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Citation for final published version:

Walters, David , Quinlan, Michael, Johnstone, Richard and Wadsworth, Emma 2019. Representing miners in arrangements for health and safety in coalmines: a study of current practice. *Economic and Industrial Democracy* 40 (4) , pp. 976-996. 10.1177/0143831X16679891

Publishers page: <http://dx.doi.org/10.1177/0143831X16679891>

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1. Introduction

Despite the many improvements made in occupational safety and health (OHS) engineering in coalmines in some countries, coalmining remains among the most hazardous occupations. It is notable for its high rates of serious and fatal injuries, and multiple fatality incidents. In poor countries, coalminers experience these outcomes with alarming frequency as well as high (though vastly underestimated) rates of serious mining-related disease. In richer countries, although the number of workers employed in mines has decreased substantially over time, those who remain employed continue to face a higher risk of fatal injury than workers elsewhere. Despite the rate of nonfatal injuries and illnesses being lower than the average reported for private industry, the seriousness of those that are reported is greater (Quinlan 2014). Also the risks of serious work-related ill-health, while less than in previous times, have by no means entirely disappeared as the re-emergence of black-lung disease in Queensland coalmines indicates (ABC 2016).

Even in rich countries, therefore, both the ever-present risk of disaster, as well as of everyday harm in coalmining, continue to warrant attention to appropriate arrangements for their prevention. Many coalmines are owned or operated by large global corporations, and investment by these companies plays a major role in many national economies.¹ While not all global investment results in direct control of the management and operation of coalmines, such corporations undoubtedly influence governance and management of safety in mining.

At the same time, arrangements to manage OHS in coalmines have undergone substantial reorientation in recent decades as a result of regulatory reforms and voluntary standards focusing corporate attention on more systematic approaches to managing safety and health. There are distinct trends in responses to these influences. On the one hand, there has been enormous growth in the use OHS management systems, corporate governance strategies emphasising zero harm, attention to safety culture, safety climate and so on. These have developed alongside expert strategies on risk assessment, rethinking the role of critical incidents in accident prevention, and increased systems auditing. On the other hand, another feature of the same reforms, evident in the regulatory measures of most countries and global regulatory standards like those of the ILO, are arrangements to ensure that systematic OHS management approaches are participative and ensure institutional representation of workers' voice. This usually takes the form of health and safety representatives (who are often union members or supported by unions) and joint health and safety committees. These two aspects of approaches to health and safety are not mutually exclusive, sharing some common elements in practice. Nevertheless, the former draws upon a unitary understanding of organisations, while the latter is embedded within a pluralist conceptualisation of labour relations in which unions are prominent. One of the key research questions this paper seeks to address is what occurs in practice in an industry where both understandings are in evidence.

In countries like the UK and Australia, regulatory requirements for workers' representation in OHS in coalmining are of long standing. Indeed, they considerably pre-date worker OHS representation arrangements in other sectors.² It is curious, therefore, that although the operation of such provisions has been widely studied in other sectors, they have been the subject of negligible research in coalmining. This provided a further reason for the study on which this paper is based.

¹ For example, London and Kisting (2016) cite that 25 per cent of foreign direct investment in Africa in 2002 was in the extractive industries.

² They were introduced in the UK for example by the Coalmines Regulation Act 1872 — more than a century before the powers given to unions to appoint health and safety representatives by the Health and Safety at Work Act 1974.

This study examined the experience of implementing regulatory provisions for worker OHS representation in coalmining in the Australian state of Queensland. It explores this practice against a background of general regulatory and policy support, but in a climate other researchers have found to be hostile to the presence of organised labour — usually acknowledged as a key support for the effectiveness of such arrangements (Yassi et al 2013). Our priority in this paper is more with the empirical evidence of what occurs when this form of engagement is operationalized and what supports or constrains its role, than with theorising the labour relations that helps explain this. The latter is given prominence in a separate paper we have written based on the same research project (Walters et al 2016). In the present paper we have deliberately tried to foreground the former. In particular, it considers the kinds of risks workers' health and safety representatives engage with in coalmines and how they use their statutory powers and functions to protect their fellow workers. It poses questions concerning the fit of the statutory approach to these powers and functions with the versions of health and safety management systems increasingly adopted by global corporations and considers some implications for policy and further study.

We begin by outlining our research methods and presenting something of the regulatory context, followed by our main findings on worker representatives' activities. We end by discussing the implications of context for the effectiveness of regulatory measures that support the representation of workers' OHS interests.

2. Materials and methods

Study methods involved two forms of field data collection and analysis supported by a review of relevant literature. The latter included a detailed examination of the history, development and practice of the statutory rights and functions of worker representatives in Queensland coalmining. To set this in a wider context we also reviewed research literature on worker representation in OHS elsewhere. This work was supplemented by a review of recent literatures on managing coalmining risks, health and safety indices in coalmining and current methods for regulating these risks. Conventional search techniques including keywords and electronic datasets were employed to undertake the review.

Using this approach we identified provisions for worker OHS representation and utilised one element as an appropriate means of studying practice. The Coal Mining Safety and Health Act 1999 (which reflects the much older history of statutory intervention for worker representation in coalmines), makes provision for two forms of OHS representatives. Workers in each coalmine may elect two Site Safety and Health Representatives (referred to as site representatives from here on) and the miners' union (the Mining and Energy Division of the Construction, Forestry, Mining and Energy Union (CFMEU)) is further entitled to appoint three Industry Safety and Health Representatives (referred to as industry representatives) to cover the whole state. Industry representatives must be qualified mine deputies. Their remit (including rights of access) extends to all Queensland mines. Coalmining in Queensland is still relatively highly unionised. In practice, therefore, the vast majority of site representatives are, and have always been union representatives. The provisions for both types of representatives include the usual statutory functions of OHS representatives like powers of inspection, consultation and representing workers' interests. They also have further powers to review health and safety management systems, stop processes they consider dangerous and stop production altogether if necessary. The provisions confine their activities to OHS issues (as opposed to wider industrial relations matters like pay and working conditions, which are the remit of other union representatives and emphasise that they should not unnecessarily impede production. A further unusual feature is that written records of their inspections, like those of the government mine inspectors, must be kept as part of the mine's record of inspections. This allowed an examination of documentary

records of some of their activities, not normally available to those researching OHS representatives in other sectors.

