

The impact of changing employment and mining practices on the mine ventilation profession in Australia

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ABSTRACT:

The ventilation profession in Australia is at something of a crossroads. The changing nature of the mining industry nationally and globally poses numerous challenges for the profession in its role as the “repository” of ventilation knowledge and experience. However, underground mines will continue to need to be ventilated, and in fact in many respects will need to be ventilated to a higher standard than in the past. The factors and trends identified in this paper therefore provide both threats and opportunities for the profession and are changing the way ventilation services are delivered in Australia. Whilst there will remain a need for both “GP” and specialist ventilation practitioners, it is likely that the number of experienced “GP” ventilation professionals will diminish, but the number of specialist “niche” players will increase.

1 INTRODUCTION

Major changes have occurred in Australia over the past 20 years with respect to employment practices of both technical staff, such as mine ventilation practitioners, and underground workers. Some of these changes include: downsizing of the workforce, outsourcing of technical skills away from the mine site itself, FIFO (fly in, fly out) and “back to back” rosters, abandonment of centralised technical services at corporate headquarters, the trend away from prescriptive mining legislation (with specific underground mine ventilation standards) to more general legislation based on “duty of care”, removal of legislative requirements for formal “ticketing” of ventilation staff, the difficulty of attracting high-quality school leavers into the mining industry, the development of “global” mining companies, often with head offices in overseas countries, the trend to less variety in mining methods (away from the wide range of selective, high cost, high labour methods to a narrower range of bulk, lower cost, more capital intensive methods), changes in professional indemnity insurance costs and availability, a more “blurred” demarcation between ventilation professionals and occupational hygienists, safety professionals and others, the trend to the use of mining contractors (rather than companies having their own operating workforce), the loss of “status” of the pro-

profession to other technical groups and the growth of underground civil engineering activities as major sub-surface projects in their own right. Each of these developments is having a significant effect on an overall re-shaping of the nature of mine ventilation profession in Australia. This paper lists these factors, discusses the impact they are having on the industry and the profession, and examines the likely future impact on the profession in Australia, and by implication, the potential impact on other Western countries. Note that many of these factors “overlap” or have several impacts, so that there is no easy “classification” or “ordering” of factors.

2 MINING REGULATION IN AUSTRALIA

The Commonwealth of Australia is an independent nation of just over 20 million people with a historically very strong mining industry. It has a land surface the same size as that of the continental USA and over 35 000 km of coastline. There are six states and two mainland territories in Australia, all of which have some mining activity. Mines are regulated at the State/Territory (not Federal) level, under state not federal legislation, using state and not federal inspectors.

3 CHANGING STYLE OF LEGISLATION

There are now three styles of legislation in Australia, depending on the industry and the State.

- *Conventional prescriptive legislation*: in which detailed regulations prescribe how a mining activity is to occur.
- *Duty of care legislation*: where the outcome is prescribed, but the method of achieving that outcome is left to the mining company. In some States, there is now no specific mining legislation at all, with mines being covered under the same safety legislation as other industrial workplaces.
- *Hybrid legislation*: either a mix of prescription and duty of care, or a combination of duty of care with officially approved guidelines or codes of practice, which helps companies avoid the need to develop procedures for all activities.

There has been a variable response to the “duty of care” style of legislation. Larger mining companies tend to welcome the legislation as giving them more flexibility over their operations. The expense of developing the required operating procedures using risk assessment techniques can often be spread over multiple operations. Smaller mining companies find the loss of prescriptive regulations imposes a heavy burden on them in terms of having to develop their own standards for a great variety of procedures.

With “duty of care” legislation, ventilation professionals can no longer rely on meeting specific and detailed government regulations to demonstrate that the mine is adequately ventilated. The “burden of proof” moves from the Government to the mine owner. Ventilation professionals must therefore now be much more competent in conducting or participating in risk assessments to a recognised standard, documenting procedures, and auditing against those procedures than in the past. In addition, they must be better informed about what would constitute “good practice” within the industry as this is often the most appropriate defence against negligence.

