

## How Bad is the State of Occupational Fatalities in New Zealand?

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### Abstract

The Pike River disaster has increased attention on safety in the New Zealand mining industry. While mining is a dangerous occupation, its fatality rate does not appear to have increased. Furthermore, most workplace fatalities do not occur in mining. This paper explores the data on occupational fatalities and finds the following. First, occupational fatalities are concentrated in just a few industries. Second, these industries are noticeably riskier than others. Third, the gap between New Zealand's occupational fatality rate and those of countries it compares itself with has increased. Fourth, work-related fatalities are only a small proportion of all accidental deaths in New Zealand. Possible reasons for these facts are discussed.

**Keywords:** Accidents; Occupational Safety; Occupational Health.

### Introduction

The recent Pike River mining disaster in which 29 men were killed in a methane explosion has once again focused attention on the state of occupational health and safety in New Zealand (The Press, 2010a; NZ Herald, 2010a; Sunday News, 2010). It has also led to calls for increased regulation of mining (The Press, 2010b; NZ Herald, 2010b), but a natural question to ask is are things really that bad in mining or was this just a one-off event? Even if the enquiries about mining health and safety do find systematic problems, are the health and safety shortcomings just in the mining industry or do they occur more widely? A possible clue to answering these questions is a couple of ministerial press releases, one issued more than 13 years ago and the other issued a year ago. In October 1997, the then Minister of Labour issued a media release noting his unhappiness with the level of fatalities, especially in farming, forestry, and construction, announcing that he had initiated a campaign to reduce workplace deaths, and stating that he thought that the number of fatalities could be reduced (Department of Labour, 1997). In January 2010, the current Minister of Labour issued a media release expressing her unhappiness about the level of workplace fatalities, in this case in the construction, forestry, and agriculture sectors and announced a new strategy to prevent their occurring (Wilkinson, 2010). The perception in both cases was that there were too many occupational deaths, that certain industries were over-represented and that something could and should be done to reduce them.

These sorts of public proclamations have been made many times before in many different contexts. In 2000, the General Manager of the branch of the Department of Labour (DoL) dealing with occupational safety and health launched Worksafe Week 2000 designed to target

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the main cause of the “appalling toll of accident, injury, and illness” (Department of Labour, 2000a). That year the DoL issued media releases about the unacceptably high number of workplace accidents in agriculture, especially involving vehicles and in construction, especially from falls (Department of Labour, 2000b; Department of 2000c) Over the last 12 months, the DoL has issued media statements about the high number of workplace accidents in agriculture, especially involving vehicles and in construction, especially from falls (Department of Labour, 2009; Department of Labour, 2010). Concerns about mining safety are also not new. In response to mining deaths in 2006, the DoL issued a discussion paper in 2008 (Department of Labour, 2008) and sought submissions about how to improve health and safety management in the underground mining industry, but few changes eventuated from this.

While much appears to have been done to reduce work-related accidents and deaths, nothing seems to have changed in terms of New Zealand’s industrial safety record. The DoL consultation draft for its National Action Agenda 2010–2013 only serves to highlight this fact, with the Minister of Labour stating in it that:

The national Strategy aims to reduce injuries and fatalities at work and deliver healthy and productive workplaces for all New Zealand. It has been in place for five years, but we have yet to see a significant reduction in our fatality and injury rates (Department of Labour, 2005: 4).

Clearly, this statement suggests that what has been done to date has not worked. Maybe the Pike River disaster does, indeed, point to wider problems with the management of workplace health and safety in New Zealand. This paper explores the general state of occupational fatalities in New Zealand to see if mining is as dangerous an industry as commentary around the Pike River disaster suggests, if mining has become more dangerous, if the Department of Labour’s general concerns over occupational fatalities have any validity and to point to where future research may need to occur so as to improve New Zealand’s occupational safety record.

