Ventilation Officers or Mine Managers?
Who should Ultimately be Responsible for Mine Ventilation? A Comparison between Western Australia and Queensland

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ABSTRACT
There is still debate about who should ultimately be responsible for the ventilation system in an underground mine. The Queensland Coal Mining Safety and Health Regulation 2001, states that a dedicated ventilation officer is the person, while Western Australian Mines Safety and Inspection Regulation 1995 states that it is the mine manager who is responsible; the ventilation officer acts as the manager’s principal ventilation advisor. This paper outlines a comparison between both approaches.

INTRODUCTION
The ventilation officer is a statutory position in all underground mines in Western Australia and in all coal mines in Queensland. However, the responsibilities of this officer differ in each of these states. In Western Australia, the person is only responsible for doing surveys, updating ventilation plans, maintaining instruments, selecting and positioning auxiliary fans and ventilation control devices (VCD) and reporting any ventilation issues to the manager. The main ventilation aspect, primary ventilation design, is the responsibility of the mine manager. In this role, the ventilation officer acts as the principal advisor to the mine manager.

In Queensland coal mines, the ventilation officer is directly responsible for all ventilation aspects including primary ventilation design. A comparison between these two approaches is discussed in this paper.

QUALIFICATIONS OF VENTILATION OFFICERS IN WESTERN AUSTRALIA AND QUEENSLAND
A comparison between statutory qualification of ventilation officers in Western Australian mines and Queensland coal mines is summarised in Table 1. Ventilation officers in Western Australia are not required to have a certificate, whilst their counterparts in Queensland are. In practice, ventilation officer positions in Western Australian mines are often held by graduate mining engineers since mine ventilation is a substantial component of a Bachelor of Mining Engineering, whilst in Queensland coal mines this is not the case as graduate mining engineers cannot hold this position without having a ventilation officer certificate. The Queensland approach is the right one as mine ventilation is usually undertaken in the third year of the Bachelor of Mining Engineering curriculum, and unless the students do their final year research project on mine ventilation, they usually have forgotten many of its applied aspects by the time they complete their degree.

RESPONSIBILITIES OF VENTILATION OFFICERS IN WESTERN AUSTRALIA AND QUEENSLAND
A comparison between statutory responsibilities of ventilation officers in Western Australian and Queensland coal mines is summarised in Table 2. It shows that ventilation officers in Queensland Coal are responsible for all ventilation aspects, including the main ones:
- ensuring adequate ventilation
- primary ventilation design
- establishing ventilation standards.

<table>
<thead>
<tr>
<th>Western Australia</th>
<th>Queensland Coal</th>
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<tbody>
<tr>
<td>The person must hold a diploma or degree in which mine ventilation is a substantial component of the curriculum; or a qualification considered by the state mining engineer to be adequate for the mine.</td>
<td>The person has competencies recognised by the committee as appropriate for the duties and responsibilities for the position (Ventilation Officer Certificate).</td>
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TABLE 2
Statutory responsibilities of a ventilation officer in Western Australia and Queensland.