Another impact of this new style of legislation is that government mining inspectors are now more like technical auditors rather than traditional “inspectors”. Government audits tend to be done by an audit team of inspectors, each with their own specialist area, rather than an individual “GP” inspector. This means when inspectors are on site, they are more likely to want to discuss the “big picture” ventilation issues as to how and why the company has developed the procedure that it uses to control the ventilation risks, rather than review historical records of sometimes tedious regulations.

As a further example of the trend away from industry-specific legislation, the role of the mining warden has generally been replaced by that of the State Coroner. Rather than a Warden’s inquiry being held into major mining disasters, it is now more likely for this to occur via a Coronial inquiry.

4 LOSS OF STATUTORY POSITION OF VENTILATION OFFICER

In the past, each jurisdiction required each mine to have an on-site ventilation officer who had responsibility for mine ventilation. This was a statutory appointment, i.e. the ventilation officer had to be personally approved by the Government Inspectorate and issued with a statutory appointment letter. This is still the case in the coal mining operations in Queensland and NSW and the metal mining operations in Western Australia, but there are no statutory requirements for ventilation staff for other mining operations in Australia. In many mines, this has left a vacuum in terms of both the need for any ventilation staff at the mine site, and the qualifications for those staff. Frequently, the individual now responsible for ventilation at many metal mines is also responsible for one or more other areas, such as pumping and drainage, or other “services” work.

5 DEVELOPMENT OF PORTABLE QUALIFICATIONS

The development by the Australian Government of an Australian Qualifications Framework (AQF) covering all education and accreditation standards from high school to PhD level, and the development of Career paths and National Competency Standards, means that it is now much easier to train to a recognised standard and to transfer skills around Australia. In the past, a person with a “statutory” Mine Manager’s Ticket or statutory Ventilation officer’s ticket would need to sit for sometimes extensive practical and oral examinations when transferring from one state to another. The development of the AQF and the adoption of nationally accredited (and recognised) competency standards has reduced the “barriers to entry” for qualified staff in terms of moving between States. However, as most jurisdictions (except coal) do not require a ventilation officer to be appointed for each mine (even a part-time ventilation officer), nor specify the qualifications of the ventilation officer, there is no formal requirement at this time for ventilation professionals to meet these National competency standards.

6 INTERNAL COMPANY STANDARDS AND THE “QUALITY ASSURANCE” TREND

Most of the larger mining companies in Australia now have their own internal standards for mine ventilation. In the coal industry, the development of “major hazard plans” for certain key risks is required as part of the legislation. This has tended, in some instances, to remove the need for discretion or the

need to develop “tailored” procedures at each mine site, reducing the need for the number and skill level of ventilation staff.

7 FLY-IN, FLY-OUT (FIFO) AND “BACK TO BACK” ROSTERS

Even mines that do have a ventilation officer may not always have access to that person. This is often the case with fly-in, fly-out (FIFO) operations. Some staff positions in FIFO operations are considered to be critical, so that when one person is “away”, their colleague is on site (termed “back to back” rosters). This would include surveyors, geologists and others associated with the production process. However, ventilation staff in non-coal operations are often considered to be non-critical, so that when the ventilation officer is “away”, there is no-one available to provide ventilation guidance. This has particular significance when it comes to emergency situations such as fires. Many FIFO operations in Australia have re-written their procedures so that the ventilation officer does not have a formal role in the event of an underground fire, as there is not always a ventilation officer on site. In our opinion, this is a significant flaw and a retrograde step.

8 THE REDUCED INFLUENCE OF THE MINING INDUSTRY

Twenty years ago, the resources (mining and related) companies in Australia made up over 30% of the capital value of the Australian stock market. Today, that value is under 20%. The mining industry no longer has the same influence on Australia’s domestic growth and wealth. This is evidenced by the fact that the minister responsible for mining at the Federal level is one of the most junior ministry positions within the Federal cabinet.

