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“Thoughts, Feelings, Action”: Survey of Victorian Managers of Major Hazard Facilities

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Abstract

This paper reports on a survey of Victorian Major Hazard Facility managers as a follow up to earlier comparative case study research of regulation encompassing MHF, counterterrorism and financial regulation. The case study research suggested that the Victorian MHF safety case regime could be viewed as a 'best case scenario' amongst the three regulatory regimes studied. The results of the survey support this positive assessment of the Victorian safety case regime and the critical role played by the regulator independently from the regulations they are charged to administer. The survey also provides an important window into understanding what assists in compliance with safety case requirements and the way managers' deal with business pressures and competing regulatory demands that may threaten safety levels at their respective sites.

Aims

The optimum strategy for reducing risk through regulation has been subject to much discussion and debate. Promising approaches have resulted from research that points to the value of flexible procedures designed to keep the focus on the particular risk at hand, jointly developed between regulator and site that both maintain rigorous standards of risk reduction whilst being relevant to context (Black 1997; Coglianese 2003; Gunningham and Johnstone 1999; Parker 2002). The safety case approach to reducing major hazard risk is a high profile example of this method of regulation which, at best, combines rigorous risk reduction with a collaborative approach to development of procedures through intensive involvement by regulators and a collaborative approach on site between workers and management (Hopkins and Wilkinson 2005).

This article reports on a survey of Major Hazard Facilities (MHF) in Victoria that asked relevant managers to assess their experience of the safety case regime, regulatory requirements instituted after the Longford Gas Explosion in Victoria in 1998. The survey was broad ranging covering managers' experience with the *Occupational Health and Safety (Major Hazard) Regulations 2000 (Vic)*, regulations which enshrine a safety case approach within Victoria, their experience working with the regulators within the Victorian Major Hazard Unit (MHU), potential alternative sources of support for compliance with the MHF regime, (i.e. third party actors (Grabosky 1997)), achieving business goals alongside safety case compliance, as well as their experience of the growth of regulatory demands generally and conflict between regulatory regimes.

This survey sits within a broader comparative research project of regulatory response to disasters in three areas: major hazard regulation (following Longford), counter-terrorism regulation at ports, airports and MHFs (following the terrorist attacks of September 11th 2001) and financial regulation in the wake of the collapse of HIH Insurance in 2001. What is most relevant to this paper from this broader research project is that MHF regulation in Victoria appeared as a "best case scenario" in terms of regulatory response to disasters. Through our interview and case study analysis, the Victorian Safety Case regime could be understood as the most effective regulatory response across the three domains (Haines 2009a; Haines, Sutton and Platania-Phung

2008). However, a question remained as to whether the six case studies undertaken of MHFs in Victoria were representative of views across the state. In short, was our optimism in this regime well-founded?

Methods

The survey was administered on-line after managers had been contacted directly by the researchers to ascertain the most relevant manager able to answer the survey questions. 27 managers responded to the survey. There were 41 MHFs in Victoria at the time of the survey. As mentioned, 6 case studies were undertaken so that a final total of 32 sites were in the research pool. The combined research covered 78% of all MHFs in Victoriaⁱ.

Middle and site managers made up two-thirds of the survey respondents (66%). In terms of their occupational background, 59% were engineers, 22% had a technical or trade background and 18% a business or management background. They had a median of 2.25 years experience in their current role (mean of 3.3 years) and 7.75 years within their organization more generally (mean of 12.9 years). Critically, all but one respondent reported either 'a moderate' or 'a lot' of understanding of the regulatory regime.

The MHFs surveyed covered a range of industries, with 42% in the petrochemical sector. 41% of the sample comprised storage facilities only, whilst 59% of sites had a process component to their operations. The age and size of sites also varied. In terms of age 58% of the sites were over 30 years old and 42% under 30 years old. Sites ranged in size from less than 10 employees on site (5 sites) to over 60 (11 sites). We also asked about site ownership with over half operated by a publicly-listed company (56%). Of those that were private, the majority were owned by a private equity consortium as opposed to being family owned operation. We also drew on publicly available MHU material to identify which sites were seen as less safe in terms of their MH processes on site. Discussions with regulator suggested that the presence of licence conditions indicated some concern on behalf of MHU in terms of the level of MH risk on site. Clearly, however, this level of risk was not of the order that would lead to a site being refused a licence. It is important to note here that our earlier research had indicated that the Victorian MHU was willing to refuse a licence should

the site not be up to the standard required (Haines, et al. 2008). Our case study sites also included one whose licence application was initially rejected and intense work put into risk reduction in order to bring the standard of the site up to a level acceptable to the MHU. Through licence conditions, then, we were able to include a proxy measure for MH risk on site where the absence of conditions indicated higher safetyⁱⁱ. At the time of survey, 59% participating sites had license conditions and 37% did not.

