of Exe Design but they did generally show some details in the design outcomes.

Question 11 is marked out of:	10
Minimum mark obtained:	6
Maximum mark obtained:	8
Average mark obtained:	6.88

Comments from Examiners

This was a confusing question and not well explained.

Most people had answers which showed they had an understanding but no real detail explained.

Question 12 is marked out of:	10
Minimum mark obtained:	7
Maximum mark obtained:	8.5
Average mark obtained:	7.88

Comments from Examiners

A number of candidates did not fully consider the information in the table when giving their answers. Correct answers were given for the wrong reeason.

ORAL EXAMINATION

Date/s:	23 May & 7 June 2013
Number of candidates:	13 (8/UG + 5/S) eligible to sit exams
Number of candidates examined:	7 (4/UG +3/S)
Post Orals examined:	5 - 3/U + 2/S (of 11 eligible)
Passed:	0

Overall comments:
NB: 7 candidates were examined. 6 other eligible candidates (1/1st, 3/2nd & 2/3rd attempt) did not take the opportunity to be examined.

It was intended that each candidate would be asked the four questions. In most cases this occurred.

Analysis of Questions topics on which candidates were not yet competent

Topic Examined During Orals
Note: all the oral question are based on events or issues Managers of Electrical Engineering have or are currently facing

All orals were opened with the examiners introducing themselves and the candidate giving a brief update of their role and what they had done since the passing or the last oral

Underground

Scenario 1: As manager of electrical engineering, you have been told that due to mining constraints previously encounter during development, when the Longwall reaches the zero mark in 6 weeks time. The Longwall transformer and Hydraulic pumps will be within the Hazardous Zone. Walk the examiner through what you would do as the MEE. The examiners where looking for: Who would be involved, how it would be managed, what options were available, what risks would be encountered and how they would be managed.	
Scenario 2: As manager of electrical engineering you have been advised by a motor rewind repair shop that a 150 kw motor that you currently have in for overhaul has some non conformities to the old MDA approval. There where 4 other motors of the same type currently in use underground in hazardous zones The examiners where looking for: How the candidate would address the issue, who would be involved, what options where available and how it would be managed both short and long term	
Scenario 3: As manager of electrical engineering, you have received a call at 3 am from a 4th year apprentice that there had been a power trip to 5 km overhead line. He was the only electrical person there at the mine as all other electrical trades had phoned in sick. The examiners where looking for: How they would manage this situation. What the 4th apprentice could and could not do, as per the regulations. Testing of the over head power line. Management of the situation	

Scenario 4: As manager of electrical engineering, your managers has informed you of trails he would like to conduct underground of a small remote control loader to clean under conveyor belts. The examiners where looking for: Standards, Intro to site, Management on non ex equipment	

Surface Mines	
Scenario 1: As Qualified Electrical Engineer, the mine was conducting a shut down on an electric face shovel and the on board auxiliary generator had failed. The only available generator was a 500 KVA 'mine approved' from a local hire company The examiners where looking for: Type of earthing, earthing arrangements, introduction to site and what was involved and checks required. Protection setting and integration, standards to be referenced	
Scenario 2: As Qualified Electrical Engineer conducting welding operations at your mine what processes and systems would you require to be implemented for the safe operation and ongoing repairs of the equipment. The examiners where looking for: Management of welders, assessment of inspection companies, introduction to site practices, standards to be referenced.	
Scenario 3: As Qualified electrical engineer, you have received a call at 3 am from a 4th year apprentice that there had been a power trip to 5 km overhead line. He was the only electrical person there at the mine as all other electrical trades had phoned in sick. The examiners where looking for: How they would manage this situation. What the 4th apprentice could and could not do, as per the regulations. Testing of the over head power line. Management of the situation	
Scenario 4: As Qualified Electrical Engineer how would you manage the requirements for Truck Out loading bins in relation to the electrical safety of the control systems The examiners where looking for: Scene investigation, reporting and to what part of the regulations and timeframes. Investigation area, commissioning and follow up with whom, commissioning and documentation requirements, reference to previous safety alerts and recommendations from those being addressed	

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