9 PROBLEMS WITH ATTRACTING CAPABLE STUDENTS INTO THE MINING INDUSTRY

Even though Australia is large, it is highly urbanised with a heavily populated “fringe” around the coastline, with most of the remainder of the country being only sparsely populated, much like Canada. Most high school students in Australia do not want to work or live away from the major cities. In addition, the general view of the population is that the mining industry is an environmental vandal, and is a “stone age” and “low tech” industry with little “sizzle” compared to more high-flying industries such as Information Technology. This means that it is becoming

increasingly difficult to attract capable high-school graduates into the mining profession. This can be seen by the fact that Universities teaching mining engineering have generally had to lower their entry requirements for students over the past 15 years. In addition, whilst there were about ten Universities teaching mining engineering 20 years ago, there are now only four and this will reduce to three within the next few years.

10 PROBLEMS WITH ATTRACTING CAPABLE STUDENTS INTO THE VENTILATION PROFESSION

Even within the mining industry itself, the ventilation “profession” is often seen as being a dreary, boring job most suited to those with poor “people” skills and who are happy with their own company, squirreling away taking gas and airflow measurements and tinkering with ventilation network models. Ventilation staff are often seen as being one of the “nerds” of the mining profession.

11 JOB INSECURITY; EARLY DEPARTURE FROM THE WORKFORCE; “CHURNING” OF THE WORKFORCE

The long-term real prices of almost all commodities have been falling and continue to fall. The pressures on mining companies to cut costs are inexorable. The heavy cost pressures on the industry, the increased proportion of mines with short mine lives and the “rationalising” of ownership has led to a loss of employment security generally.

This, along with the rigours of fly in-fly out operation, means that many engineers plan to leave the industry by the time they are about 40 years old, departing from the industry at a relatively early age and taking their accumulated knowledge, skills and experience with them.

The churning (movement of individuals from one company to the next) has led to few engineers wanting to invest the time and effort into developing technical skills that may result in them being so specialised that they are among the first to be retrenched in the event of a change in corporate emphasis. They see that “having more than one string to their bow” (i.e. being a generalist rather than a specialist) makes them more redundancy-proof. Therefore there is an often an unwillingness from the individual to develop specialisation in ventilation.

In addition, it takes years of exposure to ventilation issues to develop an experienced and competent ventilation engineer. This process is not easily “nurtured” when the engineer must be regularly moving between companies due to lay-offs and takeovers.

Therefore even if an engineer does want to pursue ventilation as a career, “churning” tends to selectively work against his (or her) ability to develop and then retain his skills.

12 FLATTENING OF MANAGEMENT LEVELS AND LOSS OF CAREER PATHS

Up until about 15 years ago, large mining companies in Australia typically had 8 to 12 levels of management between the workforce and the CEO. Middle management provided numerous opportunities for quite senior technical specialists and managers in very fulfilling roles. Most of these positions no longer exist. Therefore the only way for ambitious engineers to rise to more powerful positions within the industry is to go via the “operating” route, i.e. becoming a mine manager. At the very best, “ventilation” is seen as only a short stepping off point for most engineers on their way to something “bigger and better”.

13 TREND TOWARDS USING VENTILATION CONSULTANTS RATHER THAN IN-HOUSE VENTILATION SPECIALISTS

This flows on from mining companies wanting to turn as large a proportion of their cost base into a variable cost, rather than a fixed cost. It is very expensive to keep a technical specialist in-house, particularly when that specialist needs to write papers and attend conferences and make site visits to other operations if he/she is to remain a “specialist”. In-house technical specialists are often seen as a luxury and are among the first staff to be “downsized”. Most companies consider it easier, cheaper and simpler to “buy in” specialist advice when they need it. To our knowledge, Australia now only has three “career” (long-term) ventilation engineers based at a mining operation in Australia.

14 LOSS OF VENTILATION MENTORS

The flattening of management structure and loss of technical managers has often meant a loss of the mentors that were previously responsible for nurturing, encouraging and developing individuals suited to specialist roles, such as those in ventilation. These mentors no longer exist within the mining companies. This results in frustration and also “gaps” appearing in the skills of ventilation staff, who are often left to “sink or swim” in their role.