Results

Overall initial assessment

The first two figures show the results of an overall assessment by managers of the safety case regime. In Figure 1 managers were asked whether they felt the regime was exemplary and should be applied to other countries and in Figure 2 the managers were asked whether they felt that their site used the safety case regime effectively to reduce the risk of a major hazard incident. The results are positive for both questions, with 73% (19 sites) seeing the regime as exemplary and 89% (24 sites) reporting that they used the regime effectively to reduce MH risk. Further analysis of these questions revealed that sites which had conditions on their licence were significantly less likely to see the regime as exemplary ($t(23) = -2.23$; $p < .05$). There were no significant differences on these initial assessments however in terms of type of site, industry, age of site or size.

FIGURE 1

Views of the regulations as exemplary

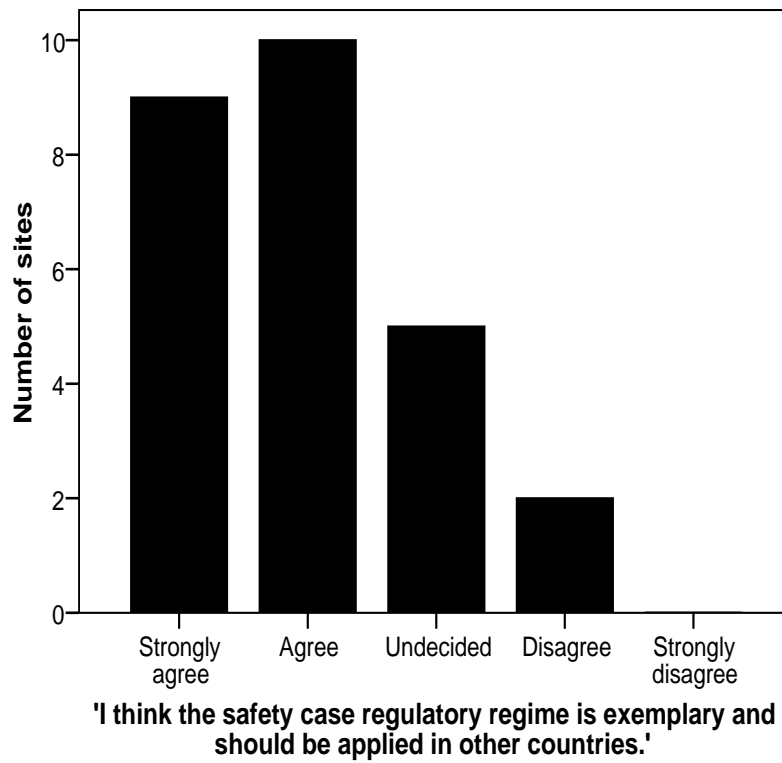
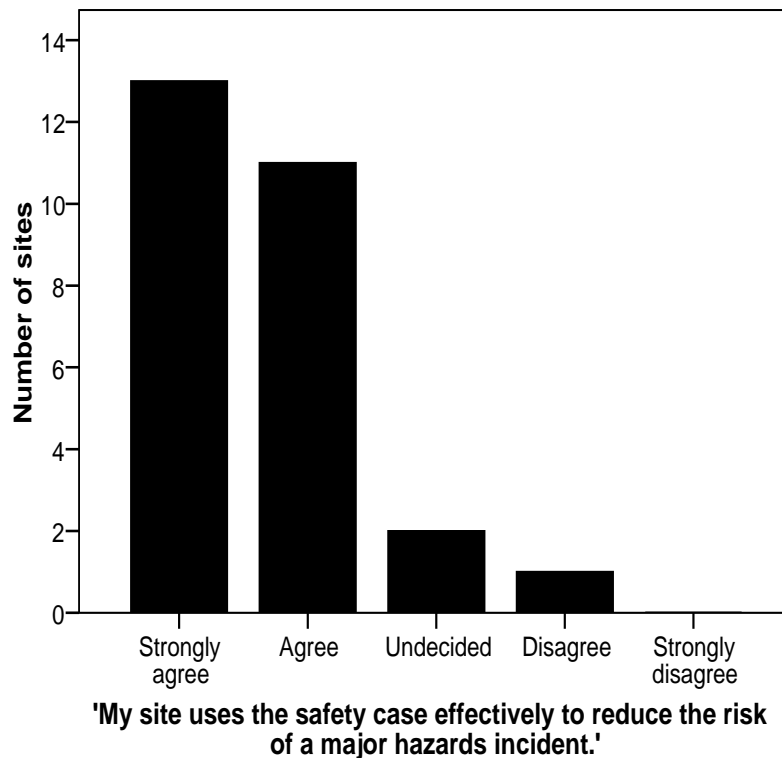