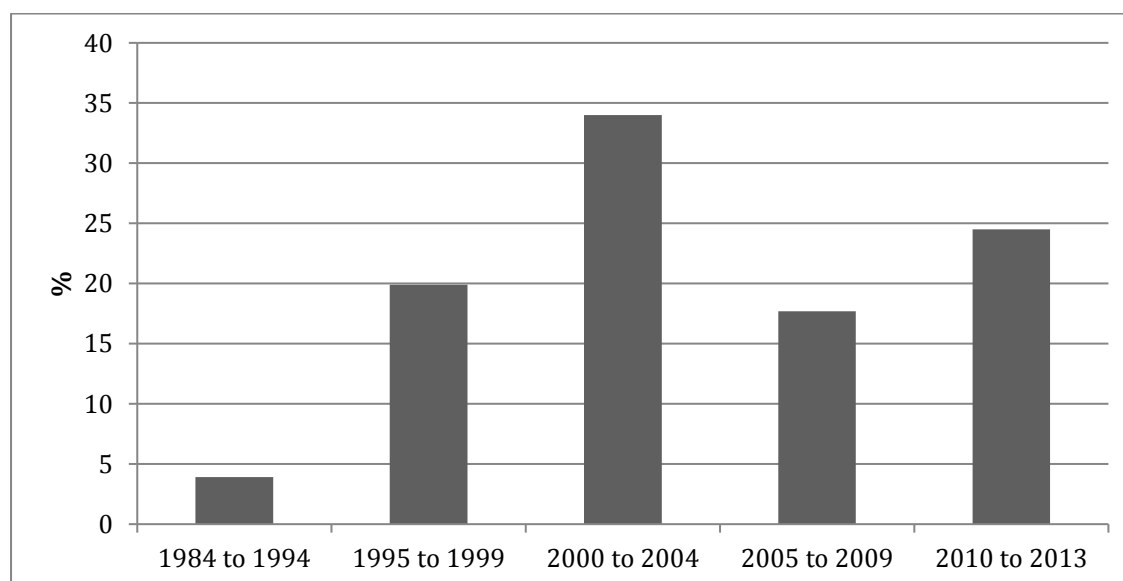
The first approaches to field data collection involved accessing a sample of records of industry and site representatives' inspections and, for comparative purposes, a further sample of those of government mines inspectors (from the Queensland Government Department of Natural Resources and Mines). The Mining and Energy Division of the CFMEU made these inspection reports available to the researchers. They covered 19 Queensland mines (12 open-cut and seven underground), most of which were large or medium-sized (nine and eight respectively). Union density was greater than 75% in the majority. In four mines, one third to half the miners were union members, while in three mines there was no significant union presence. The reports were mainly those of industry representatives and the Department of Mines and Energy Safety and Health Mines Inspectorate (referred to as the mines inspectorate from here on) (Table1). A smaller number were written by site representatives. The earliest was written in 1984, but most (over 75%) were written between 1998 and 2013 (see Figure 1). Most of the industry representative and mines inspectorate reports were written as a result of a site visit (85% and 92% respectively) while all of the site representative reports were written following an on-site inspection. The remainder were predominantly records of postal correspondence (for example, reporting on a review of documents supplied), arising from contact with managers or workers, or following an incident at a similar mine elsewhere.

Table 1: Statutory inspection records supplied by the CFMEU

Document type	Number, %
Industry representative report	473, 41
Mines inspectorate report	605, 52
Site representative report	50, 4
Other*	37, 3
Total	1165, 100

*These included: visit notifications; correspondence between industry representatives and mine managers; and other documents (e.g. photos, plans, health and safety documentation)

Figure 1: Timespan of documents supplied by CFMEU (in five year intervals)



Each of these documents was examined to identify what was recorded in relation to inspections, including why an inspection was made, what was inspected and the outcome and how these activities related to the fulfilment of functions defined in the Coal Mining Safety and Health Act

1999.³ An issue often of concern in participative approaches to health and safety management where workers' representatives have statutory powers and functions is whether they use their powers and functions responsibly and in ways proportionate to the risks involved. To gain some insights into this we examined how inspection records might help gauge the extent to which worker representatives engaged with serious risks. The mechanisms that can result in fatalities in coalmining are well-known, having been extensively documented over many years. Drawing on the relevant literature and using a classification detailed by Quinlan (2014), these formed the basis of our understanding of what constituted a 'serious risk'.⁴ Broadly, such risks are those associated with:

- Fire and explosions including machinery fires as well as methane and coal dust fires.
- Inundation/inrush of water (often from old workings but also due to excessive rain or breaking into underground rivers or aquifers) into mine workings. Though mainly associated with underground mines, failure of tailings dams are a hazard in open-cut mines.
- Falls of ground (also known as rock falls), including rocks spat out horizontally from the face by intense pressure underground and falls of material from the high walls in open-cut mines.
- Outburst of poisonous gas (or dangerous accumulations of gas) in underground mines, although exposure to toxic fumes can also be an issue in confined spaces in open-cut mines.
- Machinery incidents in underground and open-cut mines, including contact with moving machinery, catastrophic machinery failure, and traffic incidents such as collisions between vehicles or vehicles hitting pedestrians.
- Electrocution through contact with live cables, water or machinery in both open-cut and underground mines.
- Falls from height including failure of winding gear in underground mines, falls from platforms or machinery or falls associated with trucks etc. tipping over inclines, especially in open-cut mines.
- Entrapment in confined spaces in both underground workings or confined spaces in open-cut workings. This hazard can become fatal when associated with fire, toxic gases, lack of oxygen or rising water levels.

According to Quinlan (2014), the first four of these have been associated with significant multiple fatalities (especially fire and explosions), while others, such as falls and entrapment, may sometimes also result in multiple fatalities. Machinery and electrocution incidents, although having serious consequences for the individuals involved, have rarely led to multiple fatalities.

Checking for these risks, inspections may examine several simultaneously. For example, checking the electrics of machinery and infrastructure will simultaneously address the potential for electrocution and ignition points for a fire/explosion. Similarly, examining road conditions entails considering risk of collisions as well as vehicles tipping over the steep inclines found in open-cut mines. Equally, assessing ventilation regimes and testing for gas levels (including methane, carbon monoxide and carbon dioxide) not only addresses the risk of fire/explosion, but also the build-up of toxic fumes. In the same way, examination of secondary egress and the availability/condition of self-rescuers addresses the hazards of fire/explosion and entrapment. Therefore, in recording what was being examined during inspections we were conscious of, and duly recorded, where an activity addressed several different fatality mechanisms among this broad categorisation of eight fatal risks types.

³ For comparative purposes, this was applied even to those records pre-dating the legislation.

⁴ See for example, Donoghue, 2004; Groves et al, 2004; Hopkins, 1999; Karra, 2005; Nugent et al, 2010; Poplin et al 2008; Saleh and Cummings, 2011; and others cited in Quinlan 2014.

Analysing inspection records involved reading each document and coding the risk type. The aim was to create a typology of inspection activities. This enabled us to consider both the relative frequencies of certain activities and any changes in these frequencies over time.

This said, recorded inspections represent only one element of representatives' activities. Moreover, the records provide little indication the context of what is recorded or what influences this, or of follow-up or other activities not recorded. To explore these questions, the second field research method involved 24 detailed interviews with representatives, union officials and a senior mines inspector. Sample interviewees included past and present industry representative, and current site representatives, the majority having worked in the coalmines providing the records for documentary analysis (Table 2). The two underground mines where it proved impossible to interview representatives were both medium-sized, while the open-cut mines where no representatives were interviewed included one large, two medium-sized and one small mine.