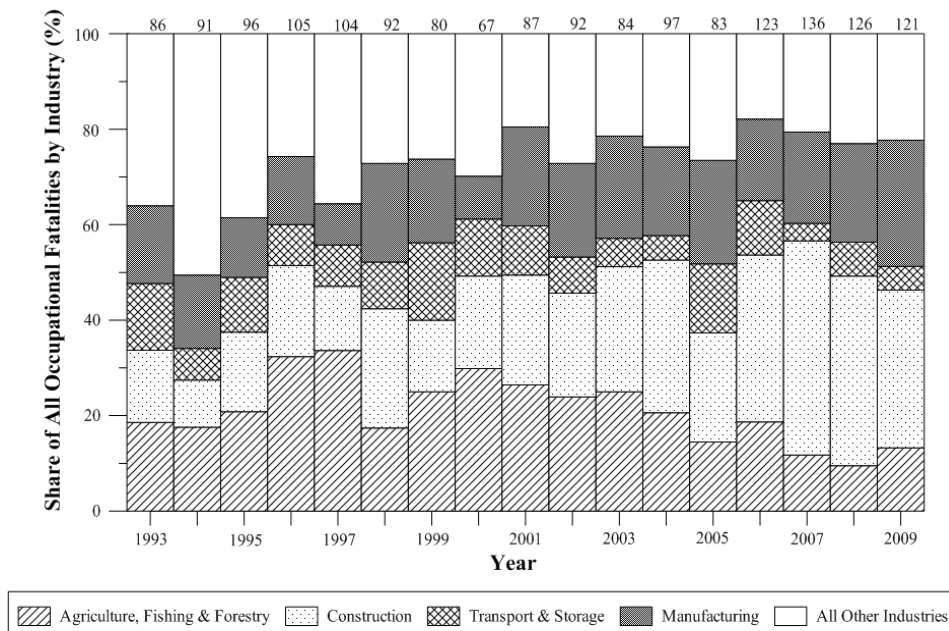
## **Occupational Fatalities by Industry**

The first thing to establish is what has actually happened regarding work-related accidents and fatalities in New Zealand. Unfortunately, this is not as simple as it sounds since the data collected on occupational accidents in New Zealand by government agencies, such as the Accident Compensation Corporation (ACC), the DoL and the New Zealand Health Information Service, is notoriously incomplete (Wren, 1999; Pearce, Dryson, Feyer, Gander, McCracken and Wagstaffe, 2006).<sup>1</sup> However, inaccurate and incomplete occupational injury data is not specific to New Zealand and is, instead, a general feature of workplace injury data regardless of where it is collected (see OECD, 1990; Takala, 1999; Dong, Fujimoto, Ringen, Stafford, Platner, Gittleman and Wang, 2011). Thankfully, while data on all forms of occupational accidents have deficiencies, some categories of occupational accident data are noticeably more reliable than others. For instance, Dong et al (2011: 347) find that “fatal injury rates should also be taken into account for OSHA’s targeting given that fatality data are much more complete and reliable than nonfatal injury data”. Fatalities, by their very nature, are simply much more difficult to hide or misclassify than non-fatal injuries. Occupational fatality data, while not perfect (see Langley, McNoe and Feyer, 2006, on work-related bystander deaths), are likely the most accurate that we have. Encouragingly, when seeking to make comparisons between countries, Langley et al, 2006 report that even though

bystander deaths are treated inadequately, they are at least treated in a similar way across countries, suggesting that countries' safety records can be compared using fatality data with at least some degree of confidence. As long as any mis-measurement does not change over time and is similar between countries and between industries, and this seems to be much more the case for data on occupational fatalities than for injuries, then this seems the best data to use to make comparisons and therefore is what is used in this paper.

Figure 1 shows the number of workplace fatalities from 1993 to 2009 for all industries as well as what proportion of them occur in specific industries (Cryer, Langley and Stephenson, 2008).<sup>2</sup> The number of fatalities has increased over time from 86 in 1993 to a high of 136 in 2007 before dropping back. Looking at the raw number of work-related fatalities, most (close to 80%) now occur in agriculture, forestry, and fishing, construction, manufacturing, and transportation and storage. Normally, mining accounts for at most a couple of fatalities each year and in some years none occur at all.

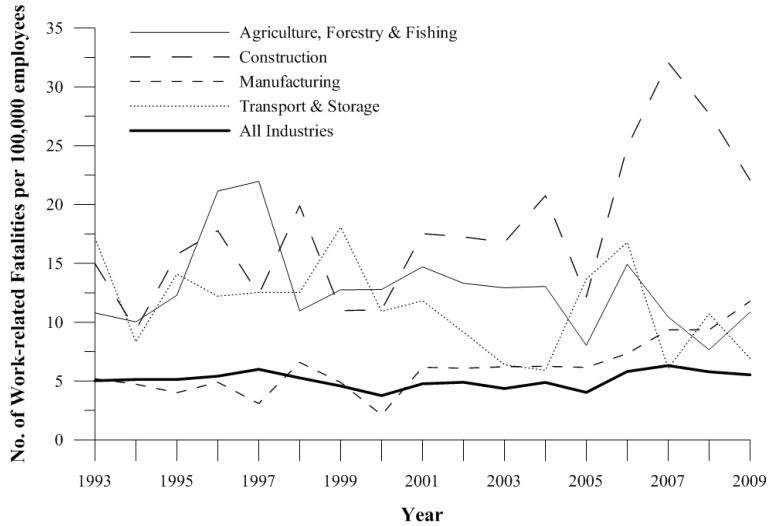
**Figure 1: Share of Occupational Fatalities by Industry**  
(Number of Occupational Fatalities).



Source: Accident Compensation Corporation.