FIGURE 2

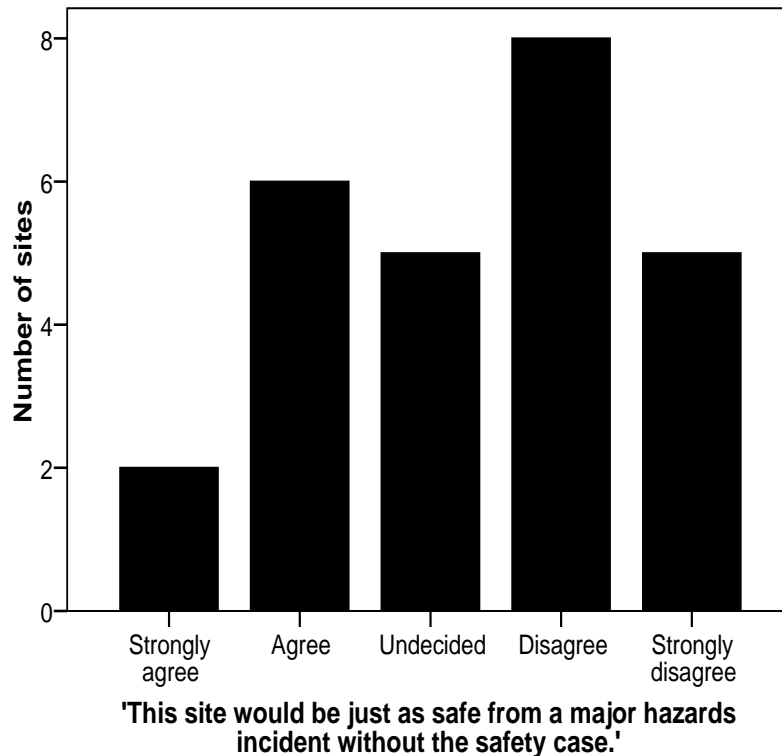
Effective use of Regulations



An important question was whether the managers felt that the site would be just as safe from a major hazards incident without a safety case regime. As Figure 3 (below) shows 13 (48%) either disagreed or strongly disagreed with this statement, whilst 8 (30%) either agreed or strongly agreed with the statement, and 5 (18%) were undecided. Clearly, the results are somewhat equivocal and lend some support to the recent Productivity Commission report that in cases of low incidence high consequence events it is difficult to assess the specific impact of a regulatory regime such as safety case (Productivity Commission 2008).

FIGURE 3

Independent impact of Regulations



Further, the majority of sites had multiple sources of control which may have shaped their view as to the independent influence of the safety case regime. Case study analysis suggested that many sites had internal procedures to address major hazard risk, procedures developed independently from the MH regulations. This finding was confirmed in the survey with 24 out of 27 survey sites reporting they had independently developed procedures. There could be considerable monitoring of these procedures by head office for example. The majority of survey sites with multi-national ownership (78%) rated their sites as '5' or above on a 7 point scale in terms of the "hands on" nature of their head office (where 1 was 'very hands off' and 7 'very hands on').

The role that independently developed procedures play in reducing risk, however, is not entirely clear. It will be remembered at the time of the Longford gas explosion that Exxon had in place what was considered cutting-edge internally generated

procedures (known as its Operating Integrity Management System (OIMS)) for controlling major hazard risk, yet the fact of the existence of these procedures did not prevent the disaster (Dawson and Brooks 1999). For the current study, it was difficult to assess whether sites that had internally developed procedures were safer (as assessed in terms of presence or absence of licence conditions) given that most of the sites (89%) reported having internal procedures. However, there was no significant relationship between licence conditions and views of the independent impact of the regime ($t(23) = -1.11$; $p > .05$). Without a rigorous assessment of these internally generated procedures it would be a brave strategy to remove the protection of the safety case regime and rely on these procedures alone.

There is a separate issue here, however, one that is relevant to concerns with 'red tape' (Regulation Taskforce 2006). The survey results showed that 19 of the 24 managers reported that harmonising their internally developed procedures with those required under safety case involved 'a lot of extra work' even though the safety case procedures were developed by the sites themselves and presumably designed to suit site needs (albeit subject to approval by the regulator). Four managers reported 'a little extra work', none 'no extra work' and one manager did not respond to this question. The level of work involved was high even when the managers reported that their internal procedures were commensurate safety case procedures. From this it is clear that political and business concerns with the general increase in regulatory pressure must take account of internally generated 'red tape' and not only the demands coming from government.