Table 2: Functions of the interviewees

Interviewee	Number
Site representative at mine included in the documentary analysis	14
Site representative at other mine	4
Current industry representative	3
Former industry representative	2
Senior mines inspector	1
Total	24

Interviews were conducted either between CFMEU organised training sessions in June 2013 (see below), or at the CFMEU offices in two separate districts during August 2013. Each interview lasted approximately one to one and a half hours, was recorded and subsequently transcribed. Transcripts allowed identification and exploration of themes reflecting representatives' experiences of injury and ill-health prevention, activities, perceived outcomes, balance of activities, and their relations with workers and managers. We explored the extent representatives used their statutory powers; how they balanced tensions between safety and industrial issues; the supports and constraints under which they operated; their perceived needs; and how they supported one another. We also explored their relations with sub-contractors and their liaison with the mines inspectorate. The interview with the senior mines inspector followed the same structure and covered the same issues.

Finally, one researcher was able to attend and observe sessions of the two annual five-day training courses for site representatives provided by the CFMEU.. The researcher attended two days each of the course for underground representatives and that for representatives in open-cut mines. The industry representatives provided much of the training in both, and attending the courses allowed us to observe in detail the support site representatives received from them in this respect. We were also able to examine the subject matter of training, the pedagogic methods involved, and to observe interaction between representatives.

3. Results and discussion

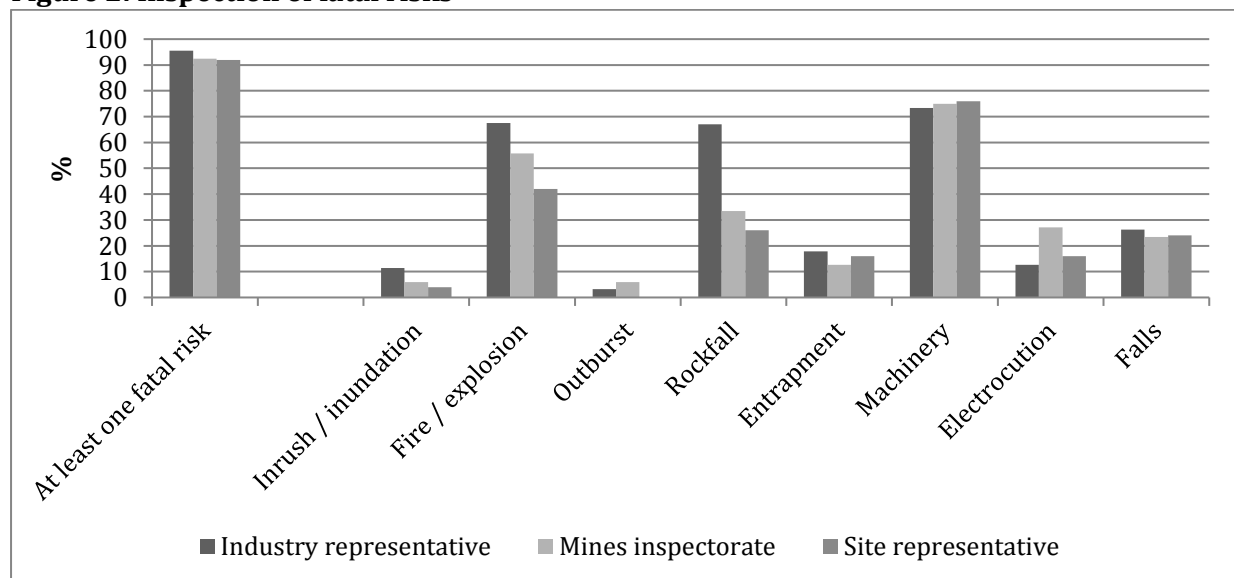
This section examines inspections undertaken by site and industry representatives and compares these to those undertaken by regulatory inspectors. It compares the types of risks identified in documented inspections and differences between each type of representative and between them and regulatory inspectors regarding scrutiny of documented OHS systems or 'hands-on' inspection of the physical conditions. It also considers these differences over time. We examine the extent to which representatives were involved with activities such as risk assessment and

reporting high potential incidents (HPI), which are characteristic of recent approaches to health and safety management in high-hazard industries. We then examine how representatives used their statutory powers to intervene in health and safety management systems and stop what they considered to be dangerous work activities.

3.1 Inspecting serious risks

Most site visit reports, regardless of whether they were undertaken by representatives or the mines inspectorate, referred to inspection of at least one fatal risk (94%). Machinery, fire or explosion and rock fall were most commonly reported (Figure 2). There was some variation between industry representative and mines inspectorate reports: more of the former referred to inrush/inundation, fire/explosion and rock fall, and more of the latter referred to outburst and electrocution. Binary logistic regression showed most of these differences were significant independent of mine type, with industry representative reports more likely to refer to inrush/inundation, fire/explosion, rock fall and entrapment, site representative reports more likely to refer to inrush/inundation and entrapment, and mines inspectorate reports more likely to refer to electrocution. In addition, mine type was independently associated with all fatal risks except electrocution. Underground mines were more likely to have reports referring to inrush/inundation, fire/explosion, outburst, rock fall and entrapment, while open-cut mines were more likely to have reports referring to machinery and falls.

Figure 2: Inspection of fatal risks



Interviews suggested representatives were aware of the potentially serious nature of the hazards they were there to prevent:

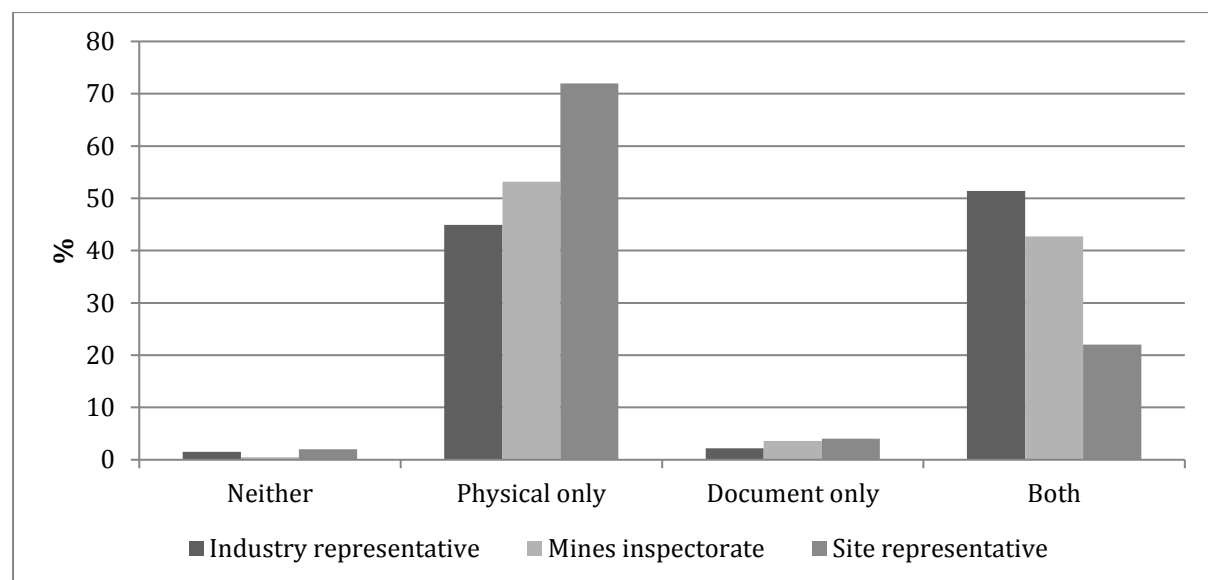
Because it frightens you at 2 o'clock in the morning when you get a call, you think what's going on, this is bad. And to wake up out of a sleep, you know, my worst fear is a fatality, you know, and ... I don't want that to occur, you know what I mean? And that to me is a failure, you know what I mean? Where I've failed, in the role, because I haven't been able to stop it. ...