Looking at just the raw number of fatalities is misleading because this does not take into account the number of employees who potentially could be killed. Other things equal, we would expect an industry with a larger workforce to have more fatalities than one with a smaller workforce. Since the New Zealand labour force has increased by 41% from 1993 to 2009 (using data from the Household Labour Force Survey), we would expect the number of occupational fatalities to increase too. Figure 2 shows the number of workplace fatalities per 100,000 employees from 1993 to 2009 for all industries as well as those industries indicated in Figure 1 as potentially being riskier than average. The four industries where many of the fatalities occur do, in general, have higher incidence rates than other industries. This just mirrors what has been found internationally, that particular industries and occupations seem to be inherently riskier than others. Furthermore, the riskiest industries in other countries are also those that are riskiest in New Zealand (Feyer, Langley, Howard, Horsburgh, Wright, Alsop and Cryer, 2001; National Occupational Health and Safety Commission, 2004; OECD, 1990).

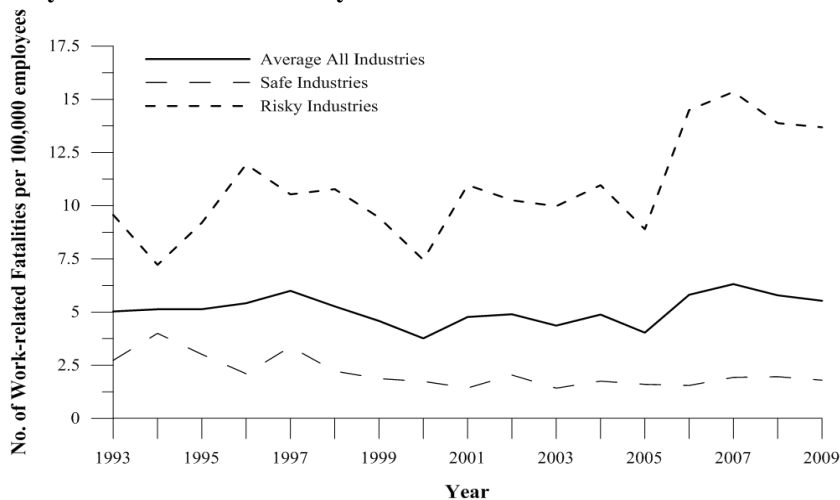
**Figure 2: Fatality Rates for the Riskiest Industries**



Sources: Accident Compensation Corporation and Statistics New Zealand.

Mining (not shown as it is highly variable and the occasional, very high fatality rate distorts the axes, making it difficult to make comparisons between the other industries) also has a high average fatality rate, in fact, the highest of all industries. It is not possible to give a precise number because ACC do not give a specific number of fatalities for an industry in a year if it is between one and three. Mining often falls into this range with 65% of the years between 1993 and 2009 having between one and three deaths. But the best scenario (one each year it is between one and three) and the worst scenario (three each year it is between one and three) give an average of between 31 and 59 fatalities per 100,000 employees from 1993 to 2009. The average total number of deaths is very low though since the mining workforce is so small. In addition, the mining fatality rate is also highly variable with some years where deaths do not occur. In contrast to its possible perception since the Pike River disaster, the data up until 2009 do not show that mining has become any riskier over the past 15 years. The Pike River disaster seems to be one of those tragic low-probability, high death events that occur once every generation in mining in New Zealand. Additional examples are the 1967 Strongman coal mine explosion, which ended in 19 deaths and the 1939 Glen Afton coal mine carbon monoxide poisoning, which resulted in 11 deaths (New Zealand Herald, 2010c).<sup>3</sup>

**Figure 3: Fatality Rates for Safe and Risky Industries**



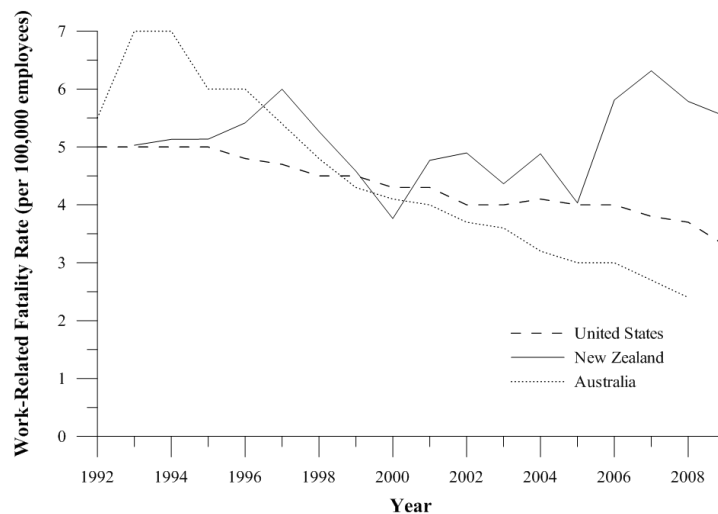
Sources: Accident Compensation Corporation and Statistics New Zealand. Risky Industries are Agriculture, Forestry, and Fishing, Construction, Manufacturing, and Transport and Storage. These correspond to ANZSIC codes A, C, E, and I. Safe industries are industries other than these.