Perceptions of regulator and the regulations

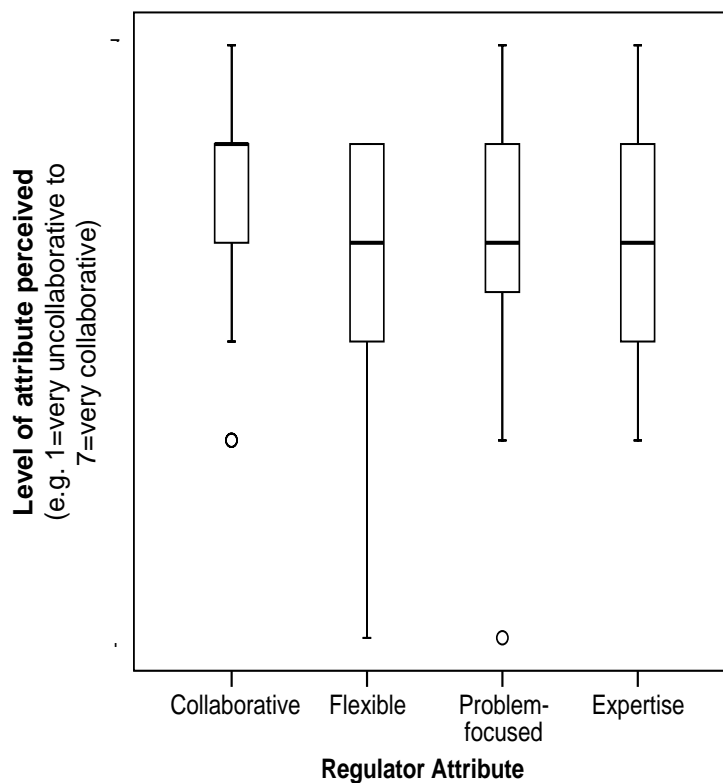
The relationship the site has with the regulator, however, does seem important in sites' views of the regulatory regime. Further analysis of the survey data reveals some relevant information regarding the results shown in Figure 3 above. Where the regulator was seen as 'problem focused' the respondent was less likely to feel the site 'would be just as safe without the safety case regime'. That is, there was a significant correlation between the managers' views of the regulator and their views about the independent effectiveness of the regime ($r(26) = .55$; $p < .01$).

This finding takes us to an exploration of the perceived helpfulness of the regulators and the regulations within the survey (Figure 4 and 5 respectively). In brief, Figure 4

below shows a positive evaluation of the regulators, supporting the interview analysis of the collaborative nature of the safety case process. Figure 4 shows that on a 7 point scale the median for the regulator as ‘collaborative’, flexible’, ‘problem focussed’ and having ‘expertise’ was 5 or above. The overall average rating was 5.07.

FIGURE 4

Perceptions of the Regulator

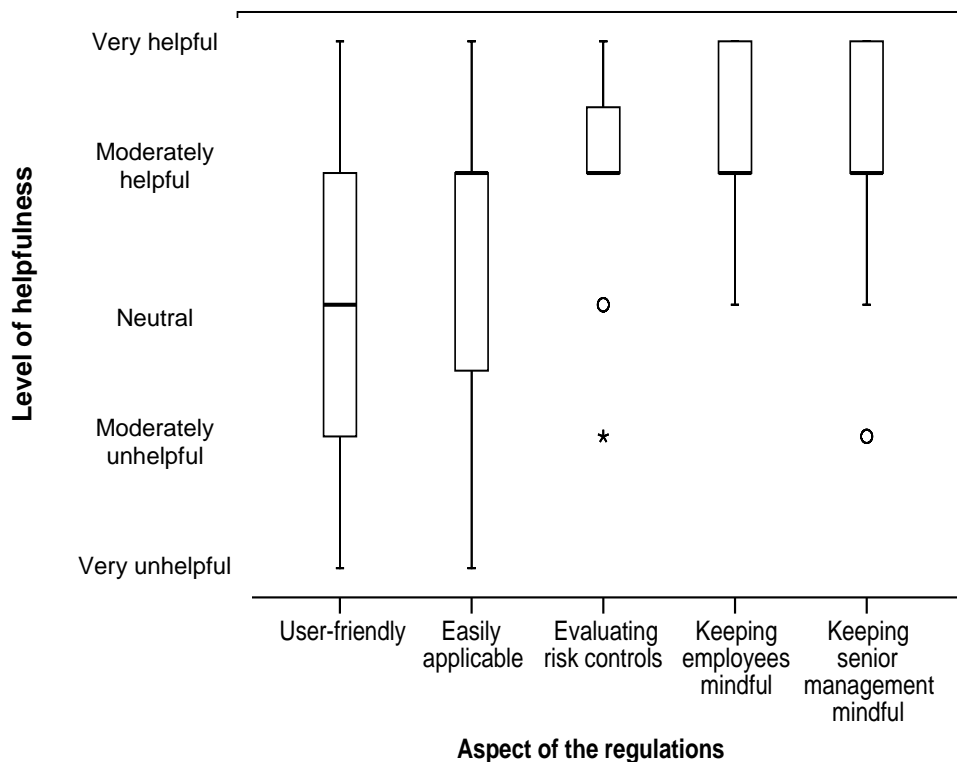


The ratings of helpfulness of the regulations show a rather more mixed picture. Managers rated helpfulness in terms of whether the regulations were ‘user-friendly’, ‘easily-applicable to site needs’, ‘evaluating whether risk control measures are effective’, ‘keeping employees mindful of the possibility of a large scale incident’ and ‘keeping senior management/directors mindful of the possibility of a large scale incident’, and each on a scale ranging from 1 (‘very helpful’) to 5 (‘very unhelpful’). Helpfulness ratings were reverse scored in order to compare them more directly to the regulator ratings. Figure 5 shows the ratings for various ways the regulations may be found to be helpful. Overall, there is some evidence in Figure 5 below that managers

feel the regulations are more helpful in keeping both employees and senior managers mindful of the possibility of a major incident than they are user-friendly. The importance of mindfulness, however, should not be understated. Indeed, mindfulness has emerged as potentially an important factor in reducing the risk of disaster (Weick, Sutcliffe and Obstfeld 1999). These results can then be seen to support the proposition that co-regulation, at least in the form of a safety case regime, might be helpful in keeping those on site attentive to the possibility of a major incident and hence more concerned to ensure that risk is reduced.

