DESIGN FOR HEALTH AND SAFETY IN CONSTRUCTION

Dangerous work - a fatal inequality

The inequality of work fatality can be reduced by safe design and those in dangerous jobs can be given a much fairer chance to go home alive, write *John Culvenor* and *Dennis Else*.

Dangerous work - a fatal inequality

When a workplace fatality occurs there is a three in four chance that the person killed is a transport or production worker, tradesperson or labourer (Figure 1). Those of us in the safest jobs have a vastly better chance of returning home alive than those doing these dangerous jobs. Of the 232 fatal injuries in 2007-8, 172 (74%) were in one of these job categories.

Many things affect workplace safety. One of the most important things is the presence of hazards. The jobs that kill and injure people contain a lot of hazardous things – moving machinery, work at heights, dangerous chemicals, heavy lifting, noise, dust, extreme temperatures, and so on. It is abundantly evident that if we could remove all the hazardous things, the dangerous jobs would then be as safe as the safe jobs. Many of those hazardous things are inherent to the job or are used for something useful but they could be made safer by design. Maintaining the status quo is not inevitable. Change is possible and necessary. The inequality of work fatalities can be reduced by safe design and those in the dangerous jobs can be given a fair go and a much fairer chance to go home alive.

It is not just in relation to fatalities that the risk is unequally shared around our community – similar distributions to those shown would be true for most types of non-fatal workplace injuries and the few occupational diseases captured by workers compensation data.

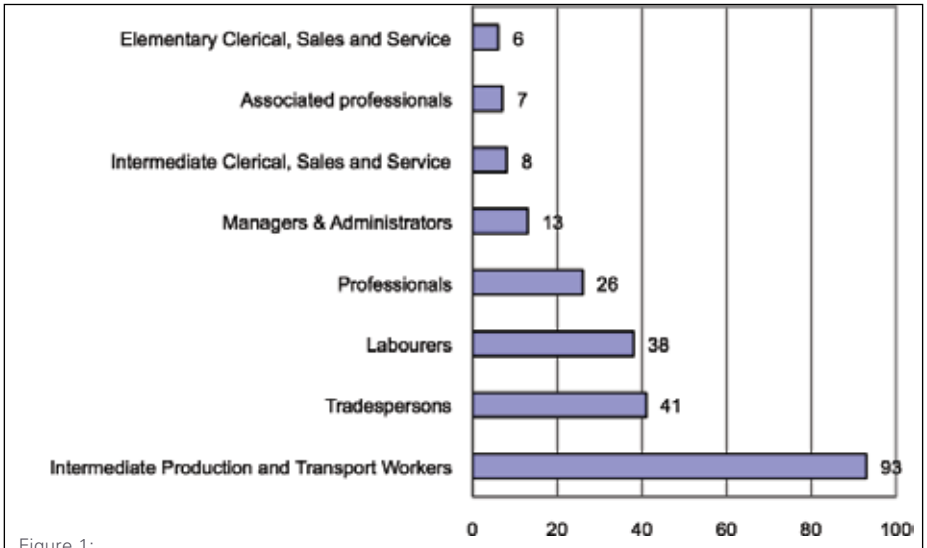


Figure 1:
Number of compensated fatal injuries at work in Australia by occupation category 2007-8 (Source: NOS[1])

The state of play in construction industry safe design

The 10 year National Strategy was agreed by the Workplace Relations Minister's Council in 2002 (National Occupational Health and Safety Commission 2002). The National Strategy sought a reduction in our national inventory of hazardous things. To "eliminate hazards at the design stage" is one of the five priorities of the National Strategy. First and foremost then – we should avoid making more danger by careful thought about the design of things. This has been followed by the development of the Guidance on the Principles of Safe Design for Work (ASCC 2006).

Support in the construction industry emerged from the 2003 Royal Commission into the Building and Construction Industry and the 2005 National Standard for Construction Work developed by the National Occupational Health and Safety Commission (now Safe Work Australia). This standard provided a basis for regulation by the jurisdictions such as the introduction of these provisions in 2007 in Western Australia. The Regulations have been since supported in Western Australia by the 2008 Code of Practice for Safe Design of Buildings and Structures.

The Australian legal interventions follow initiatives in the European Union and accompanying legislation in Europe such as the United Kingdom. Indications are that the initiatives in the UK may be having some effect on designers. For instance in 2004 Health and Safety Executive construction inspectors reported a significant improvement in the actions taken by designers to deal with problems such as work at height, compared with the previous year (Charnock 2004).