<table>
<thead>
<tr>
<th>Western Australia</th>
<th>Queensland Coal</th>
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<tr>
<td>Conducting primary ventilation survey (quantity, gas, temperatures, fan quantity and pressure, every three months.)</td>
<td>Conducting primary ventilation survey every month.</td>
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<tr>
<td>Conducting primary ventilation survey immediately after any substantial changes in the primary ventilation system, and if requested by an inspector.</td>
<td>Conducting primary ventilation survey immediately before and after any change and if it is deemed necessary depending on the circumstances at the mine and if it is requested by an inspector.</td>
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<tr>
<td>Maintaining and calibrating all ventilation instruments.</td>
<td>Implementing the mine ventilation system.</td>
</tr>
<tr>
<td>Selecting and positioning auxiliary fans and ventilation control devices (VCD).</td>
<td>Establishing ventilation standards.</td>
</tr>
<tr>
<td>Updating ventilation plans every three months.</td>
<td>Ensuring adequate ventilation for the mine.</td>
</tr>
<tr>
<td>Reporting promptly any ventilation issues to the mine manager.</td>
<td>Taking charge of any changes to the ventilation system.</td>
</tr>
<tr>
<td>Updating ventilation log book.</td>
<td>Ensuring that all ventilation control devices are properly constructed and maintained.</td>
</tr>
<tr>
<td>Regularly conducting ventilation survey in active working areas (many mines translate this as secondary survey, i.e. survey in development headings and drawpoints, and generally do this every month).</td>
<td>Recording surface barometric pressure.</td>
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<td></td>
<td>Recording air quantity for each working face during each working shift.</td>
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<tr>
<td></td>
<td>Positioning gas monitoring equipment.</td>
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<td></td>
<td>Setting gas alarm levels.</td>
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<td></td>
<td>Setting main, booster, and auxiliary fans.</td>
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<tr>
<td></td>
<td>Avoiding recirculation in auxiliary and scrubber fans.</td>
</tr>
</tbody>
</table>

In Western Australia these responsibilities remain with the mine manager.

In terms of conducting a primary ventilation survey, the three-monthly interval in the Western Australia regulation is due to the fact that it is practically impossible to conduct the survey on a monthly basis in an underground metalliferous mine due to the typically large size of the mine. It has to be noted that there have been no underground coal mines in Western Australia since the closure of mines in Collie in 1994. However, the regulation is valid for both metalliferous and coal mines.

Due to the absence of underground coal mines in Western Australia, measuring surface barometric pressure is not a regulatory requirement. Most of the metalliferous mines in Western Australia use the sublevel open stoping method, which does not have a goaf. However, with the increasing number of metalliferous mines using the block or sublevel caving method, this will be required in the future should these mines have significant amounts of pyritic minerals in their caved materials. There have been a few spontaneous combustion events in caving metalliferous mines, such as in Freeport Indonesia’s DOZ mine (Loomis et al, 2008). These incidents involved high levels of pyritic minerals in their caved materials.

Both regulations require a primary survey to be conducted after each change in the ventilation system and/or if it is requested by a mine inspector. Both also require the ventilation officer to look after VCD construction and maintenance.

The Queensland regulation does not require the ventilation officer to maintain and calibrate all ventilation instruments, but the person normally does this as part of their job.

In terms of establishing ventilation standards, although the Western Australia regulation states that this is the responsibility of the mine manager, the ventilation officer generally does this job on behalf of the mine manager.

The Western Australia regulation requires each underground mine to have a ventilation log book. This book contains survey reports, instrument calibration reports, ventilation plans, mine inspector inspection reports and all ventilation related memos such as change of VCD setting, auxiliary fan moves and installation, etc. This is not a requirement in the Queensland regulation. The log book is a good system to record any changes that happen in a mine ventilation system and should be adopted in all underground mines in the world.

THE REASON FOR FUNDAMENTAL CHANGES IN ROLE AND RESPONSIBILITIES OF THE VENTILATION OFFICER IN QUEENSLAND COAL MINES

Fundamental changes in the role and responsibilities of the ventilation officer in Queensland coal mines happened as a result of a recommendation in the report from the warden’s inquiry on the explosion at Moura No 2 Mine on 7 August 1994 (Windridge, 1996). Eleven miners lost their lives in that explosion. This explosion was the third to occur in the Moura district within 20 years. The first occurred at the Kianga Mine on 20 September 1975, with 13 miners losing their lives. The second occurred on 16 July 1986, at Moura No 4 Mine, with 12 miners losing their lives. The third explosion meant that 36 miners had lost their lives within 20 years in the Moura district.

The report summarises the role of the ventilation officer as follows:

Although a person with the title ‘Ventilation and Fire Officer’ was appointed at Moura No.2, he did not have an overriding responsibility, under the manager, for the mine ventilation system. Rather, the role of ventilation officer appears to have been one of taking statutory measurements, keeping records, and little else.