However, the reduced number of ventilation staff within the mining companies themselves, and the

loss of experienced in-house mentors, have led to a growing demand for auditing services and also for training services from consultants, in addition to normal consulting design services.

15 REDUCTION IN THE SKILL LEVEL OF IN-HOUSE VENTILATION GENERAL PRACTITIONERS

The lower emphasis on ventilation (in metal mines) has, in part, led to the relatively fast “rotation” of young mining engineers through the role of ventilation officer or engineer. This is resulting in a very wide variation in technical skills within mines in Australia. In addition, many mines assume that the ventilation knowledge that a young engineer obtains as a University undergraduate is sufficient for him to take on the role of a competent ventilation officer. This is rarely the case; in effect, the engineer is thrown into the job with little on-site or off-site support and left to “sink or swim”.

16 THE TREND TOWARDS THE USE OF MINING CONTRACTORS

Many mine owners in Australia no longer have operating workforces at all. A typical example would be a mine in which the mine manager, geologists and planning engineers (perhaps) are employed by the owner, but the entire underground workforce, supervisory staff and technical support staff (ventilation, rock mechanics) are employed by a mining contractor. The fact that mining contracts are often for only two years (usually with an option for the owner to extend the contract) means that the “technical” focus of the mine becomes very short term, especially in areas such as ventilation.

17 IMPROVED TRANSPORT; COMMUNICATION TECHNOLOGY CHANGES

Almost all new mining operations in Australia in the past 15 years use fly-in, fly-out arrangements, except where there is already a nearby town. This was initially driven by changes in taxation policy in Australia, but over the past 10 years, mining companies have also found that the workforce most often has a strong preference for living in a larger community with more services, than in a remote community with relatively few services.

Concurrent with this has been the development of communication technology (fax, high-speed internet, email, video-conferencing) that allows mine plans and most other information to be transferred quickly

between a mine site and an off-site. It also allows meetings to be held with staff at any location.

18 CHANGES IN CAREER PLANNING STRATEGY WITHIN MINING COMPANIES

The “cradle to grave” employment mentality of the past meant that mining companies were rather paternalistic to their workforce. Each professional employee could rely on someone in the company to be planning their future for them; looking for development roles and other opportunities for personal and professional growth. Companies would complete skills inventories and endeavour to manage employee’s careers to fit with long-term company goals. Long-serving employees were considered to be an asset; they are now often considered to be a liability, part of the problem rather than part of the solution; adding to the organisation’s inflexibility to change. Today, tenure of four to five years in a company is often all that the company wants. Therefore, personal and professional development is the responsibility of the individual, not the company. This results in a more ad hoc approach to corporations developing or retaining specific skills. It also results in companies being unwilling to spend funds on training courses for individuals. The responsibility for (and cost of) upgrading or retaining technical skills is often now borne by the individual not the mining company.

19 THE REDUCED INFLUENCE OF MINING UNIONS AND THE DIFFERENT PERCEPTIONS OF THE IMPORTANCE OF VENTILATION TO MANAGERS AND WORKERS

Union coverage in the private (non-government) sector in Australia has fallen from over 50% 25 years ago to about 20% today. Whilst the coal mining industry is still strongly unionised, the non-coal industry is much less so. Even in the coal industry, there is now extensive use of contractors. Unions do tend to consider ventilation more important than do mining companies. We regularly ask workers what the biggest issues are in their workplace; they regularly tell us that ventilation matters (dust, fumes, heat) are the biggest or second-biggest issue. This is so even when they do not know that we are in the “ventilation business”. However, if we ask the mine managers what the biggest issues are in the workplace, ventilation issues almost never even makes it to the manager’s short-list. This is especially true for metal mines. We believe this dichotomy is due to the fact that the worker has to work daily and even hourly in poor environmental conditions which af-

fect his enjoyment and satisfaction of the workplace. However, the manager does not believe that there are any serious health risks in the workers being exposed to unpleasant but “otherwise benign” conditions, so considers truly clean and comfortable air as being in the optional luxury category.