"Safe design" however does not have to result from special designer-focused regulations such as those applying to construction in Europe. It's what we do now using existing frameworks – when we do it well. Ever since their inception, the legislation styled along the lines of the Robens (Committee on Health and Safety at Work 1972) reforms has supported this model to various degrees. Legislation in Australia from the 1980s onwards has been underpinned by the 'control at source' philosophy although the specific articulations of designer duties vary somewhat throughout the Australian jurisdictions (Bluff 2003; 2004).

The safe design guideline (ASCC 2006) emphasises the "lifecycle" of designed products. At common law those who influence safety have a duty to implement safety measures so far as is reasonable. The duty extends to designers, manufactures, suppliers, and so on. Most directly, this arises from the case of Donoghue and Stevenson[2] - the 'slug in the ginger beer' case in the 1930s. The UK House of Lords formulated the 'love thy neighbour' doctrine establishing a duty of care from all people to all others. The case in point was about the duty of a beer manufacturer to an

eventual consumer of the beer. The duty applied even though the drinker did not buy the beer them self. In fact the contractual chain was a number of steps removed, as can often be the case with equipment used in workplaces.

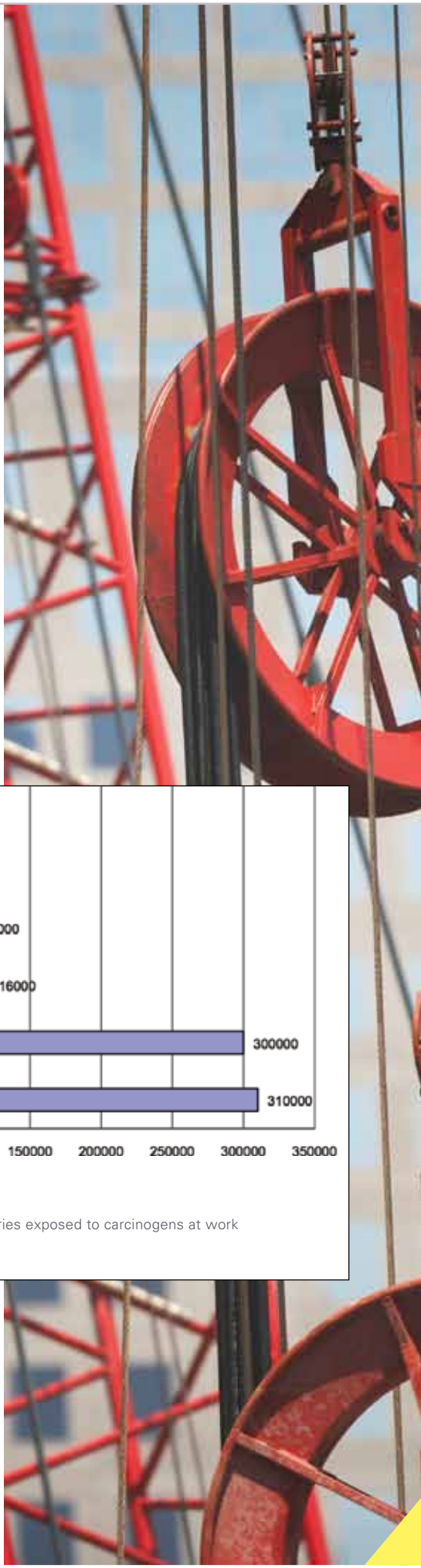
A case in the Victorian Supreme Court[3] in 2008 demonstrated these principles at common law in the case of construction work. In this case an air conditioning maintenance technician fell through a skylight in 2005. Negligence was attributed to the technician's employer and also the occupier of the building and the architect who prepared plans for the building renovations. The design of the renovations and the renovation work itself were conducted in 1999-2000. The design included the positioning of the air conditioners that were being maintained five years later and lead to the technician being near to the skylight. So just as a manufacturer of beer must be cautious about the effect on consumers, designers must take into account the effect of people who will come into contact with the outcomes of their work.

Designing for diseases

Workplace deaths from disease are probably about eight times as numerous as those from accidents. There are thought to be about 5,000 cases of cancer caused by occupational exposure each year in Australia (ASCC 2006). Total cancer cases in Australia number about 106,000 per year and there are about 39,000 deaths due to cancer (year 2006 estimate: source AIHW 2007). The number of deaths in one year is thus about 37 per cent of the number of cases. Thus it is fair to assume that if there are 5,000 cases per year in Australia due to occupational exposure then there are also many thousand, perhaps about 1850 deaths. This is thus about eight times bigger than the injury problem (1850 v 232).