So, returning to the original questions: have things changed regarding fatality rates across industries and over time? The answers are that things have not improved, fatality rates are no lower and are possibly even higher in some cases, and the industries that have traditionally had high fatality rates are still the ones that have high fatality rates.

## How Do We Compare Internationally?

The data in the previous section tells a simple and clear story. There has not been an improvement in the safety record of New Zealand's workplaces and there is a group of industries, which have continuing higher levels of risk than other industries. This begs the question of whether or not the occupational safety experience in New Zealand differs markedly from that overseas. Maybe it is just a worldwide phenomenon.

**Figure 4: Work-Related Fatalities by Country**



Sources: Accident Compensation Corporation, National Occupational Health & Safety Commission, Safework Australia, Statistics New Zealand, United States Bureau of Labor Statistics.

Compared to Australia and the United States, which were used in 2000 to assess the relative state of health and safety in New Zealand workplaces in a review of the Health and Safety in Employment Act (Office of the Minister of Labour, 2000), New Zealand's overall rate of occupational fatalities has worsened. As can be seen in Figure 4, New Zealand's overall fatality rate is more than double that of Australia's and two-thirds higher than that of the United States. Even more troubling is that the work-related fatality rates in Australia and the United States have been falling whereas the New Zealand rate appears unchanged, or even possibly increasing. Feyer, Williamson, Stout, Driscoll, Usher, and Langley (2001), using different data sets covering 1985 to 1994 for New Zealand and 1989 to 1992 for Australia and the United States, also find that workplace fatality rates are the highest in New Zealand. They also find falling fatality rates for all of the three countries over the period studied, but this is a period before that studied in this paper. The observations are in sharp contrast to Palmer, Calvert, Fryer and Kalafatellis (2009), who find that a strong majority of New Zealanders believe New Zealand is safer than other developed Western countries and that New Zealand is becoming safer.

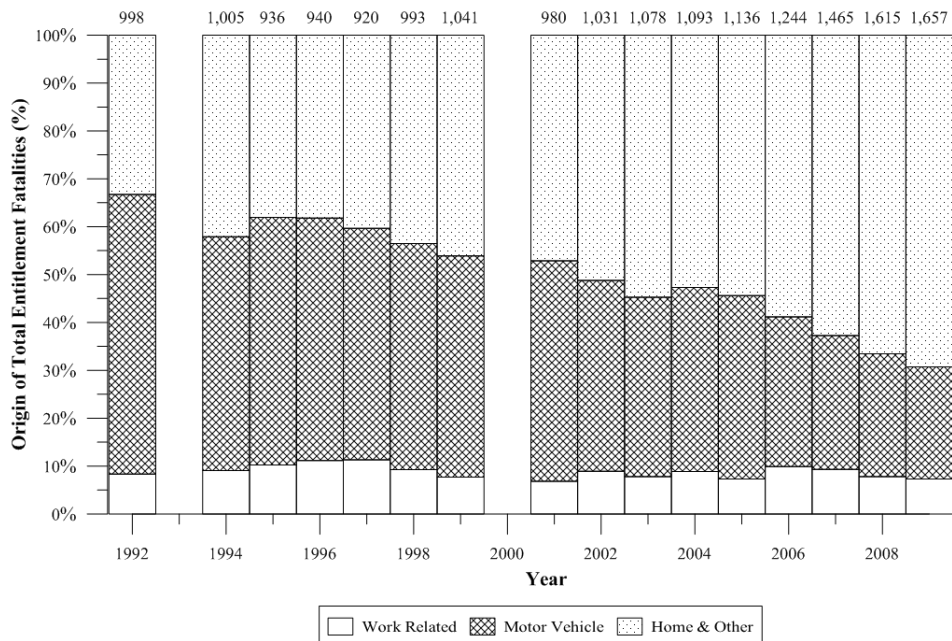
These differences between the fatality rate of New Zealand and the rates of Australia and the United States, while obviously troubling, also presents an opportunity. There must be some reason(s) for the differences. This gives us a chance to figure out the key factors driving the

differences in fatality rates, such as different and changing demographic or employment patterns or awareness and attitudes about risk or in occupational regulations, and then use this to devise policies to improve the situation in New Zealand.