20 THE REDUCED INFLUENCE AND SUPPORT FOR THE PROFESSIONS AND PROFESSIONAL BODIES

There is a overall trend in Australia for a loss of public confidence and support for professions in general: lawyers, doctors, engineers, teachers, academics and others. In the past, the public held most professionals in high regard; this is no longer generally the case. This may be related to the very high proportion of school leavers who now go on to tertiary education; whereas a tertiary education was only for an elite few in the past. There is a trend to regard the “self-made” person, sometimes with little formal education, as the real success story, and for the professionals to be regarded as out to feather their own nest.

21 THE EMERGING ANTI-TECHNICAL BIAS AND CHANGES IN CORPORATE GOVERNANCE PHILOSOPHY

In the past, the directors of Australian mining companies were often technical people: engineers and geologists. Today, a majority of board members are non-mining professionals: lawyers, accountants, IT or HR professionals, environmentalists, even social activists and retired politicians or public servants. In addition, there is a strong trend in Australia away from full-time managing directors on the board towards part-time independent directors. Both these trends tend to develop a subtle bias in “upwardly mobile” young engineers towards the view that “technocrats” are not likely to “get anywhere”. This is evidenced by the fact that most young engineers, if they do decide to take up post-graduate study, choose an MBA or other commercial or business degree, rather than a science or engineering master’s degree or a PhD.

22 THE DEVELOPMENT OF “GLOBAL” MINING INDUSTRY AND “GLOBAL” MINING HOUSES

The chronic poor shareholder returns from most mining operations around the world has led to a dramatic increase in corporate takeovers and the

growth of trans-national mining houses. This is having several effects. Two important ones are:

- The trend for major technical audits or feasibility studies to be conducted from an off-shore (non-Australian) base (e.g. corporate headquarters in London or elsewhere)
- The trend for the bigger mining houses to develop “corporate” policies in major technical areas, including ventilation, which may reduce the need for technical expertise or technical decision-making at individual sites. This is part of the “one size fits all” approach.

However, there are also benefits of globalisation. There are now more opportunities for Australian ventilation professionals, both those within companies and within consulting firms, to be engaged on projects outside Australia.

23 THE HIGH LEVELS OF ECONOMIC GROWTH IN ASIA

The Asian countries are experiencing very high levels of economic growth. In addition, the standard of living (and hence wages) and expectations of the Asian workforces is growing. The demand for all resources is very high. These factors are leading to the development of a larger mining industry in these countries, and adoption of more “western” mining practices. This is leading to opportunities for Australian mining companies and also for Australian mining consultancies in this fast-growing region.

24 CHANGES IN TECHNOLOGY

Even though mine ventilation is seen by some as a low-technology speciality, the reality is that technology is creating major changes for the profession. The practice of auxiliary ventilation is still changing significantly due to much larger fans and ducts and bigger mobile equipment (bigger airways and bigger diesel engines). This is impacting on the distances that can be mined before flowthrough ventilation is established, and the required airflows for auxiliary ventilation. Gas drainage is allowing mining operations in seams that were simply too gassy to be able to be safely mined in the past. The understanding of the nature and causes of spontaneous combustion and refrigeration/cooling (including adoption of air-conditioned cabins) is having significant effects on mine design and ventilation layouts. The trend towards diesel truck haulage via ramp to the surface (rather than conventional underground crushing and shaft hoisting) is also having considerable impact.

25 THE TREND TO LESS VARIETY IN MINING METHODS

The need to reduce operating costs and improvements in metallurgical recoveries and treatment costs means that the elaborate and selective mining methods of 20 or more years ago have often been replaced by one of only a few highly productive methods of today. Along with this reduction in mining methods and trend towards “simpler” high-productivity methods is a reduced need for ventilation design. Mass production reduces (in fact, opposes) the need for tailor-made designs, or for major design changes and can tend to stifle creativity at the macro level.