FIGURE 5

Perceptions of the Regulations



It is interesting in this regard to take a closer look at the survey response in terms of whether the MH regulations were useful in evaluating whether risk had been reduced on site. As Figure 5 above shows there was a considerable divergence in views here and further analysis revealed that sites with a condition on their licence viewed the regulations as significantly less helpful in evaluating whether their risk control

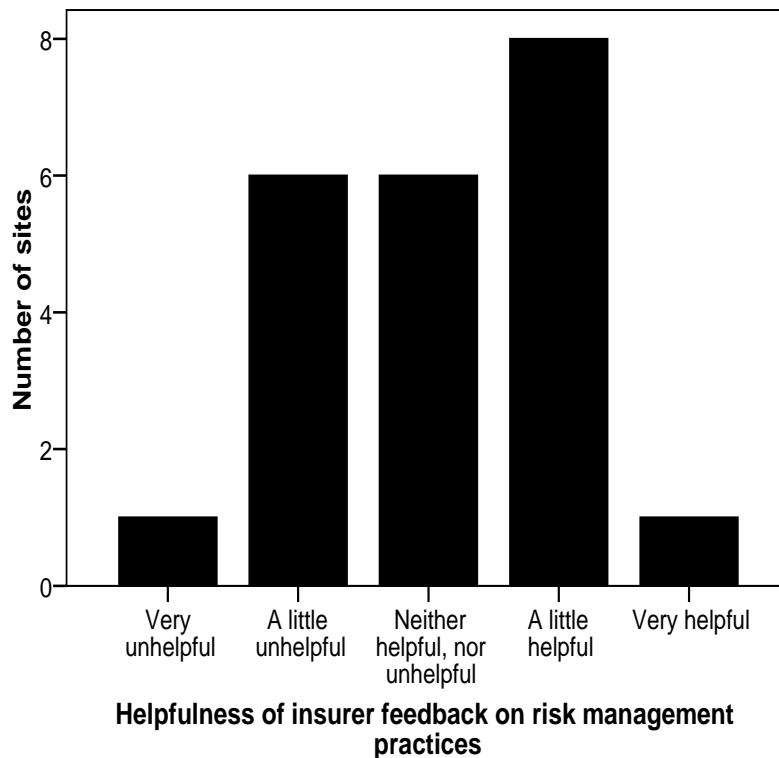
measures were effective ($t(24) = -2.33$; $p < .05$). Arguably, it is possible a picture is emerging here, with sites with conditions on their licence (our proxy for a less safe site) not fully grasping the potential within a safety case regime. In a sense, the logic of the regime is somewhat at odds with their expectations and experience on site.ⁱⁱⁱ Overall, the survey supports the case study findings that it is important to assess the regime and the regulator separately. Both have an independent influence on the effectiveness of a regime.

Impact of third parties

There were two sources of third party pressure gathered through the survey: the influence of insurers and community pressure. The potential influence of insurers in reducing risk (Grabosky 1997) and community pressure, the ‘social licence to operate’ (Kagan, Gunningham and Thornton 2003) are both commented on in the literature. These results were largely consistent with our case study research. Figure 6 below reports on the helpfulness of insurer feedback on site risk-management practices. Seven (26%) reported this feedback to be either ‘a little unhelpful’ or ‘very unhelpful’, whereas 9 (33%) found such feedback to be either ‘a little helpful’ or ‘very helpful’. For 4 self insured sites such an independent influence was not available. Such results suggest that whilst insurer feedback may be helpful, it should not be relied upon in designing a regulatory regime. The case study research also showed a mixed picture in terms of the influence of insurers on MH risk management. In the case studies, sites which were self-insured through head office might find themselves covered by virtue of their overall ownership structure. Certainly, with some case study sites, insurance arrangements took place at arms length with little or no relevance to actual site risk management practices. Further ‘packaging’ of different lines of insurance in order to receive a premium discount could further increase the distance between insurance and specific forms of risk reduction (Haines 2009a). On the other hand one case study site was able to use insurer feedback in enhancing their safety case regime.