Eighty-seven is supposed to be an unlucky number in Australian cricket – being 13 short of a hundred. It's also an unlucky number of Australian men at work. More men than women suffer cancer in general society however the figures are not strikingly different being 61,000 cases among men and 45,000 among women. However, those caused by workplace exposure are mainly suffered by men. Men are estimated to suffer 4400 occupational cancers per year contrasting with 640 among women. Hence the figure for men is the unlucky proportion of about 87 per cent of the total.

The construction industry is one of the places where exposure to potential carcinogens is prominent. The total number of people thought to be exposed to carcinogens at work is 1.5 million. Two thirds of these are in six industries (Figure 2). The construction industry figures prominently along with wholesale trade. In part this is due to the large number of people employed in the construction industry (about 500,000). The percentage of people employed in construction who are exposed is estimated at 55 per cent. This is about double the average of all industries being about 23 per cent. The highest proportions are in forestry and logging (85 per cent).



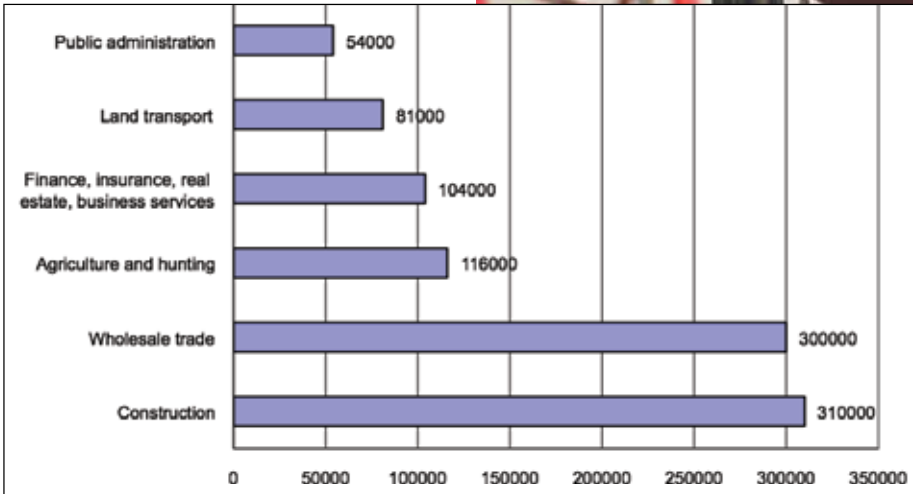


Figure 2:
Estimates of the number of people in various industries exposed to carcinogens at work in Australia (ASCC 2006)

Figure 3 shows year by year the number of new cases of mesothelioma. The annual number of new cases has continued to rise long past the reductions in the use of asbestos and is expected to continue to rise for another 10 or 15 years. Decisions about materials in construction clearly have a long-term impact. This is the nature of disease as a design problem.

Safe design is for the long term

Recent efforts at strengthening the resolve of the construction industry toward safe design are welcome. The problem of injury, such as potential falls through skylights, is a great target for this thinking. To deliver the best value in the long term this thinking needs to be extended to the choice of materials and construction methods to minimise exposure to products that can cause disease.

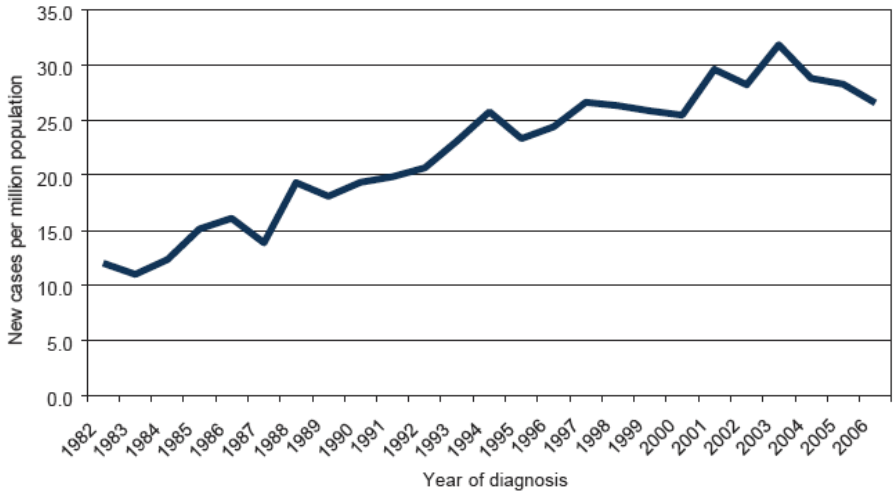


Figure 3: New Mesothelioma cases (source ASCC 2010)

Professor Dennis Else was Chair of the National Occupational Health and Safety Commission from 1996 to 2002. During that time he built support for a 10 year National OHS Strategy which was endorsed by all State and Territory Ministers, the ACTU and the ACCI in 2002. Having previously led the development of the first Australian Standard for OHS Management Systems he focused the Commission's work on closing the gap between paper systems and real practice in workplaces. He couples his long association with the University of Ballarat in the academic role of Professor of Occupational Health and Safety with the practical challenges as Group General Manager of Sustainability, Safety and Health with Brookfield Multiplex.

