

Does ABET contribute to OHS in mining?

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ABSTRACT

South African mines have an unacceptable occupational health and safety (OHS) record. Of particular concern are the categories of workers who are most vulnerable to accidents and disease and who generally have the least formal education or training, those termed elementary workers (unskilled) and machinery operators and drivers (semi-skilled). This article questions the role of adult basic education and training (ABET) as a primary driver of mine OHS, with specific reference to these categories of workers. The article concludes that ABET has positive and generalised effects in the workplace, that may include OHS awareness, but that the scale of ABET impact on mine OHS is negligible. Additional and alternative OHS training initiatives are required to provide the least educated workers with comprehensive preparation and training for the hazards and risks of underground mining.

Key words: Adult basic education and training (ABET), literacy, mining, occupational health and safety (OHS), training

INTRODUCTION

South African mines have a disturbing occupational health and safety (OHS) record. The incidence of fatalities and injuries following falls of ground, during transportation, with explosives or in general mining accidents has been reduced in recent years, but is still considered high.^{1,2,3,4,5} Occupational diseases, especially lung diseases and noise-induced hearing loss, are pervasive.^{5,6,7} The highest recorded rates of tuberculosis (TB) worldwide occur in South African gold miners.⁶ Of particular concern are the categories of workers who are most vulnerable to accidents and disease and who generally have the least formal education or training, termed elementary workers (unskilled) and machinery operators and drivers (semi-skilled). Elementary workers often do heavy manual work in mine tunnels that are too narrow for machinery. This includes shovelling, moving and loading rock; barring down or breaking overhanging rocks; sweeping or vamping for ore particles; laying pipes and operating water hoses. The category 'machinery operators and drivers' includes drillers, crane, hoist and lift operators and locomotive drivers. Their particular vulnerability to accident and disease is underlined by the education and training authority for the mining and minerals sector, the Mining Qualifications Authority (MQA), which states that replacement demand for both of these categories of workers is "due to mortality related to occupational and other diseases, and accidents on duty" (p. 102).⁸ Disregard for the admission may be due to a ready supply of migrant labour as hundreds of thousands of men from rural areas of South Africa and neighbouring countries seek work in the local mining sector each year.⁹

This article questions the role of adult basic education and training (ABET) as a primary driver of mine OHS, with

specific reference to elementary workers, machinery operators and drivers. A connection between relatively higher levels of formal education and enhanced OHS in mining is universally assumed. Corresponding assumptions are made in local mining that poor OHS is related to the under education of workers.^{1,10} The notion that raising workers' general level of education via participation in ABET will have a positive impact on mine OHS dates back to the Leon Commission of Inquiry into Mine Health and Safety and continues today.^{8,11} However, the connections between ABET and the OHS of mineworkers have been over simplified. The impact of the various and subtle achievements of ABET on the positive and negative drivers of OHS behaviour of participating mineworkers has rarely been subject to rigorous qualitative or quantitative investigation.

The purpose of this article is to consider the available information in order to make a case for more realistic planning and provision of OHS and other training for mineworkers; to add to the understanding of the role of ABET; and in particular to advocate for additional approaches to mine OHS training. Searches were conducted of at least five academic databases, the websites of local mining and mine health and safety institutions and the indices of mining journals. Peer-reviewed literature on the connection between ABET and OHS in South African mining was simply not available, though there were articles in the mining press some of which made untested claims.

PREPARATION AND TRAINING OF UNDERGROUND MINeworkERS

Local geological conditions require labour-intensive, deep underground mining.¹² Consequently, South African mines are relatively labour-intensive, when compared to operations



in countries like Australia and Canada. OHS challenges are exacerbated because high numbers of South African workers are exposed to health and safety risks at a given time, compared to other parts of the mining world,¹ and the large number of workers on a single mine presents significant organisational and logistical challenges.⁵ Elementary workers, machinery operators and drivers together constitute 73% of the total mining workforce, estimated at 548 000 at the end of 2009 (p. 10, 59).⁸ The two categories of workers are considered together here because both are “typically trained for their specific positions after entering into employment contracts and such training thus becomes the primary responsibility of employers...” (p. 74).⁸

Training on mines offers substantial business opportunities. For example, the MQA disbursed over R504 million to employers and other training consultants during the 2010/2011 financial year (p. 90).¹⁸ Yet training offered to less educated workers is largely unregulated. Public evidence of such training, OHS and other, is difficult to access. The 2008 Presidential Audit on mine OHS found that: “on-the-job training was not done by most of the mines” (p. 63)¹ and other research suggests that “Far less training takes place than is anticipated by Section 10 of the MHSA” (p. 44).² Training statistics of the mining sector’s training authority, the MQA, are not published in the annual report but available on a restricted access data base, the MQA-I-Share. No central or standardised guidelines are provided to employers regarding the preparation or induction of new recruits to mining or other underground workers, by the MQA.¹³ Occupational health is especially neglected in terms of advocacy and training¹⁴ as well as OHS as a subject or generic issue for mineworkers.^{1,2}

There are countless registered mining qualifications and skills programmes offered in South Africa, but these are