FIGURE 6

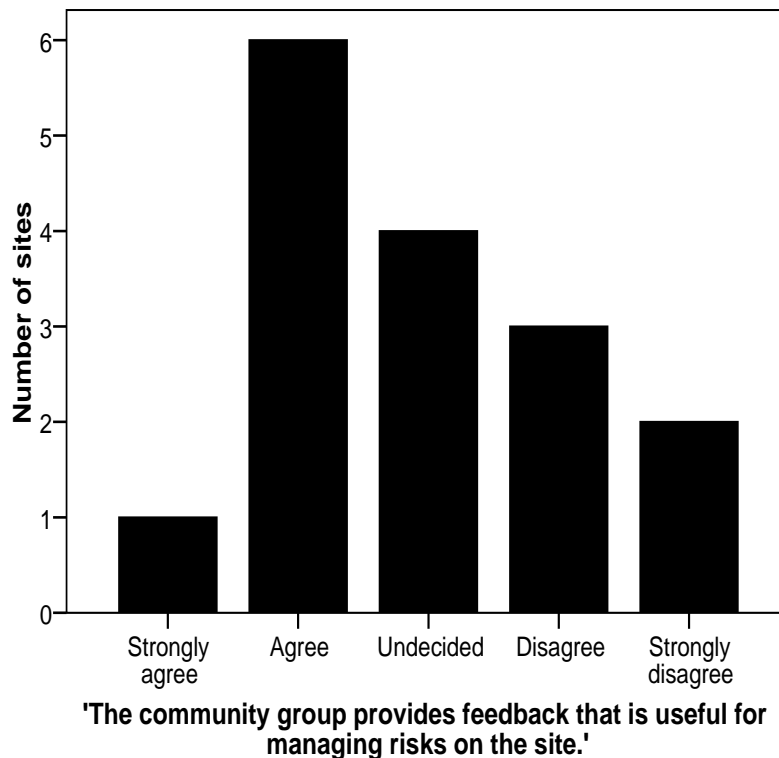
Impact of Insurance on Compliance



Managers' experience with the impact of social pressure on levels of compliance, as measured by community group feedback was also somewhat mixed. A word of explanation is important here. The safety case regime requires that sites communicate with the local community, particularly in terms of emergency procedures, but also to address local concerns. What was striking was that a number of the sites did not have a specific community liaison committee (11 sites). It is difficult to assess the role of the community where there is no specific liaison committee in place. These results, then, need to be interpreted with some caution as a total picture of the impact of the local community on compliance. Nonetheless, our case study analysis suggest that where there was no community group in place, sites perceived that the community was 'happy' with how the sites were controlling major hazard risk. Of course, interviews with community members could be at variance with such a view (Haines 2009b). Sites views of community liaison group meetings and their impact is, therefore important to understand.

FIGURE 7

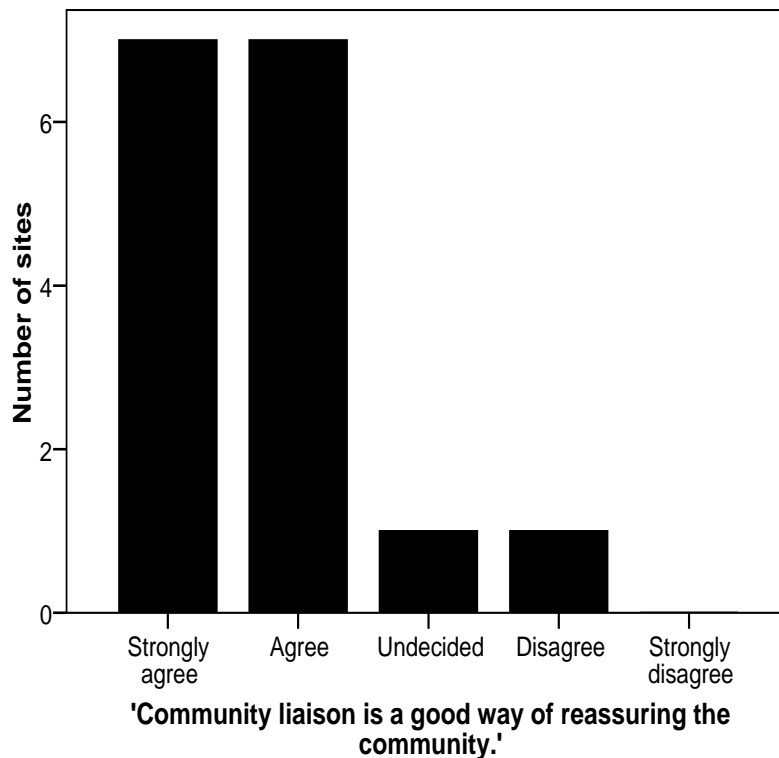
Managerial views on the role of community feedback in risk management



Figures 7 (above) and 8 (below) present survey results for the 16 sites that reported having a community liaison group. Together Figures 7 and 8 suggest that managers felt that their interaction with the community group was of more importance in reassuring the community about their site's commitment to reducing major hazard risk than in the community providing helpful feedback on how to reduce those risks on site. These results support qualitative research from the study (Haines 2009b). This qualitative analysis, however, reveals that the relationship between community reassurance and reduction of risk is a complex one and the community reassurance is an important function in advanced industrialised contexts. However, reassurance cannot substitute for competent MH risk management on site.