John Culvenor is a Chartered Professinal Member and Dennis Else is a Fellow of the Safety Institute of Australia.

Dr John Culvenor is an independent consultant in engineering specialising in occupational health and safety and ergonomics and Senior Lecturer (part time) and Honorary Research Fellow in Occupational Health and Safety at University of Ballarat, Australia. John holds a Bachelor of Engineering with Honours (1992), Graduate Diplomas in Ergonomics (1994) and Labour Relations Law (2000) and completed a PhD on the topics of engineering, ergonomics, creativity and workplace safety (1998). John's area of research interest is occupational health and safety in particular manual work, safe design and conceptual thinking. Contact John at john@culvenor.com, 03 9441 0590 and see more at www.culvenor.com.

The Safety Institute of Australia is Australia's professional body for health and safety professionals. With over 60 years experience, and a membership fast approaching 4,000, the SIA aims to develop, maintain and promote a body of knowledge that defines professional practice in OHS.

We are committed to creating a profession that can deliver the highest standards of OHS and we do this through the engagement of our individual members, corporate and strategic partners, governing bodies and key professional stakeholders.

Through the SIA, individuals have access to qualified timely advice into public policy and regulation, research and development to advance OHS knowledge and guidance. We have developed a body of knowledge to set health and safety standards, procedures and practices to be adopted on a national basis across the profession.

References:

Australian Institute of Health and Welfare 2007, Cancer in Australia: an overview, 2006, AIHW, Canberra.

Australian Safety and Compensation Council 2006, Guidance on the Principles of Safe Design at Work, ASCC, Canberra, www.safeworkaustralia.gov.au/AboutSafeWorkAustralia/WhatWeDo/Publications/Documents/154/GuidanceOnThePrinciplesOfSafeDesign_2006_PDF.pdf

Bluff, L. 2004, Regulatory Strategies for the Safe Design of Plant, Working Paper 24, National Research Centre for Occupational Health and Safety Regulation, Australian National University, http://ohs.anu.edu.au.

Bluff, L. 2003, Regulating Safe Design and Planning of Construction Works: A review of strategies for regulating OHS in the design and planning of buildings, structures and other construction projects, Working Paper 19, National Research Centre for Occupational Health and Safety Regulation, Australian ents/154/

GuidanceOnThePrinciplesOf SafeDesign_2006_PDF.pdf

Bluff, L. 2004, Regulatory Strategies for the Safe Design of Plant, Working Paper 24, National Research Centre for Occupational Health and Safety Regulation, Australian National University, http://ohs.anu.edu.au.

Bluff, L. 2003, Regulating Safe Design and Planning of Construction Works: A review of strategies for regulating OHS in the design and planning of buildings, structures and other construction projects, Working Paper 19, National Research Centre for Occupational Health and Safety Regulation, Australian National University, http://ohs.anu.edu.au.

Committee on Safety and Health at Work 1972, Safety and Health at Work: Report of the Committee 1970-72, London.

Charnock, D. 2004, Designer Initiative 2004 Report, HSE Construction Division (Scotland, North West and Newcastle Offices), Manchester, www.hse.gov.uk.

National Occupational Health and Safety Commission 2005, Safe Design Guideline, NOHSC, Canberra, www.nohsc.gov.au.

Safe Work Australia 2010, Occupational Disease Indicators, Safe Work Australia, Canberra, www.safeworkaustralia.gov.au/AboutSafeWorkAustralia/WhatWeDo/Publications/Documents/340/Occupational_Disease_Indicators_2010_PDF.pdf.

Western Australia Commission for Occupational Safety and Health 2008, Code of Practice for Safe Design of Buildings and Structures, Western Australia Commission for Occupational Safety and Health, West Perth, www.docep.wa.gov.au/Worksafe/PDF/Codes_of_Practice/Safe_design.pdf.

1. NOSI: NOHSC Online Statistics Interactive, the Natational Workers' Compensation Database http://nosi.ascc.gov.au/. Query settings: by occupation; fatal/non-fatal; 2007/08 preliminary (latest year available).
2. Donoghue v Stevenson [1932] AC 562
3. Ianello v BAE Automation and Electrical Services Pty Ltd & Ors [2008] VSC 544 (4 December 2008)