Industry representative

3.2 Worker representation and systematic health and safety management

The Coal Mining Safety and Health Act 1999 (Qld) emphasised a risk management approach to regulating OHS in Queensland coalmines and mining companies operating in Queensland having both the architecture and procedures to meet these requirements (Gunningham and Sinclair, 2012), principally in the form of a safety and health management system. Subsections 99(5) and (6) require site representatives to inform the site senior executive if they believe the mine's health and safety management system to be ineffective. They are further required to advise an inspector if they feel the site senior executive's action to remedy this is unsatisfactory. Similar requirements are placed on industry representatives under section 121. It was therefore instructive to examine the extent representatives addressed the risk management systems in place. Analysis of documented inspections showed such review featured prominently in industry representatives' site visits. Just over half their inspections (54%) referred to examining documentary material (risk assessments, records etc.). As Figure 3 shows, reference only to documentary inspection was rare (2%). It also shows that industry representatives and the mines inspectorate focused more on health and safety management system documentation than site representatives. Patterns of documentary inspection between industry representatives and the mines inspectorate were similar. The main differences were that more industry representative reports referred to inspecting documents relating to emergency response, training, representatives, records/monitoring, the match between documentation and practice, and the effectiveness of the health and safety management system.

Figure 3: Relative levels of physical and documentary inspection for representatives and the mines inspectorate



At the same time, almost all mines inspection reports (96%) referred to the inspection of something physical (work areas, equipment etc.), but reference **only** to physical inspection was made in just over half (51%) of them. This was most common amongst the site representative reports, reflecting a preference, clearly demonstrated in the interviews for a 'hands-on' health and safety role.

Interviewer: And what sort of routine would you have in inspecting?

Respondent: Well normally you do an inspection and you take notes and then if you find that something has caught your eye or ear, that looks out of place or not quite right, well you go back after your inspection and you do a revision of what procedures are in place for that area, whether it's to do with traffic control or what jobs guys are doing or conditions, lighting, all that sort of thing.

Site representative

Focusing only on physical inspection was least common amongst industry representative reports. This is best explained by the wider role these representatives play in reviewing OHS management within their jurisdiction and position external to the mines they visit. As interviews with both them and the site representatives make clear, industry representatives often visited mines either in response to requests for support from the site representative or as part of proactive visits. As one site representative put it:

Respondent: They bounce off us a lot for the best places to go and look at, the high-risk areas. So they will come up to us and say, where is your problems? And I will say, well the long wall at the moment is shitty ...

Interviewer: So they would start by looking at the physical issues?

Respondent: They will come and talk to us first and they will ask us what has been happening? Where is your problem? And we will say oh well we have been having a bit of an issue down at development. Well we will go and have a look

Site representative

To carry out these tasks adequately, industry representatives need to undertake documentary inspections alongside physical inspections, and assess how one relates to the other.

Inspection records also showed that the balance between examining physical features, documents or both has changed significantly over time (Figure 4). In both industry representative and mines inspectorate reports, reference to both physical and documentary inspection increased from 1999 to 2008. It seems reasonable to conclude that this reflects the effects of the 1999 statutory requirements emphasising OHS management. Again, this was supported by interviewee responses:

I think things have changed ... you know, our Check Inspectors to me appear to be tied up a lot now with the legislation and procedures and that type of stuff. ... When I first come into the role..... I loved inspecting coalmines. ... A lot of it now is about risk assessments and reviewing risk assessments and doing that.

Former industry representative

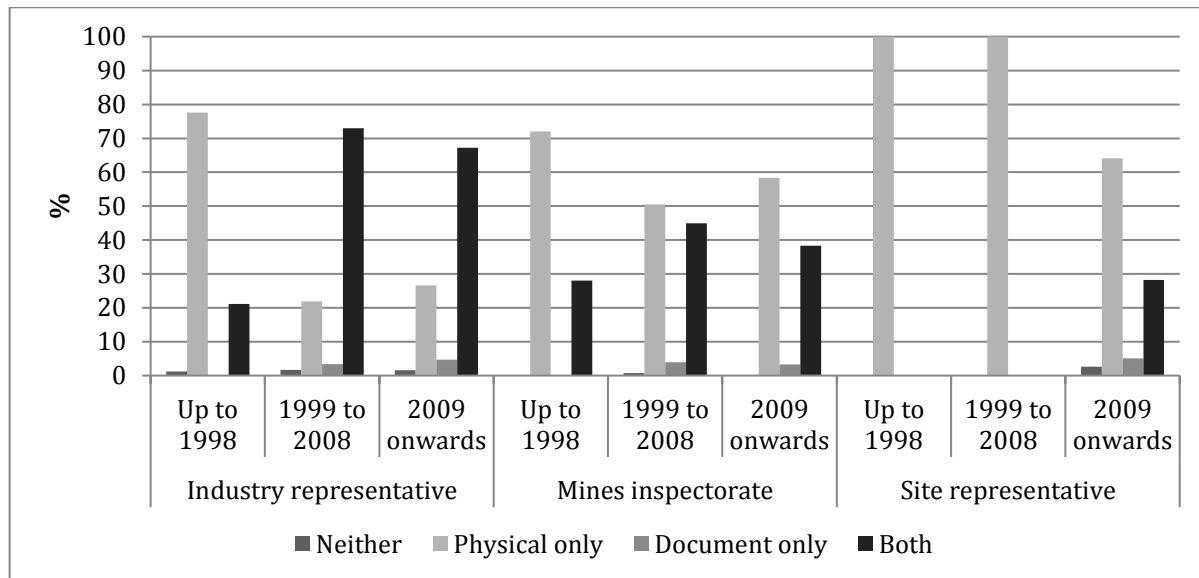
Interviewer: Has your role changed over time, you've been doing for 13, 14 years so.