### Accidents Waiting to Happen?

Perhaps New Zealand’s higher workplace fatality rates, relative to those of other countries, just reflect a willingness by New Zealanders to tolerate a greater level of risk. One way of assessing this would be to look at the rate of workplace fatalities in relation to fatality rates in other areas of New Zealanders’ lives. The accident and fatality rates for different areas of peoples’ lives are shown in Figure 5. Relative to all accidents in New Zealand, workplace accidents make up only a small and relatively stable proportion of accidental deaths (on average about eight percent). Motor vehicle fatalities, while making up the greatest source of accidental deaths in 1992, declined to about a quarter of all such in deaths by 2009 and have actually fallen in total number. Accidental fatalities outside the workplace and not caused by motor vehicle accidents have increased in number and in importance, and now constitute a significant majority of accidental deaths (about two-thirds of all accidental deaths).

**Figure 5: Accidental Fatalities in New Zealand by Origin**  
(Total Number of Accidental Fatalities)



Source: Accident Compensation Corporation. Home & Other is made up of accidental deaths at home, from recreation and sport, medical treatment errors, and so on. The 1993 data are in a form which do not allow a consistent comparison. In 1999 ACC work-related records are incomplete as employers were able to purchase private accident insurance.

So, the absolute numbers of workplace accidental fatalities have increased but this is not the area of New Zealanders’ lives which seem to have become riskier in terms of accidental death. Accidental deaths in the home (37.8% of all accidental deaths in 2009), from recreation and sports (3.8%), from medical treatment errors (4.3%), and elsewhere (15.5%) have all experienced increases. Furthermore, the size of the increase in the rate of accidental deaths outside the workplace and not involving motor vehicles has increased substantially, from nine accidental deaths per 100,000 people in 1992 to 27 in 2009, and is an order of magnitude larger than the increase in workplace fatalities, from five accidental deaths per 100,000 workers in 1993 to 5.5 in 2009. Interestingly, this is, in contrast, to the survey results of Palmer et al (2009) who find that New Zealanders believe they are most likely to be

injured on the road rather than in the workplace or the home. This relates to all accidental injuries of which fatalities only make up a small part, but even still, it does suggest people incorrectly estimate the level of risk they face in different areas of their lives. Maybe understanding more about why there is this difference in perceptions versus reality will help to shed light on what, if anything, can be done about improving the workplace fatality rate as part of the Workplace Health and Safety Strategy (Department of Labour, 2005).

## **General Discussion**

The state of occupational safety in New Zealand can be summarised by four basic facts. The obvious question is: what explains these facts? The first two facts — namely, that a handful of industries account for most work-related fatalities and that this handful of industries are also significantly more risky than all of the other industries — are easily explained. Some types of work are simply inherently riskier than others. Fatalities are far more likely to occur when working at heights building an office tower than in standing at a till in a supermarket, or driving a fast moving or lightly protected very heavy vehicle on hilly slopes than standing in front of a classroom of children. This does not mean that actions cannot be taken to reduce the chances of being injured or killed in the high risk industries, just that there will always be a naturally higher probability of dying in them than in other ones.

It is the last two facts that are the most intriguing. Why has the gap between New Zealand's occupational fatality rate increased relative to countries with which it compares itself, including Australia? Why is it that work-related fatalities make up only a small and stable proportion of all accidental deaths in New Zealand with most occurring outside work and increasingly more of these at home? Knowing what has caused the changes in New Zealand's workplace fatality rates and how they relate to wider society is crucial to knowing how to reduce them.

There are three basic types of possibilities worth exploring. The first relates to the willingness of people to take risks. It is clear that people are willing to do things even when there is a positive risk of death. For example, Monasterio (2005) found that while New Zealand mountaineers and alpine rock-climbers had an accident rate of 47% and a death rate of over eight percent, 96% of the climbers studied, aware of the high accident and fatality, had knowingly climbed in high risk situations. The climbers reported that they found the activity beneficial and chose to climb despite the perceived risks of the sport. Clearly for them, the benefits of the sport outweighed the costs, including the potential for injury and death. Furthermore, there is evidence that even if some actions are taken to reduce risks that people react in ways that tend to offset them, with the result that the risks faced do not fall nearly as much as originally envisaged. A classic example being in efforts to improve automobile safety where the evidence, overwhelmingly, shows that drivers act at least partially to offset increases in safety from policy initiatives or better technology by driving in ways that are riskier, such as driving faster and overtaking more often (Peltzman, 1975; Chrinko and Harper, 1993; Risa, 1994). A New Zealand example of this effect is studied by Garbacz (1991). There is also no reason to think that this principle does not cover actions taken by employees that affect their workplace risk, whether these are actions outside work, such as drug use (Musson and O'Reilly, 1999) or the amount of sleep chosen (Ruby, 1997), or at work, such as drugs or alcohol use (Gleason, Veum and Pergamit, 1991; Gerber and Yacoubian, 2001; Ministry of Health, 2001), or avoiding using highly uncomfortable safety equipment.