Table 1. ABET in the mining sector 2010–2011¹⁸

ABET Level	Workers enrolled
ABET 4 ≡ Grade 9/ Standard 7	1 770
ABET 3 ≡ Grade 5/ Standard 3	1 999
ABET 2 ≡ Grade 5/ Standard 3	2 299
ABET 1 ≡ Grade 3/ Standard 1	1 667
Total	7 735

inevitably aligned to the national qualifications framework (NQF) and pitched at particular NQF or educational levels, the lowest of which is NQF level 1, approximately equivalent to Grade 9 or Standard 7 which equates to some assured secondary schooling. It is estimated that 48.9% of all mine-workers left school before a level equivalent to NQF 1 (Grade 9) and consequently lack the educational scaffolding for registered qualifications and skills programmes in mining or other employment sectors (p. 16).⁸ Across the mining industry 15.4% of all mineworkers never attended school at all, 37% of mineworkers did not complete primary school and 71% of all employees did not complete their schooling (p. 16).⁸ It is estimated that 80% of underground mineworkers did not complete their schooling (p. 35).¹ This provides an uncertain scaffolding of foundational skills, such as literacy, numeracy and English language use, for workplace training. Even if national or regional educational levels change, underground mine work continues to attract people who cannot find other occupations because of their lack of formal education. Some mining companies, especially the relatively more mechanised coal mines, employ only workers who have completed formal schooling (Grade 12). An alternative is to offer workers what is often termed ‘second chance’ education or ABET.

ABET IN THE MINING SECTOR

The use of the designation ABET is uniquely South African. ABE or adult basic education is used in other parts of the English-speaking world to refer to an extended notion of adult literacy provision, including numeracy and English language skills. It is essentially compensatory adult education, i.e. intended to compensate those who were deprived of part or all of the education they would normally have received during the period of compulsory schooling. ABET emerged during policy initiatives of the early 1990s and reasons for adding the "T" showed a commitment to the integration of education and training into ABET.¹⁵ Adult literacy provision and education for mineworkers in South Africa dates back to the late 19th century, when developments in diamond and gold mining centres led missionaries to increase educational and religious efforts in these locations, assisted by relatively more educated workers.¹⁶ However, the role of literacy and ABET in OHS was first seriously promoted by the Leon Commission in its recommendation that all mining companies "move forward the national initiative in adult education with a view to improving communication in mines, which will in turn result in improved health and safety" (p. 168).¹¹ The logic has endured, as evidenced in the formal skills planning of the sector training authority: "The MQA was specifically tasked with the improvement of OHS skills capacity in the industry, by reducing the rate of illiteracy" (p. 31).⁸

Currently, the provision of compensatory ABET is a strategic programme of the MQA, but actual enrolment of mineworkers has declined from 20 339 workers in 2005 (p.59),¹⁷ to 7735 in the 2010-2011 financial year (p. 55).¹⁸ Recent enrolment in the different ABET levels is presented in Table 1.

The scale and consequent impact of provision is plainly negligible in an industry employing over half a million workers, many of them with inadequate formal education. ABET provision in the mining sector faces comparable challenges to other industrial sectors: mainly the logistical problems of releasing workers from the underground workplace at regular times as work shifts change; and low worker motivation due to no clear link between ABET achievement and workplace progression.¹⁷

IMPACT OF ABET

What are typical outcomes or effects of ABET in an industrial context? Assuming adequate quality and duration of provision, ABET can yield personal and organisational benefits. A study of individual and organisational outcomes of ABET in a laminate factory south of Johannesburg involved migrant workers,

having a social and educational background comparable to mineworkers.¹⁹ The findings suggested that there were some general trends in terms of ABET outcomes, but the way in which workers apply new skills varies according to their personal interests, the ABET subject or learning area, the ABET level and the demands of the context. Enhanced literacy naturally assists with the reading or writing demands of multiple contexts, English communication with verbal reporting and communication in the workplace, while numeracy had the most impact on better management of workers' own money. Workplace outcomes at different ABET levels were reported as:

- ABET Level 1 (Grade 2/ basic literacy in the mother-tongue of the learner): increased self-esteem of individuals, improved morale in company, lower absenteeism (p. 111, 135).¹⁹
- ABET Level 2 (Grade 5/ post-literacy and oral English communication): communication in company improves, reporting of reject products improves, machine down-time better (p. 112, 135).¹⁹
- ABET Level 3 (Grade 7/ reading and writing English and more complex numeracy): workers take on new tasks and machines as they can read English and understand basic numeric conventions (p. 135).¹⁹
- ABET Level 4 was not offered at the research site and is also not offered on many mines (p. 59).¹⁷ Yet this ABET level is significant in career development terms as it provides access to the registered and unit-standard based qualifications and skills programmes, which are the primary offerings of the training authorities in all industrial sectors.

In 2006, the MQA attempted to investigate ABET in the mining sector, including its impact on OHS.¹⁷ The report describes such impacts as positive, but with a qualification: "A common perception exists that ABET contributes to improved health and safety, but it is not possible to make this link

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quantitatively through data" (p. 56).¹⁷ The MQA study treats ABET as a single holistic process and does not analyse its component aspects. While the scale of ABET impact is negligible, it is possible to categorise the examples cited in the report into two sources of ABET impact on OHS, i.e. improved literacy and enhanced awareness of OHS issues. The only evidence presented in the study is in the form of observations of training staff, trade unionists and workers, presented hereafter. There was no input from line management on connections between ABET and OHS in the report.