Respondent: Yes, it's, legislation just changed a bit ... legislation before it was very prescriptive. ... and now they've gone to this risk, risk management

Site representative

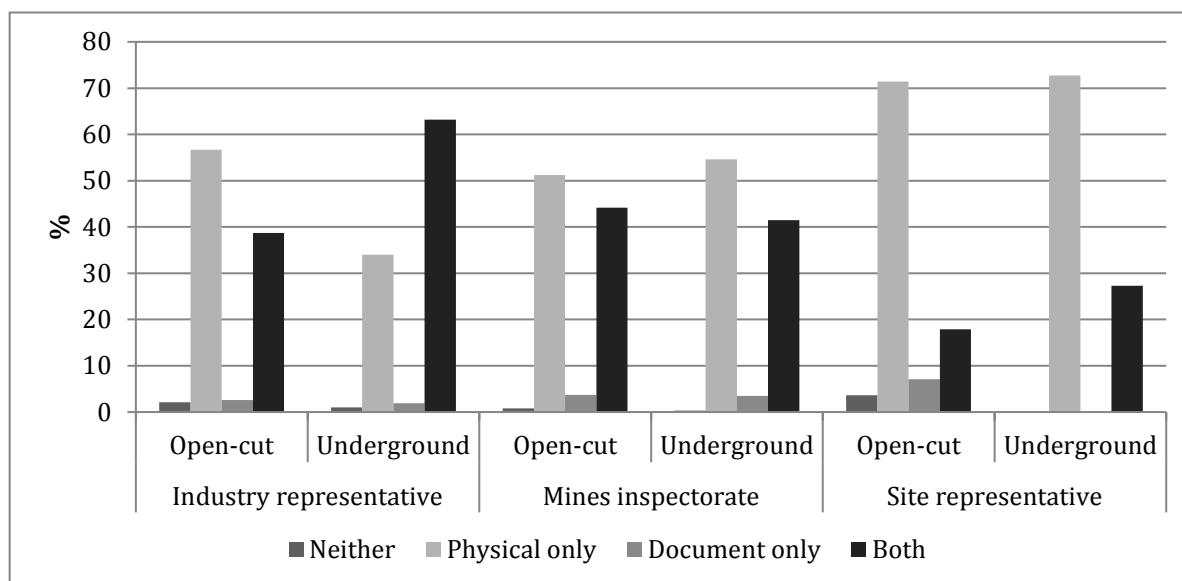
More difficult to explain, however, is that Figure 4 also demonstrates that reference to both indicators of OHS management performance during their visits has fallen back in the last five years. This slowing down or reversed trend was also observed in relation to several other aspects of the operation of arrangements for health and safety management in recent years. A similar finding is reported in other research on OHS in Queensland coalmines. We will discuss this finding later in this paper.

Figure 4: Comparing relative levels of physical and documentary inspection among representatives and the mines inspectorate over time: before the Coal Mining Safety and Health Act 1999, between 1999 and 2008, and later



Considering relative levels of physical and documentary inspection by mine type suggested more of the reports on open-cut mines referred only to physical inspections, while more of those on underground mines referred to both physical and documentary inspections, especially with regard to industry representative reports (Figure 5). This may reflect the belief amongst those interviewed that underground mines had more elaborate and complicated OHS management documents setting out procedures on the greater and more complex risks associated with underground mining. Consequently a visit by an industry representative, whether prospective or to support the site representative, was likely to involve more scrutiny of documented procedures in underground mines simply because there was more to scrutinise.

Figure 5: Comparing relative levels of physical and documentary inspection among representatives and the mines inspectorate by mine type



3.3 The involvement of representatives with reporting high potential incidents

High potential incidents are indices of increasing importance in health and safety practice— especially in high-risk industries. They are incidents judged to have a high potential to lead to serious harm, even if no harm actually occurred. The risk-based coalmining regulation implemented in Queensland reflects this increased significance. Under it, mines are required to report HPIs to site and industry representatives and the mines inspectorate. Not surprisingly, therefore, HPIs were a recurring theme in representatives' reports, particularly more recently. They showed industry representatives' involvement in and support of investigation and subsequent learning processes.⁵ In the documents examined, fatal risks were the main focus of the industry representatives' references to HPIs. HPIs were also often part of on-going issues at particular mines, which had been flagged by site representatives. However, a number of the industry representatives' reports referred to disagreements between a mine manager and the site representative about whether an incident should be classified as a HPI.

3.4 On risk assessment

The inspection records did not include those of formal risk assessment, although it was clear from many interviews that site representatives considered this part of their activities. They were involved both directly in undertaking assessments with managers and indirectly in reviewing existing risk assessment documents when following up complaints from miners. For example, one representative said:

A lot of those complaints can involve the review process so going back and reviewing procedure and then coming with some information and saying to them well look this is how I interpret this or whatever you know.

Site representative

Another added:

They might come up and say look, has there been a risk assessment done on this? And I will say look I wasn't involved in it but I will find out and get back to you. ...

Site representative

⁵ These reports are not always the result of a site visit.

However, interviews also revealed that managers sometimes marginalised representatives' involvement. For example, while most representatives talked of their engagement with identifying and assessing risks on an every day basis, some suggested managers attempted to exclude them from formal risk assessment procedures, preferring to select workers they wished to consult:

But you sometimes find that the company will select people to do those risk analysis and they're not always people on the job, fully relevant to what's going on

Site representative

3.5 Using statutory powers

If representatives identify deficiencies in the health and safety management system the 1999 Act requires them to notify the senior site executive. This can be done as a formal procedure. Not surprisingly, use of these powers, or representatives' powers to order work cessation, has been the subject of long-standing debate between mining companies and the CFMEU. For this reason, we examined the documentary evidence of their use as well as questioning interviewees concerning their experiences in this respect.

Cases where the health and safety management system was found to be inadequate and in which the industry representative served a formal notice featured in 5% of their reports, applying to around half of the mines covered. Documentary analysis showed industry representatives rarely stopped work: only 24 (5%) reports referred to the suspension of operations. These related to eleven mines, suspensions varying from one to five per mine. On four occasions, operation of particular plant was suspended because of faulty equipment causing an incident at another mine. In another two reports, made on consecutive days, referred to the same incident (in this case risk of in-rush); and for two mines identical suspension notices, issued within days of each other, referred to a fume incident. It was not clear at which mine that incident took place.

Suspension of all operations, as opposed to those confined to particular areas or using specific equipment, was even rarer: there were six (26% of the 24 suspension reports and just 1% of all industry representative reports). In suspending operations either completely or partially, all but one of the reports referred to at least one of the fatal risks identified earlier. The one that did *not* referred to the mine's Fitness for Work policy, which covers fatigue, drug and alcohol and other physical or psychological impairment, an area increasingly recognised as critical for workers' safety, health and well-being in high-risk sectors. It was also noteworthy that two reports referred explicitly to the industry representative supporting an earlier decision by the site representative to suspend operations.

The CFMEU's own analysis of suspension notices for all Queensland coalmines identifies 80 being served since the 1999 Act was introduced (CFMEU, 2013). Our data were drawn from a sample of less than half of these coalmines and in some cases for a shorter period than the approximately twelve years covered by the CFMEU compilation. Taking this into account, the number of suspension notices we identified is nevertheless broadly the proportion of the total that would be anticipated in our sample.

Similarly, only three (6%) and 10 (2%) of the site representative and mines inspectorate reports respectively referred to suspending operations. All three of the former reports were from the same mine, while the latter reports related to four mines. All the site representative and mines inspectorate reports suspending operations referred to at least one fatal risk.

There were too few suspension directives under section 167 in our data to draw reliable inferences concerning patterns in what they addressed or trends over time. However, the CFMEU analysis indicated that these directives have been increasingly used by industry representatives at the management systems level (CFMEU, 2013). It also noted only one of the major coal operators significantly questioned their content and that until recently such appeals were rare. Most industry representative suspension notices have been upheld following these appeals, or the mines inspectorate has issued a Directive under

section 166 in their place which requires remedial action but allows the process in question to continue while such action is taken. As the CFMEU pointed out, in most cases the inspectorate and the industry representatives were in agreement, pointing out that had the latter had the power to issue a section 166 Directive, they would have done so themselves.