If the basic notion that people are willing to live with a certain level of risk in what they do (if they feel it is worth it) is accepted, this opens up possibilities in explaining the differences in fatality risk rates (Viscusi, 1992). Factors, such as the monetary and personal costs of actions to increase safety, how effective actions are in reducing risks, the benefits of the risky activities being engaged in or the inherent tolerance of risk, would then have a role in determining the ultimate fatality rate experienced. Maybe New Zealanders are more willing to live with risk than people from other countries. Or, it could be that efforts to improve safety are less effective in New Zealand than elsewhere. It is possible that the costs of improving safety can be higher in New Zealand than overseas or that activities in New Zealand have higher risks of dying, but also confer higher benefits, than those available in other countries.

Comparing costs versus benefits of actions that affect workplace safety can potentially explain why work-related fatality rates have not decreased compared to other countries. However, if we look at each of the individual factors mentioned previously, we know that driving fatality rates have gone down and home-related fatality rates have dramatically increased. It seems implausible that this is because people have a different willingness of risk in each area of their lives. So this factor does not seem able to explain the behaviour of occupational fatality rates. Given that knowledge is readily transferable, as is equipment, it is difficult to believe that efforts to improve safety are less effective in New Zealand than elsewhere (and that they are becoming radically less effective at home). A similar argument would also seem to hold for costs of improving safety. If there is a worldwide market for knowledge and equipment then the costs of preventing accidents should be the same between countries. This leaves differences in the benefits of activities.

One of the benefits for employers to reduce the riskiness of their workplaces is that they do not have to pay to compensate for the risks. The 'safe' industries in New Zealand have got safer (see Figure 3), which means employers in riskier industries would need to pay more compensation to workers for the greater relative difference in risks. Employers in risky industries then have the motivation to reduce this 'cost' by making their workplaces safer, which would mean their fatality rates should have fallen. If real wages are increasing then employees who die miss out on a more enjoyable life than if wages were lower (some will find this an artificially cold piece of analysis, but it is nevertheless a logical possibility). This gives them an incentive to take more care in their work and lives. However, given that real wages have increased – the average annual increase in hourly earnings for all industries from 1993 to 2009 is 4.4% (Quarterly Employment Survey (QES)) and average annual inflation over this period was 2.7% (Consumer Price Index) we would expect employees to take more care so fatality rates would fall. While the analysis of the costs and benefits of taking care presented is only indicative and at an aggregated level, and would need to be more extensive to be fully convincing, the analysis does suggest that factors of this type do not seem able to explain much of the observations about occupational fatality rates.

Another possibility is that people are making decisions in risky situations based on inaccurate beliefs about the risks they face and, as a result, they believe they are acting more safely than they really are. This is consistent with the findings of Palmer et al (2009). If people are mistaken about which activities are risky, they end up taking care in the "wrong" places. For example, being very careful when driving but less careful when at home or in the workplace would explain why the rate of driving fatalities has decreased and the risk of home or leisure based fatalities has increased. Believing (falsely) that New Zealand workplaces are safer than those overseas might explain why they have not declined. Essentially, New Zealand workers take less care than they should because of a sort of "Lake Wobegone effect". If this is true,



then a possible policy could be a sustained drive to communicate the true level of workplace risk to workers, especially in the high risk industries. However, as might be deduced from the introduction, there have been repeated attempts of this over the years with little impact. So it is the case that either the ways in which this has been done need changing to be effective, or it is that inaccurate beliefs, even if they exist, are not causing the observed level of workplace deaths.

The second broad group of factors relate to the structure of New Zealand workplaces and society. One is changes in the proportion of employment among industries. Maybe the share of employment in high risk industries in other countries has fallen whereas in New Zealand it is unchanged or has increased. For example, Feyer, Williamson, Stout, Driscoll, Usher, and Langley (2001) found that incorporating differences in the distribution of employment by industry reduces (but does not eliminate) the occupational fatality rate of New Zealand relative to the United States and Australia over the mid 1980s to the mid-1990s. If the distribution of employment over the last ten years did not change or even increase in the high risk industries in New Zealand, both absolutely and relative to the Australia and the United States, then this could explain the workplace fatality rate trends.

Using Statistics New Zealand data on the distribution of employment by industry for this period shows that the employment in the safe as well as the risky industries move in the same direction (a simple correlation of 0.39 using the HLFS), and that the average share of employment in the high risk industries has decreased, but this is not uniform over all these industries as the share of employment in construction actually increased. If we look at what happens with constant shares of employment in 1997/98 and then use the annual rates of fatalities till 2008/09, even with the share of construction increasing we would still expect the total number of fatalities to be almost the same in the riskiest industries, and the risky industry fatality rate to be almost the same as the actual fatality rate. My calculations show that if employment shares over 1997/98 to 2008/09 had been the same as at the start of this period, then the total number of fatalities for the four riskiest industries would decrease by four and the average combined fatality rate for these industries would be one-tenth of a percentage point lower compared to the actual numbers and rates of fatalities. Looking at hours worked is more complicated because the QES excludes agriculture and fishing. Since the fraction of employment in these two industries has fallen, their shares of hours worked has probably fallen too. The changes in the distributions of hours are similar in nature to the changes in the distributions of people employed but tend to be larger. Without agriculture and fishing it is difficult to give an exact answer, but it seems likely that we could expect results similar to those from looking at changes in numbers of people employed since the patterns of changes in the remaining industries are similar. So changes in the distribution of employment across industries do not seem to be the answer either.