26 CHANGES IN WORKERS EXPECTATIONS REGARDING HEALTH AND SAFETY, CONCEPTS OF CORPORATE RESPONSIBILITY, PROFESSIONAL INDEMNITY INSURANCE

In the past, mine workers often felt that “atrocious” working conditions were part of their job. Whilst the workforce has been substantially focussed on dust in the past, new issues such as heat and diesel particulates are now attracting considerable workforce concern. Good workplace conditions also helps to keep workers in the industry for longer (which helps prolong careers and investments in training), reduce turnover and improve morale.

Australia has not (yet!) developed the level of litigation that is seen in the USA. Nevertheless, there is an increasing trend towards litigation of professionals. This is resulting in very substantial increases in professional indemnity insurance, which impacts on ventilation consultants more so than in-house ventilation professionals.

It is also becoming increasingly common for government investigators of workplace accidents to look beyond the “obvious” cause of an accident to the underlying causes. Two recent cases in Australia illustrate this. In one, a welder was electrocuted and the prima facie cause was not following the approved job procedure. Further investigation revealed that the conditions on the job were excessively hot, so that the welder wanted to “just get the job done and get out”, which was therefore a contributing factor to the accident. In another, a miner fell down a shaft during its sinking operation. The argument was mounted that excessive temperatures resulted in an inability to concentrate for the full shift length in what is otherwise a hazardous environment.

There is also a trend to adopt the concept of “industrial manslaughter” in new legislation, which would allow managers (or any other responsible person) whose negligence resulted in the death of an

employee to be prosecuted and jailed. Technical areas such as ventilation or rock mechanics, which clearly involve judgement calls at times, and where decisions can sometimes be “counter-intuitive”, are therefore now considered to have higher risk profiles.

27 CHANGING NEEDS OF CORPORATE CLIENTS IN TERMS OF FEASIBILITY WORK; TREND TOWARDS BANKABLE FEASIBILITY STUDIES

The art and practice of mining is become more complex as the body of knowledge continues to grow and as orebodies become more remote and deeper. Most corporate clients no longer have the ability to conduct a major feasibility study in-house. Most clients do not even have the ability to manage a team of independent specialist consultants themselves so as to develop a feasibility study in-house, instead preferring to get a “one-stop-shop” consulting firm to undertake or at least coordinate the entire feasibility study process.

In addition, many new projects are funded by “project financing”, joint ventures or other strategies in which the technical risk of failure has to be very low to obtain bank financing. Many projects therefore require a “bankable” feasibility study (i.e. one which meets the high standards required by a bank’s high risk aversion). An in-house technical team is not always seen to be sufficiently unbiased to meet these requirements.

Therefore, within the mining profession, there is a trend towards larger mining consultancies with a full complement of professional skills, complemented by a growing number of small but very specialised “niche” consulting firms. Consulting firms (and academics) are now the main repository of ventilation skills and experience in Australia.

28 CHANGES IN EMPHASIS WITHIN HEALTH AND SAFETY, ROLE OF RISK ASSESSMENT

In the past, control of ventilation hazards in the underground environment was often due to the need to control the long-term health risks, e.g. lung disease. The perception of management is that these “health” risks are now under control and will not reappear. The emphasis has now swung towards controlling safety risks, e.g. rock falls.

In our opinion, this change in emphasis is driven, at least in part, by the trend to quantify risk according to one of the many modern risk assessment tools. We believe this process, accompanied by the fact that often the participants in the risk assessment

(frequently young) have little experience of the long-term health effects of poor ventilation, tends to bias the “classification” of risks towards the fast-acting acute risks (fatality due to rock fall) rather than the slow-acting chronic risks (lung disease), even if the risk profile is actually the same. This opinion is also shared by Kizil and Donoghue (2001), who argue that this trend to put higher priority on the short-term acute safety risks in the underground environment over the long-term chronic health risks is not justified. Kizil and Donoghue also believe that, if this trend is reversed, there will be a renewed interest in improving the environmental conditions in which workers spend their working life.