In addition to suspensions and stoppage of work, other formal notifications by industry representatives were also rare (37, 8%). Again, four (11%) reports made explicit reference to and were supportive of the site representative. Many of these formal notifications identified weaknesses and required corrections to the health and safety management system.

There are several points that emerge from these data. Firstly, formal notifications were used to address significant OHS risks, including inadequacies in emergency response procedures and equipment, ventilation, gas monitoring, machinery hazards and so on. Further, they are generally used to identify the link between the risks posed by these failings and the health and safety management system in place. That is, they use identification of specific risks as symptomatic evidence of inadequacies in the management systems that should ameliorate and control them. This kind of feedback constitutes a procedure widely accepted as good practice in OHS management and risk prevention. Therefore, documentary evidence supports the conclusion that representatives used their suspension powers responsibly in relation to serious OHS management systems' failings. Moreover, there is no evidence in the documentation that referral of these matters to the mines inspectorate has resulted in them being deemed to have been issued irresponsibly or in the integrity or motives of the representatives being questioned by the inspectorate.

It was also clear from interviews that representatives were aware of the significance of these powers to stop work and used them sparingly:

I know I very, very rarely have to wave a big stick just shutting the pit down, having said that I have at times had to say I'm sorry but until you do this correctly your pit's closed, and let me tell you every time it's been fixed within the hour.

Site representative

Generally, interviewees indicated they used them when there was no other recourse — often in situations where they had previously engaged with management concerning specific risks but found the response had failed to remedy the situation:

Look, as our powers and functions to stop stuff, we will give the mine the option to first. So we will go up and say we believe this is unacceptable, you need to do this, this and that and then we will go and see them or document it, send them an e-mail and then they usually, 99.9% of the time, say yeah we will fix this or give me an action plan of what you gonna do, we will be happy with that and we will check up on them and see that they are doing it or if they don't then we will just stop it.

Site representative

On other occasions, they were used when representatives believed there was an immediate risk of serious harm if the process or operation continued.

Yes, we don't take it lightly ... It has got to be a high-risk area and a high-risk task, like if it is strata. If you are working a high risk area, if you are going backwards and forwards, if you are going past something like a rib that is not bolted well, you get clobbered with it and that is the end of you, you know, so that is high risk.

Site representative

It was further clear from the interviews that the representatives were very aware of the strictures placed on their powers to serve notices or suspend operations by the regulatory requirements on them not to 'perform a function or exercise a power ... for a purpose other than a safety or health purpose' or

‘unnecessarily impede production’. At the same time, possessing these powers considerably strengthened perception of their own legitimacy, a perception reinforced by positive feedback from colleagues.

I see the work force gains a fair bit of confidence from what we do, if we're happy or if we consider it safe, they accept, that yeah, we've got the risk as low as is reasonably achievable, if we're not, confident or happy with, what's been decided or the controls, they know we've got the power to go further.

Site representative

Possessing such powers also enhanced their confidence that they would be taken seriously by senior managers in their pursuit of actions that were in the main consultative and co-operative in part because they have the potential to use powers that would seriously inconvenience senior management. There are parallels between these findings and studies of the powers of health and safety representatives to stop dangerous work in other industries and countries. For example, in Sweden where such representatives have a similar power to order the suspension of work, researchers found it was used very sparingly but greatly valued by representatives, for the legitimacy and for the respect for their role that it conferred (Frick, 2009). Similarly, there is little Australian evidence that such powers to direct that dangerous work cease have been overused. An ACTU (2005) survey of health and safety representatives reported that 11 per cent had issued a provisional improvement or default notice, and 91 per cent believed it was effective in resolving the issue. The survey further reported that 21 per cent had directed that unsafe work cease or stopped work for OHS, and 88 per cent said that the direction had resolved the issue. Our study suggests that, if anything, mining representatives used their powers even more sparingly.

4. Conclusions: representing workers' health and safety interests in a difficult climate

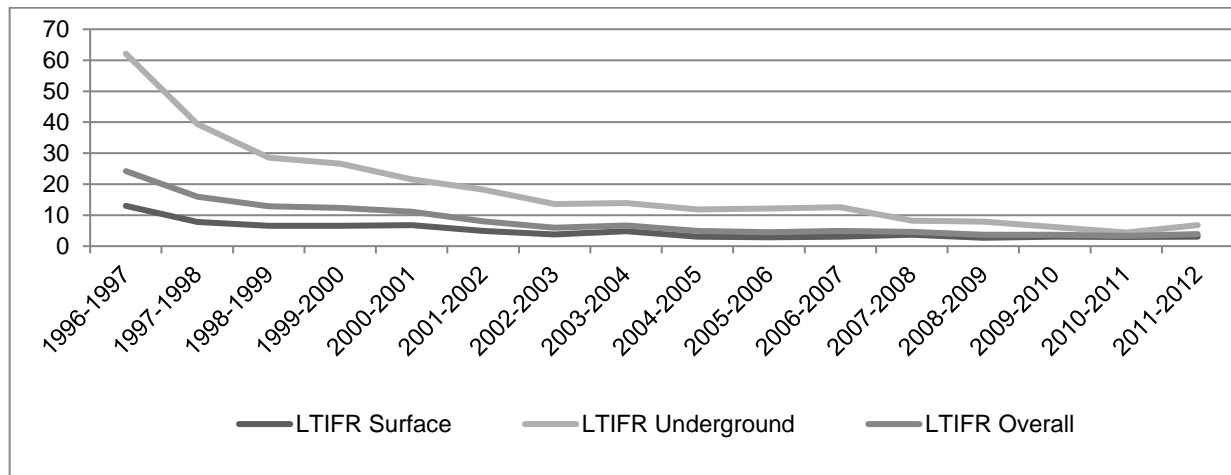
The combined evidence of documentary inspection records and verbal testimony from representatives and a senior regulatory inspector, indicates the engagement of worker representatives with addressing the serious risk of coalmining. It shows that they do so by using the various means with which they are provided by regulatory measures, the wider objectives of which are to achieve systematic management of health and safety in coalmines in Queensland. As is the case with many examples of process-based OHS regulation, the worker representation measures in the 1999 Act and the activities they support, are major pillars of a strategy of *enforced self-regulation* of health and safety management. The first significant conclusion of our study is that representatives play a substantial part in operationalizing this strategy.

In terms of their effectiveness in this role, we recognise that the present study does not provide a direct measure of their influence on improved OHS outcomes like reduced injuries and fatalities. However, where it has been possible to conduct such studies, both in coalmines and elsewhere, the consistent finding is that arrangements for representation and consultation and the presence of unions do result in such outcomes (see for example Morantz (2011), on coalmines in the US; and Robinson and Smallman (2013); Walters et al (2013); Walters and Nichols (2007) for similar findings in other sectors and countries). What is significant about the present study is that it adds to our understanding of *how* this is achieved in Queensland coalmines. Analysis of inspection records, made possible by statutory requirements on keeping these records, made it possible to obtain a quite detailed and longitudinal account of the kinds of actions that contributed to the role of representatives in reducing work-related harm to miners. It also indicates they focus on acknowledged serious risks of coalmining. Following this up with detailed interviews with representatives threw further light on the ways they addressed these tasks and on the supports and constraints on their actions. Moreover, both sources indicated representatives reviewed the health and safety management in place and were able to relate the minutiae of workplace incidents and investigations to weaknesses in these systems and recommend remedial changes to them.