The provision and maintenance of good ventilation is vital to the safety of underground coal mines and there must be a system in place to secure it. We believe that an essential requirement to that objective is to have a person who is in
charge of ventilation at a mine and is directly responsible to the manager for the provision, maintenance, monitoring and control of ventilation.

Subsequently, the report makes the following recommendation on the role of the ventilation officer:

It is recommended that a position of ventilation officer be established as a statutory position at all underground coal mines. The ventilation officer appointed must have demonstrated competencies appropriate to the duties and responsibilities of the position and would be directly responsible to the mine manager for the planning, design and implementation of the mine ventilation system and for the establishment of effective standard of ventilation for the mine, methods for its control and protection, monitoring of performance, reporting procedures, maintenance of ventilation records and plans, and emergency action plans.

The mine manager may be the appointed ventilation officer. Otherwise, if the ventilation officer has other duties, they would be subordinate to those of ventilation officer.

The report also summarizes the certification of statutory roles:

As demonstrated repeatedly in evidence, it should not be taken for granted that a statutory certificate of competency to practise as a mine manager, undermanager or deputy carries an assurance that the person possessing it is maintaining, and where necessary developing, the original knowledge base required for the appointment.

It is recommended, therefore, that the procedures for granting statutory certificates for underground coal mining and the conditions under which they are awarded, be reviewed. In particular, it is recommended that certificates not be granted for life and that a system needs to be developed and put into effect as soon as practicable that requires certificate holders to demonstrate their fitness to retain the certificate of competency on a regular basis, at intervals of not less than three and not more than five years.

The process should aim to ensure that certificate holders maintain a sound knowledge base on, and keep abreast of, technical developments in coal mining and most particularly those relevant to coal mine safety.

Some of these recommendations, such as establishing the ventilation officer as a statutory position in all underground coal mines and the responsibilities of this position, were then accommodated in the Queensland Coal Mining Safety and Health Act 1999, and the Queensland Coal Mining Safety and Health Regulation 2001. However, currently the Ventilation Officer Certificate is still granted for life and therefore there is scope for the implementation of a continuing professional development system to be implemented that would ensure ventilation officers remain current with leading practice in all aspects of mine ventilation. Attendance at and participation in relevant professional society conferences and industry seminars could be part if this.

WHO SHOULD ULTIMATELY BE RESPONSIBLE?

The main issue with the Queensland coal approach is that ventilation officers generally do not have the authority to make major decisions such as approving budget and expenditures, and signing off standards. In addition to this, the Queensland Coal Mining Safety and Health Act 1999, states that the ventilation officer is exposed to a penalty of two years of imprisonment if any person dies or suffers grievous bodily harm as a result of inadequate ventilation and a penalty of three years imprisonment if multiple deaths occur as a result of inadequate ventilation. This is unfair to ventilation officers. The legislation allows them to be made the ‘fall guy’ in the event of any ventilation incidents/disasters.

In Western Australia, the mine manager is the one who is responsible of ensuring adequate ventilation. This is the right approach as mine managers have the authority to make major decisions.

CONCLUSIONS

The Queensland Coal Safety and Health Ventilation Regulation is arguably the best in the industry because of comprehensive standards contained in it such as VCD ratings, stonedusting procedure, explosion risk zone (ERZ) inspection procedure, sealing notification and ventilation change protocols, tube bundle, gas chromatograph, principal hazard management plans, etc. However, there is room for improvement. The responsibilities of a ventilation officer should be reviewed as the regulation is over ten years old.

It is not surprising that while the legislation allows ventilation officers to be made the ‘fall guy’ in the event of any ventilation incidents/disasters, not many qualified people are interested in taking this position. As new mines are deeper and gassier than before, this issue is becoming more and more acute. Revision of the responsibilities of a ventilation officer should help address this issue.

REFERENCES