29 REDUCED SCOPE AND INCREASED FRAGMENTATION OF THE PROFESSION

The growth in the role of occupational hygienists and safety professionals has, in part, been at the expense of ventilation professionals. Whereas measurement of contaminants in the workplace was largely conducted by ventilation professionals in the past, this is now often conducted by occupational hygienists, with the ventilation professional being left with the diminished role of adjusting the airflow circuits to keep contaminants within acceptable levels. This is partly driven by the need for hygienists in the surface facilities of most mines, the tremendous growth in the number of chemical compounds in use in mines and the far greater versatility of hygienists in occupational hygiene matters. Hygienists tend to also cover noise, vibration, illumination, confined spaces permitting, welding fumes, etc.

In addition, there is a fragmentation of the previous very-wide scope of the ventilation profession. An example is the growth of specialist “off-shoots” to general ventilation practice, such as gas drainage, spontaneous combustion, refrigeration and heat stress.

30 LOSS OF STATUS TO OTHER TECHNICAL PROFESSIONS

This follows on from the points above. Ventilation used to be near the “top of the tree” or the “top of the food chain” in terms of status as a technical profession within mining. It has generally be supplanted by other technical areas, especially geomechanics, but also even traditionally “fuzzy” areas such as safety “professionals”, environmentalists and the like.

31 THE GROWTH OF NON-MINING (CIVIL) UNDERGROUND INFRASTRUCTURE PROJECTS

A recent technical conference in Australia noted that “(Sydney) will increasingly start to look like a giant Swiss cheese”. Capital expenditure on underground civil engineering projects in Australia would now significantly exceed capital expenditure on underground mining projects. The construction phase of these underground civil projects can vary in complexity as can the ventilation design of the final operating phase. To date there has not been a strong transference of ventilation design concepts and skills between underground civil ventilation practice and underground mining ventilation practice.

32 RANGE AND NUMBER OF “STAKEHOLDERS” IN VENTILATION

In the past, a ventilation professional was assessed principally on his/her technical ability. However, the range of stakeholders that he/she needs to liaise with has grown considerably. In many cases, the “people” skills of a ventilation professional are now as important as the technical skills. Some of the stakeholders in ventilation now include (variously): shift-boss/supervisor, contractors (mining, maintenance or construction), hygienists, union officials, planning engineers, purchasing staff, internal medical staff, workforce safety committees, scheduling engineers, suppliers, external medical staff, operating managers, mine rescue personnel, consultants, mines inspectors, electrical and maintenance engineers and safety officers.

This need for people skills is accentuated by the flattening of management structure, loss of mentors, loss of “status” of the profession and increasingly short-term focus of mine owners, which means decision-making timeframes are much more compressed compared to years ago.

33 CHANGES IN EGRESS AND RESCUE PHILOSOPHY

Previously, if a mine emergency occurred, it was considered normal to be sending in mine rescue teams to find and then rescue workers. Whilst this is still true to some extent, the “duty of care” now enshrined in legislation and in society itself makes it difficult to risk one person’s life to possibly save another person. The trend is therefore away from “aided” rescue to “self” rescue. This is starting to have some considerable consequences on mine planning and ventilation design. Another example of this is the relatively low fitness levels of the “mod-

ern” workforce. In the past, it was normal for workers to move through a mine using ladder ways. However, many workers today would be unable to climb any distance of ladders. This impacts on egress strategy (the mine still needs to provide for safe egress even for relatively unfit workers) and ultimately on ventilation design.

34 AGE PROFILE OF VENTILATION PRACTITIONERS

As a result of many of the above factors, there is an ageing profile of the remaining ventilation practitioners in Australia. There will be a substantial exodus of ventilation experience from the industry in the next 10 to 15 years.

35 SUMMARY

The ventilation profession in Australia is at something of a crossroads. The changing nature of the mining industry nationally and globally poses numerous challenges for the profession in its role as the “repository” of ventilation knowledge and experience. However, underground mines will continue to need to be ventilated, and in fact in many respects will need to be ventilated to a higher standard than in the past. The factors and trends identified in this paper therefore provide both threats and opportunities for the profession and are changing the way ventilation services are delivered in Australia. Whilst there will remain a need for both “GP” and specialist ventilation practitioners, it is likely that the number of experienced “GP” ventilation professionals will diminish, but the number of specialist “niche” players will increase.

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