The final types of factors affecting workplace fatality rates are government intervention in workplace safety and health, that is, the regulations that affect workplace risks (see Campbell (1995) for a history of government intervention in occupational safety and health in New Zealand). This includes the types of regulations, their enforcement, and the penalties imposed by the courts. The main form of regulation affecting workplace safety and health is the Health and Safety in Employment Act (HSEA). This type of regulation is referred to as *ex ante* liability because noncompliance can occur regardless of whether or not an accident occurs (Wittman, 1977; Shavell, 1984; and Kolstad, Ulen and Johnson, 1990). Of course, independent of whether or not an employer is prosecuted *ex ante* they can also be prosecuted after an accident occurs or *ex post*. Gordon and Woodfield (2007) argue that the HSEA is likely a worthwhile complement to *ex post* liability but that weak penalties and low

inspection probabilities dilute its effectiveness. Less effective regulation in New Zealand than other countries would explain the gap between their relative fatality rates. If New Zealand regulation is weaker than that of overseas, employers' incentives to prevent workplace accidents are lower so they may put fewer resources into accident prevention and consequently, increasing the number of accidents that occur.

However, this factor, alone, does not explain the increasing gap. To have a growing gap in fatality rates would require that the New Zealand government is continually putting fewer resources into policing the HSEA, or the fines issued by New Zealand courts are falling over time, or both. Or it would require foreign governments and courts to be continually increasing the impact of their regulations and increasing the fines they levy. Both possibilities are logical explanations, but the question is how likely are they? Take funding of the DoL for promoting compliance to the HSEA (Gunby and Wilkinson, 2010). Measured per business enterprise, this funding fell from 1992 to 2000 but then rose from 2007 to 2009; the former trend coinciding with a fall in fatality rates and the latter with a rise in fatality rates. This seems counterintuitive as we would expect the two to be positively correlated. Similarly confusing is that even though the number of DoL health and safety inspectors has been steadily falling since 2001, the fatality rates were falling or constant until 2005 before they started to rise. Since the probability of being inspected decreases with fewer inspectors, we would expect employers to have taken less care of workplace safety from roughly 2001 onwards, which should be accompanied by increases in fatality rates from then onwards. It could be that the changes in the numbers of inspectors have a lagged impact on health and safety efforts by employers, but it could also be that they have only a marginal impact on safety and health activities in workplaces. Of course, other factors may be confounding the effect of the changes in government resourcing of health and safety promotion and policing of its regulations (for example, see Rea (1981) about the potential effects of worker compensation schemes on industry risk), but at face value, changes in government resourcing do not seem to adequately explain changes in fatality rates. They also do not explain the higher accidental fatality rate outside the workplace.

Adding to the difficulty of using changes in government interventions to explain observed facts about fatality rates are the conclusions of Mears and Chapple (1996) and the findings of Mare and Papps (2000). Mears and Chapple (1996) carried out an extensive literature review of the international evidence about government intervention and workplace safety for the DoL. They concluded that evidence up until 1996 clearly showed government intervention of whatever form materially changed employer behaviour but also had little impact on overall workplace accident rates. This may explain why one of the main amendments to the HSEA in 2002, increasing worker participation in workplace health and safety through allowing employees to form health and safety committees and requiring employers to have employee health and safety representatives, seems to have had negligible impact on fatality rates.<sup>4</sup> It may be that health and safety committees are only as effective as employers want them to be, as found by Lewchuck, Robb and Walters (1996), or it depends on the right states of a complex mix of factors (including the attitude of management) as found by Markey and Patmore (2011). It may also be that most of the causal factors of workplace accidents are attributes of the workforce, such as age, education, the experience levels of employees, and workforce turnover rates, as found by O'Grady (2000). However, for whatever the reason, introducing worker participation, unfortunately, does not appear to have had much of an impact on occupational fatality rates, which is consistent with the conclusions of Mears and Chapple (1996) that government intervention has little impact on safety outcomes. Finally, Mare and Papps (2000) used the DoL administrative database of all DoL activities for the period July 1993 through to June 1997 and found that the HSEA had no significant or

conclusive impact on occupational health and safety outcomes.