While these findings support the conclusion that representatives contribute significantly to the operation of statutory arrangements for the systematic management of mining risks, an examination of trends in injury and fatality data suggest the picture may be more complex. Although these data suggest declining

injury and fatality rates largely coincident with the period since the 1999 Act was introduced, as Figure 6 shows, and others have also argued (see Joy, 2004; Gunningham and Sinclair 2012; Yang 2012), these effects began before the Act's implementation and have stalled somewhat in more recent years.

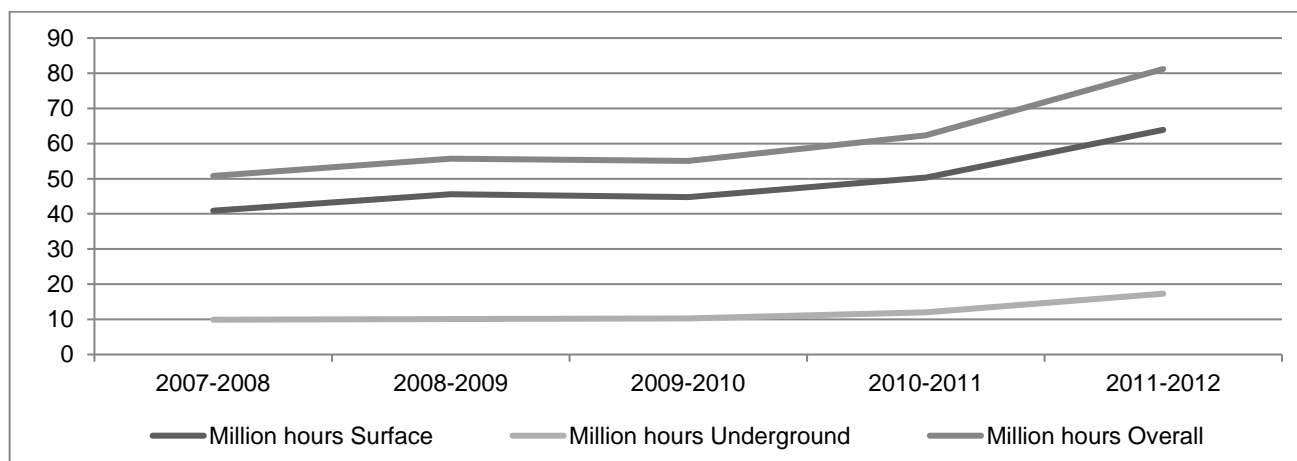
Figure 6: Lost time injury frequency rates (LTIFR) per million hours worked for Queensland coalmines 1996/1997 to 2011/2012*



*Data source: Queensland Mines and Quarries Safety Performance and Health Reports (2000 - 2001 through to 2011 - 2012)

Reasons for the trend are likely to be complex and not confined to the influence of statutory measures. Figures for hours worked suggest parallels between increased work and slowing of the improvement in the injury rate (see Figure 7).

Figure 7: Hours worked in Queensland coalmines 2007/2008 to 2011/2012*



*Data source: Queensland Mines and Quarries Safety Performance and Health Reports (2007 - 2008 through to 2011 - 2012)

In addition, research on work organisation and labour relations in Queensland coalmines points to a number of by mining company strategies to increase managerial control over work regimes, some of which may make systematic OHS management more difficult to achieve — as has been acknowledged by research in other sectors. For example, aided by wider reforms in Australian industrial relations, during the 1990s mining companies began to increase the use of contractors and non-union contract labour as well fly-in-fly-out arrangements to disconnect employment from the social communities that traditionally provided strong support for miners' unionism (Waring 2003). These approaches gained momentum in the 2000s and recent findings indicate they are well-established in Queensland (Bowden

and Barry 2015). Corporate organisational strategies also encourage considerable movement among senior managers, resulting in regular turnover of those responsible for OHS which, as representatives in the present study pointed out, helped undermine the continuity of relations between representatives and senior managers.

Analysis indicates such practices to have played a part in major disasters in coalmines elsewhere, such as in Pike River, New Zealand, where 29 miners died in 2010 and in Soma, Turkey, where 301 miners died in 2014 (Lamarre et al 2015; Ensor 2014.) A similar story is true of major disasters in other sectors, some examples being the AZF Toulouse explosion in 2001, the Buncefield fire in 2005; Deep Walter Horizon in 2010; Fukushima in 2011 and the sinking of the Sewol ferry in 2013. It highlights the combined effects of work organisation, management and labour relations strategies, and suggests precarious employment, contracting and subcontracting and the reduced presence of organised labour, while giving greater freedoms to modern business nostrums concerning the achievement of price, production and delivery efficiencies, may in turn act to increase the fragmentation of safety management and serve to remove or downgrade the effectiveness of workers' voice in warning of its consequences. These changes take place alongside corporate attempts to introduce OHS systems in which workers' behaviour, accountability, auditing and paper compliance feature strongly and where a more unitary 'worker engagement' is preferred to the more pluralist forms of 'worker representation' on OHS matters that are the subject of statutory provisions (Quinlan 2014; Woolfson 2014; Hopkins 2011), while at the same time their employment and working conditions experience considerable erosion, as Peetz and Murray (2011) have shown is the case in Australian mining.

Studies of recent health and safety management practices in Queensland mines suggest a similar trajectory. In a series of publications, Gunningham and Sinclair (2009; 2011; 2012) pointed to the limitations of management-based enforced self-regulation, in achieving improved OHS outcomes. They suggest this to be especially so where corporate governance attempted to impose external regulation of OHS management across different mines and where hostility in labour relations had already engendered a climate of mistrust among workers and their management. Similar findings were presented in an earlier report commissioned by the NSW Mines Safety Advisory Council to follow-up recommendations of the Wran Mine Safety Review in 2005 in New South Wales (Shaw et al 2007:200-207)

The Queensland experience, therefore, suggests something of a paradox. On the one hand, there is good evidence that the operation of the pluralist system of workers' health and safety representation, that is required by regulation, has made a significant contribution to systems for preventing injuries and ill-health and that the representatives themselves have played a substantial part in this achievement. On the other, there is evidence of only limited managerial support for its operation and indications of a corporate preference for a different system of worker engagement on OHS in coalmines generally in Queensland, in which autonomous representation is replaced by more behaviour-based systems of direct participation in corporate safety systems, implemented and controlled by managers. Such organisational strategies among large corporations that are a significant presence in the ownership and operation of coalmines globally, are not unique to the mines of Queensland but are widespread practice in many other sectors too. There are also no indications that the climate of labour relations that Gunningham and Sinclair argue undermines participative approaches to health and safety has become any less hostile in recent years. Indeed, if anything, comments appearing in local mining magazines suggest it may have become further entrenched.