Impact of improved literacy on OHS

Many reports mention that literacy improves safety in the workplace because employees can read and understand warning signs. ... ABET helps learners to read and understand: safety warnings; instructions; company briefings; and to communicate better (p. 46).¹⁷

“The low uptake of ABET . . . indicates that it is necessary to facilitate OHS skills and awareness outside of ABET structures”

Impact of enhanced awareness of OHS

Almost all the mines commented that ABET employees are more aware of health and safety issues pertaining to the work place as well as the world in general... Employees are more aware of health issues, including HIV/AIDS, malaria and TB (p. 45).¹⁷

ABET practitioners generally aim to contextualise learning, so current safety, and especially health, issues would probably be discussed or read about in ABET classes, enhancing participants' awareness and mastery of these subjects. The achievements of adult literacy instruction or ABET, of adequate quality, can be multiple and varied according to the contexts in which an adult learner elects to apply such new skills. Consequently, any aspect of an adult's life that is difficult due to a lack of literacy, numeracy and English language skills, such as shopping, communication at work, organising children's education, even being called upon to read out loud in church, may be enhanced by ABET. Such positive effects of ABET can be generalised to OHS as well as many other aspects of workplace engagement, facilitating the connection reported by the MQA.

The low uptake of ABET across the mining sector indicates that it is necessary to facilitate OHS skills and awareness outside of ABET structures and to pursue and develop new ways of doing so. Lung health awareness of mineworkers provides an illustrative example because: "Many employees have little or no understanding of the processes that lead to occupational lung disease, their consequences, how to protect themselves from the conditions" (p. 26).²⁰ Research into silicosis awareness among mineworkers in quarries, gold

mines and coal mines identified generalised and significant barriers to lung health efficacy.^{21,22} These included:

- Confusion regarding responsibility for managing dust: Workers felt that no-one took responsibility for dust underground or for watering down, even when the matter was discussed at the meeting place at the start of a shift (p. 13).²²
- Lack of accurate information about different diseases, their prevention and management (TB, silicosis, HIV/AIDS): There is much confusion about the diseases and their overlap. Lung diseases are sometimes grouped together as phthisis, and workers believe that one can change into another, or that milk can cleanse the lungs (p. 13 – 28).²²
- Lack of knowledge about the actual utility of PPE (masks): Some workers felt the only reason they received masks was to protect management, while others used bandanas to protect themselves (p. 12).²² The actual utility of PPE in relation to particle size was not clear to workers.

Many training modalities and methods can be used to address such barriers and enhance workers' efficacy in relation to lung disease, such as DVDs, discussions, pictures, role models, and pictures. The content would include accurate information about different lung diseases, their prevention and treatment; the relationship between specially designed masks and particle size; an understanding of the value and implementation of techniques such as wearing protective masks, watering down, extending ventilation columns, and changing out of dusty clothes immediately after a shift. What is essential is that OHS training programmes are fit for purpose. This means having a valid OHS focus, such as lung health; being suitable for the target group in terms of language and media used; being of acceptable educational and communicative quality; and offering follow-up interventions to facilitate transfer of new skills and attitudes into the workplace. Prior research is required in order to ascertain a thorough grasp of the target group; their knowledge, understanding of and attitudes to the topic in question and the barriers and facilitating factors relating to desired behaviour change (p. 5).²² Although the Mine Health and Safety Council (MHSC) sponsored the production of a set of relevant materials,²¹ these have not been disseminated by the MHSC, mining houses, or trade unions (p. s71).¹⁴

CONCLUSIONS AND RECOMMENDATIONS

ABET has tremendous potential for fast-tracking or promoting capable workers who lack formal education, or for responding to people who sincerely want a second chance at education, but relatively few workers may have the time or inclination to participate. The recommendation of the Leon Commission regarding adult education as a primary driver of mine OHS has not proven to be a feasible policy over the past 17 years. The limited evidence of both ABET and dedicated OHS training for underground mine workers compared with

unacceptably high rates of mining injuries and occupational diseases indicate that mine OHS training policy may require renewal. Alternative and additional OHS training initiatives are required for underground workers. The development of such initiatives requires an adequate base of research and accurate information. It is recommended that the highest authority for OHS training in the sector investigate the actual provision of training and preparation of underground mineworkers; and that such information be made freely available to the public, practitioners and researchers.

LESSONS LEARNED

- Most underground mineworkers did not complete their schooling.
- The uptake and scale of ABET on mines and possible consequent effects on OHS are negligible.
- ABET yields mainly personal benefits to those workers who participate, which may include enhanced OHS awareness.
- All underground mineworkers require adequate preparation and training for the workplace, but most are relatively uneducated and do not qualify for registered programmes.
- Alternative and additional OHS training initiatives are required to provide underground workers with comprehensive preparation and training for the hazards and risks of mining.

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