If you take these two pieces at face value then government regulation in New Zealand does not seem a likely cause of the trends in New Zealand's workplace fatality rates. Even if it did increase the level of care taken by employers, there is always the possibility that employees acted in a way to at least partially offset the increases. In any event, it is clear that we would benefit from an updated review of international studies on safety and health regulation. The past 15 years has seen a significant improvement in the work-related fatality rates in Australia and the United States so it is possible that these countries have discovered more effective policies than those used previously. It would also be helpful to have more studies done on the net impact of the HSEA on occupational safety in New Zealand to know if this is the cause of the growing gap between the workplace fatality rate in New Zealand versus those overseas, or even if it prevented any increase in the fatality rate that might have otherwise occurred (getting the right counter-factual here is obviously important).

## Summary

Returning to the start of this paper: what is the state of occupational safety in New Zealand? Starting with mining where the Pike River disaster has caused people to wonder about the state of this industry, there is unequivocal data that mining is a risky industry, both in isolation and relative to other industries. However, the data also shows that there has been no noticeable increase in the average fatality rate in the industry, and furthermore, the numbers of deaths from mining are usually very low and sometimes even zero. The Pike River disaster is likely one of those terrible low-probability, high-death mining events that occurs once every generation in New Zealand.

What about occupational safety in general? Here, the data is also unequivocal. A handful of industries have consistently higher fatality rates than other industries, namely agriculture, fishing, forestry, construction, manufacturing and transportation, and of course mining. This pattern is also found in other countries. However, in contrast to other countries, who have falling occupational fatality rates, the overall fatality rate has not declined in New Zealand. Why this exists in New Zealand is an important research question that needs to be addressed.

One possible place to start is what is happening outside the workplace in New Zealand, in particular at home, in sports and other recreational activities, since the accidental fatality rates in these areas have not only increased but increased much more than in the workplace. For instance, a possible area of focus is on the perceptions of risks by New Zealanders, which, seem to be markedly out of touch with reality. Another possibility is to look at what changes have occurred in other countries and the level to which people there take care at home and at work as well as the level of care businesses take with respect to their workers (workforce demographics, sizes, types of business enterprises etc). Do differences exist in the types of government policies (prescriptive versus principle-based laws, the amounts of resources governments expend on safety and health including inspections, differences in legal treatments of accidents, differences in compensation schemes, and so on)? The things learnt from the Pike River disaster may not lead to improvements in mining safety in New Zealand but by drawing people's attention to the general issue of workplace safety and realising that New Zealand's safety record is relatively poor, we may learn things that can potentially be used to improve the safety of all New Zealand workplaces. After all, if other countries can improve the safety of their workplaces then why can't we?

## Notes

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<sup>1</sup> Shortcomings include changing definitions, multiple claims for the one accident, lack of descriptive information about the sources of accidents and the occupation of the injured, and under-reporting of accidents. Firth and Herbison (1990) provide evidence of under-reporting of occupational injuries in New Zealand and Mayhew and Quinlan (2006) provide evidence of reasons for why under-reporting occurs.

<sup>2</sup> The ACC injury and fatality data from the period 1996 to 2000 should be treated with caution. Cryer et al (2008) report that employers who were part of the accredited employer's scheme did not always submit data to ACC as required. Furthermore, ACC records in 2000 are incomplete because employers were able to purchase private workplace insurance. This means that the ACC data understate the true number of employees injured during this period. The underreporting of fatalities to ACC is probably minor given how few occur and how serious and public they are in nature.

<sup>3</sup> The background regulatory facts of the Strongman mine disaster are interesting given the current investigation of the Pike River mine tragedy and the calls for dedicated mine inspectors. At the time of the Strongman mine explosion, there existed a separate Mines Department which was responsible for the safety of mine workers, with mining regulated under the Mining Act 1926. Furthermore, six dedicated coal mine inspectors were employed specifically for coal mine safety, with coal mines regulated under the Coal Mines Act 1925, which was prescriptive in nature (Mines Department, 1966 and 1967). The existence of a dedicated mines department, a prescriptive government Act solely concerned with coal mining as well as dedicated coal mine inspectors, did not prevent the Strongman coal mine explosion and the resulting deaths of 19 men.

<sup>4</sup> The basis of the HSEA was the 1972 report of Lord Robens which placed a large emphasis on "self-regulation" or joint participation of employees and employers in workplace health and safety. The HSEA before the 2002 amendments did not include this aspect of the Robens' report, however, it should be noted that unlike large and medium sized firms, smaller businesses are only required to have a representative if desired by their employees. Excluding the self-employed data from the Department of Statistics, it shows that roughly 40% of all those employed work in businesses with 20 or fewer employees, so clearly, potentially many employees may not have access to a representative. However, since the proportion of employees in small firms has been stable over the past decade, this aspect of safety and health is unlikely to have caused changes in occupational fatality rates.

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