More generally, for the future, the findings of the study imply a need to investigate the operation of regulatory arrangements on health and safety management in coalmining more widely. As we pointed out in the Introduction, there is a dearth of research concerning the relationship between regulation and practice in health and safety management in mining. Moreover, very little is known about the operation of regulatory measures for workers' representation on OHS and their relationship to health and safety management in this industry despite the longevity of these provisions. Despite its limitations, the Queensland system for participative health and safety management in mines has been cited as exemplary by some authors (see for example Yang 2012) and recommended for adoption in other jurisdictions (see

for example Royal Commission 2012). Under such circumstances, therefore, it would seem to be important to inquire how widespread the paradoxes identified above are in coalmining more generally, and to consider the implications of better understandings of their contexts and determinants for both the regulation and practice of OHS in coalmining globally.

Acknowledgements

This paper is based on a study funded by the Mining and Energy Division of the Construction, Forestry, Mining and Energy Union. It also made available its records of mine inspections and the use of its premises in which researchers were afforded the necessary privacy to conduct confidential interviews. A more recent grant from the Institution of Occupational Safety and Health also helped facilitate the writing of this paper.

References

- ABC (Australian Broadcasting Company (2016) Black lung: Queensland parliamentary review into disease resurgence approved <http://www.abc.net.au/news/2016-08-19/black-lung-queensland-government-to-set-up-parliamentary-review/7765388>
- Australian Council of Trade Unions (ACTU), 2005. A Report on the 2004 National Survey of Health and Safety Representatives. Australian Council of Trade Unions, Melbourne.
- Bowden B., Barry M., 2015. Re-casting industrial relations: Productivity, place and the Queensland coal industry, 2001–2013. *Journal of Industrial Relations* 57, 1, 48–71.
- Construction, Forestry, Mining and Energy Union (CFMEU), 2013. Submission to Queensland's Mine Safety Framework, Consultation Regulators Impact Statement. <http://www.mines.industry.qld.gov.au/assets/qusf-submissions/75-124pdf>
- Donoghue A., 2004. Occupational health hazards in mining: an overview. *Occupational Medicine*, 54, 283–289.
- Ensor, J., 2014. Hundreds of miners trapped after explosion in Turkish coal mine'. *The Daily Telegraph*, 13th May.
- Frick, K., 2009. Health and Safety Representation and Small Firms: Reflections from Sweden. In: Walters, D., Nichols, T. (Eds.), *Workplace Health and Safety: International Perspectives on Worker Representation*. Palgrave Macmillan, Basingstoke.
- Groves, A., Kecojevic, V., Komljenovic, D., 2007. Analysis of fatalities and injuries involving mining equipment. *Journal of Safety Research*, 38, 461–470.
- Gunningham, N., Sinclair, D., 2012. *Managing Mining Hazards: Regulation, Safety & Trust*. Federation Press, Sydney.
- Gunningham, N., Sinclair, D., 2011. A cluster of mistrust: safety in the mining industry. *Journal of Industrial Relations*, 53, 4, 450–466.
- Gunningham, N., Sinclair, D., 2009. Organisational Trust and the limits of Management-Based Regulation. *Law and Society Review*, 43, 4, 865–899.
- Hopkins, A., 2011. Risk management and rule compliance decision making in hazardous industries. *Safety Science*, 49, 508–510.

- Hopkins, A., 1999. Repeat disasters: The lessons of the Moura coal mine. In: Peterson, C., Mayhew, C. (Eds.), *Occupational Health and Safety in Australia*. Allen and Unwin, Sydney.
- Joy, J., 2004. Occupational safety risk management in Australian mining. *Occupational Medicine*, 54, 311–315.
- Karra, V., 2005. Analysis of non-fatal and fatal injury rates for mine operator and contractor employees and the influence of work location. *Journal of Safety Research*, 36, 413–421.
- Lamarre, J.R., Lamm, F., McDonnell, N., White, H., 2015. Independent, dependent and employee: Contractors and New Zealand's Pike River Coal Mine disaster. *Journal of Industrial Relations*, 57, 1, 72–93.
- London, L., Kisting, S., 2016. The Extractive Industries: Can We Find New Solutions to Seemingly Intractable Problems? *New Solutions: A Journal of Environmental and Occupational Health Policy*, 25, 4, 421–430.
- Morantz, A., 2011. Coal Mine Safety: Do Unions Make a Difference? Stanford Law & Economics Olin Paper Series, Paper No. 413, Stanford University.
- Quinlan, M., 2014. *Ten Pathways to Death and Disaster: Learning from Fatal Incidents in Mines and Other High Hazard Workplaces*. Sydney, The Federation Press.
- Peetz, D. and Murray, G (2011) You Get Really Old, Really Quick': Involuntary Long Hours in the Mining Industry, *Journal of Industrial Relations*, 53: 13–29,
- Poplin, G., Miller, H., Ranger-Moore, J., Bofinger, C., Kurzius-Spencer, M., Harris, R., Burgess, J., 2008. International evaluation of injury rates in coal mining: a comparison of risk and compliance based regulatory approaches. *Safety Science*, 46, 1196–1204.
- Robinson, A., Smallman, C., 2013. Workplace injury and voice: a comparison of management and union perceptions. *Work, Employment and Society*, 27, 4:674 –693.
- Royal Commission of Inquiry, 2012. Royal Commission on the Pike River Coal Mine Tragedy. <http://pikeriver.royalcommission.govt.nz> (accessed March 2016).
- Saleh, J., Cummings, A., 2011. Safety in the mining industry and the unfinished legacy of mining accidents: Safety levers and defense-in-depth for addressing mining hazard. *Safety Science*, 49, 764–777.
- Shaw, A., Blewett, V., Stiller, L., Cox, S., Ferguson, S., Frick, K and Aickin, C (2007) *Digging Deeper, Wran Consultancy Project Vol 1* (2007) NSW Mines Safety Advisory Council
- Walters, D., Nichols, T., 2007. *Worker Representation and Workplace Health and Safety*. Palgrave Macmillan, Basingstoke.
- Walters, D., Quinlan, M., Johnstone, R and Wadsworth, E. (2016) Cooperation or resistance? Representing workers' health and safety in a hazardous industry, *Industrial Relations Journal*, DOI: 10.1111/irj.12147
- Walters, D., Wadsworth, E.J.K., Davies, O.R., Lloyd-Williams, H., Marsh, K.L., 2013. Analysis of the findings of the European Survey of Enterprises on New and Emerging Risks on the effectiveness and support for worker representation and consultation on health and safety. European Agency for Safety and Health at Work, Bilbao.
- Waring, P., 2003. The nature and consequences of temporary and contract employment in the Australian black coal mining industry. *Labour & Industry*, 14, 2, 83–96.

- Woolfson, C., 2013. From Piper Alpha to Deepwater Horizon. In Nichols, T., Walters, D. (Eds), *Safety or Profit: International Studies in Governance, Change and the Work Environment*. Baywood, New York.
- Yang, B., 2012. *Regulatory Governance & Risk Management: Occupational Health and Safety in the Coal Mining Industry*. Routledge, London.
- Yassi, A., Lockhart, K., Sykes, M., Buck, B., Stime, B., Spiegel, J.M., 2013. Effectiveness of joint health and safety committees: A realist review. *American Journal of Industrial Medicine*, 56, 4, 424-438.