FIGURE 8

Managerial views on the reassurance function of community-liaison



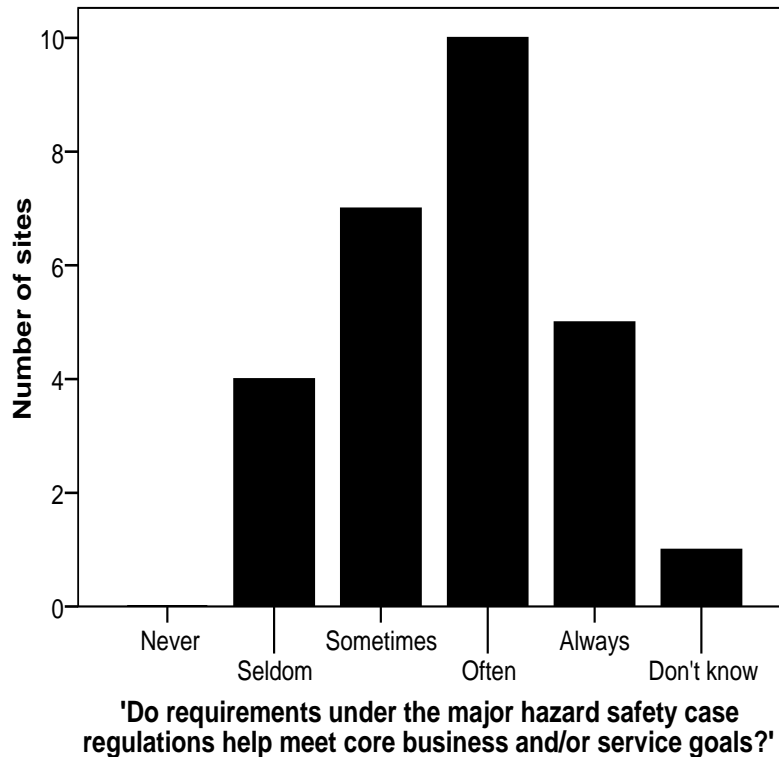
Challenges in compliance

Finally, what were managers' experiences with competing demands and pressures that might detract from compliance? Here we looked at both pressure from production/cost related concerns and from other regulatory regimes. First, what were the views about the relationship between business pressures and compliance with MH regulations? Were business pressures in tension with compliance, or were 'win win' outcomes the norm with compliance not only consistent with business goals, but actually able to further business success? Figure 9 below shows overall a positive outcome where 15 (55%) sites reported that compliance often or always furthered business goals, 7 (26%) reported that compliance 'sometimes' did so and 4 (15%) stated that seldom was this the case. Nonetheless the results suggest that the tension between compliance and business goals is a familiar scenario and that negotiating seemingly incommensurate demands a normal part of a manager's task. Further, there was no significant difference between condition and non-condition sites on the

experience of tension with business goals ($t(23) = -.023, p > .05$), so it cannot be concluded that the experience of such tension is only an issue for problematic or difficult sites. Rather, it suggests this is a normal part of site management.

FIGURE 9

Regulation and Business Pressure

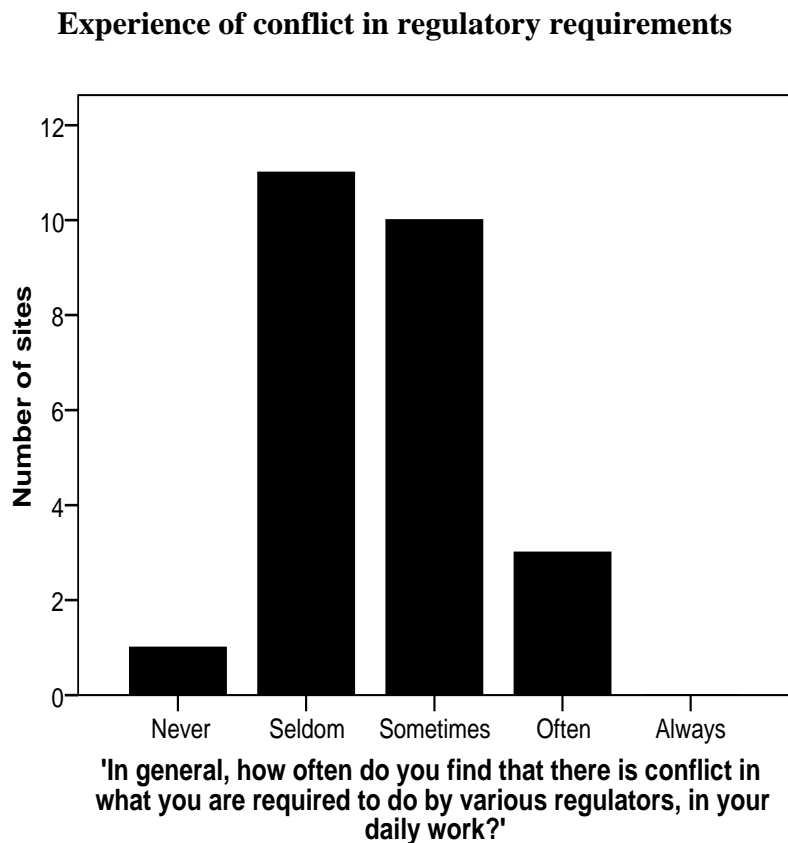


How then do managers go about resolving this tension? Managers were provided with a number of possible strategies and asked to indicate regularity of use (1-‘never’, 2-‘seldom’, 3-‘sometimes’, 4-‘often’, 5-‘always’). Based on median responses, the most common response is to resolve it internally, with consultation with the regulator and resolving the problem ‘on my own’ used sometimes. Managers reported it was rare for them to postpone a resolution or ignore the conflict or tension.

Our concern at the outset of our research was to place regulation within its context, in particular to understand whether there was an increase or decrease in regulatory demands and secondly whether managers experienced a conflict between these demands (i.e. compliance with one regime threatened compliance with another). All

but one manager reported both an increase in regulatory volume and regulatory pressure on their role. It should be noted that managers could report a decline in regulatory volume and regulatory pressure, but none did so. Again, this finding is consistent with our case study findings.

FIGURE 10



An interesting result came from our question about experience of regulatory conflict. Figure 10 above shows that 81% (22 sites) reported some experience of regulatory conflict, with 48% (13 sites) 'sometimes' or 'often' experiencing such conflict. Two managers did not respond to this question. Figure 10 suggests that negotiating through such conflict also is a familiar experience for many managers. Similar to responses to tensions between regulations and business, managers on the whole tended to address the tension (e.g. trying to resolve on own or internally, approach regulator) more regularly than defer or ignore the problem. Managers also tended to use similar approaches across scenarios. For instance, resolving tension internally was more common for regulatory conflict the more it was used as a response to conflict between

regulations and business ($r=.690$; $p<.001$). This was found for resolving on one's own ($r=.669$, $p<.01$), postponing resolution to later ($r=.561$; $p<.05$), and ignoring ($r=.428$; $p<.05$), but not for approaching either one or both regulators ($r=.205$ and $r=.114$ respectively; $p>.05$). Consistency in managerial strategies, as found here, may reflect broader company stances towards external stakeholders.

Clearly, there are not inconsiderable demands that arise from a safety case regime, notwithstanding the benefits. Those advocating regulatory reform often point to the potential for a state to lose business because of onerous regulations. In our survey we asked whether moving location was an option for sites as a response to regulatory pressure. Two thirds (66%, or 18 sites) reported that they were unable to shift their operations which suggest that ideas that industries can easily move operations as a result of regulatory pressure may oversimplify how businesses respond to regulation.

Conclusion

Overall, our results from this survey are largely supportive of a positive reading of the safety case regime in Victoria. *The Occupational Health and Safety (Major Hazard) Regulations 2000 (Vic)* can be understood as a progressive approach to the reduction of major hazard risk. The regulations, however, cannot be understood separately from the regulators in particular adequately resourced, sufficiently skilled and problem focussed regulators (Haines 2009a; Haines, et al. 2008). It is the combination of both that produces good outcomes. Indeed, here it could be argued that the stringency of the regulations together with the collaborative, problem solving approach of the regulators could both reduce risk and create an alertness concerning major hazard risk by both employees and senior management.

This result, however, does not come easily. It is resource intensive and requires managers skilled in bringing together internal procedures with regulatory requirements, resolving tensions between business pressures and compliance and finally dealing with the occasional conflict that arises between regulatory regimes. Simply put, we would argue there is no uncomplicated, stress-free regulatory approach that can ensure the safety of some of our most hazardous industries. Regulatory reform aimed at reducing 'red tape' is often necessary and timely. However, it should not forget the lessons learnt from past disasters.

ⁱ One was a former site and one case study site filled in the survey.

ⁱⁱ There was some evidence for the validity of comparing condition to non-condition sites when examining manager ratings of their confidence in their level of compliance with the regulations. Condition and non-condition sites did not differ significantly on confidence in minimal compliance with safety case requirements ($t(24)=0.498$; $p>.05$) as would be expected when all sites have met minimal requirements to gain a license. However, consistent with our assumptions that condition sites would generally have lower standards (at least as ascertained by compliance), condition sites were less confident than non-condition sites that they had gone ‘beyond’ compliance ($t(24)=3.49$; $p<.01$).

ⁱⁱⁱ However our interpretation of the finding here is tentative as the t-statistic may have been unduly influenced by three extreme outliers (indicated by the asterisk in Figure 5) all representing condition sites that gave a rating of ‘moderately unhelpful’.

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