Occupational health and safety in Australia: the construction industry's response to the National Strategy 2002-2012

Abstract

In 2002, the *National OHS Strategy 2002-2012* was agreed by all Australian governments, the Australian Chamber of Commerce and Industry and the Australian Council of Trade Unions. The Strategy established ambitious targets for the reduction of occupational injury and workplace fatalities in Australian industry, including a reduction in the incidence of fatalities of at least 20 per cent by 30 June 2012 (with a reduction of 10 per cent being achieved by 30 June 2007) and a reduction in the incidence of workplace injury by at least 40 per cent by 30 June 2012 (with a reduction of 20 per cent being achieved by 30 June 2007). The Strategy establishes five priority areas to achieve these targets: (i) to reduce the impact of risks at work; (ii) to improve the capacity of business operators and workers to manage OHS effectively; (iii) to prevent occupational disease more effectively; (iv) to eliminate hazards at the design stage; and (v) to strengthen the capacity of government to influence OHS outcomes. Workers' compensation statistics show that the fatality rate in the Australian construction industry is 9.2 per 100,000 workers, compared to 3.1 for all industries and since 1997/98 an average of 49 construction workers is killed each year – nearly one per week. The paper presents the Australian construction industry's OHS performance in relation to the National Strategy objectives and describes the industry-led development of a Guide to Best Practice for Safer Construction. The manner in which the Guide addresses the five priority areas contained in the National Strategy is described and the potential impact of the Safer Construction project is considered.

Keywords: Safer Construction Guide, National Strategy, Safety Performance, Australia.

Introduction

This paper describes an industry-initiated and led research and development project, in which current best practices used in the management of OHS in the Australian construction industry were identified and documented in a '*Guide to Best Practice for Safer Construction.*' In particular, the safety performance of the Australian construction industry is analysed in relation to the *National OHS Strategy 2002-2012*. The development of the Guide and its basic structure are described and the relationship between the Guide and the National OHS Strategy is discussed.

The *National OHS Strategy 2002-2012*

In 2002, the National OHS Strategy established clear and ambitious targets for the reduction of work-related deaths, injuries and illnesses in Australia. The Strategy was agreed to by all Australian governments, the Australian Chamber of Commerce and Industry (ACCI) and the Australian Council of Trade Unions (ACTU) to sustain a significant, continual reduction in the incidence of work-related fatalities with a reduction of at least 20 per cent by 30 June 2012 (with a reduction of 10 per cent being achieved by 30 June 2007), and to reduce the

incidence of workplace injury by at least 40 per cent by 30 June 2012 (with a reduction of 20 per cent being achieved by 30 June 2007).

The five priorities identified by the National Strategy to achieve OHS improvements and to nurture longer-term cultural change in Australian industry are:

1. to reduce the impact of risks at work,
2. to improve the capacity of business operators and workers to manage OHS effectively,
3. to prevent occupational disease more effectively,
4. to eliminate hazards at the design stage, and
5. to strengthen the capacity of government to influence OHS outcomes.

The National Strategy focuses on particular OHS risks and industry sectors. Targeted risks are falls from height, musculoskeletal disorders and hitting or being hit by objects. Building and construction is identified as a priority industry due to its high incidence rate (of occupational injury and illness) and the high number of compensation claims arising in construction, compared with other industries.

OHS performance of the Australian construction industry

Relative to other industries, the occupational health and safety (OHS) performance of the Australian construction industry is poor. Workers' compensation statistics show that the fatality rate in the Australian construction industry is 9.2 per 100,000 workers, compared to 3.1 for all industries and since 1997/98 an average of 49 construction workers is killed each year – nearly one per week (Fraser, 2007).

Figure 1 shows the absolute number of non-fatal compensation claims for work-related injuries and illness between 1997/98 and 2005/06 for the Australian mining and construction industries. Taking year 2001-02 as the base year from which the National Strategy was introduced, the number of claims has increased from 13,055 in 2001/02 to 14,330 in 2005/06, representing an increase of 9.8%. In comparison, the mining industry figures fell from 2,595 to 2,260, a decrease of 12.9% in the same period.

Figure 1: Number of non-fatal claims for occupational injuries and diseases in the construction and mining industries, 1997/98-2005/06 (Source: Australian Safety and Compensation Council, 2007)

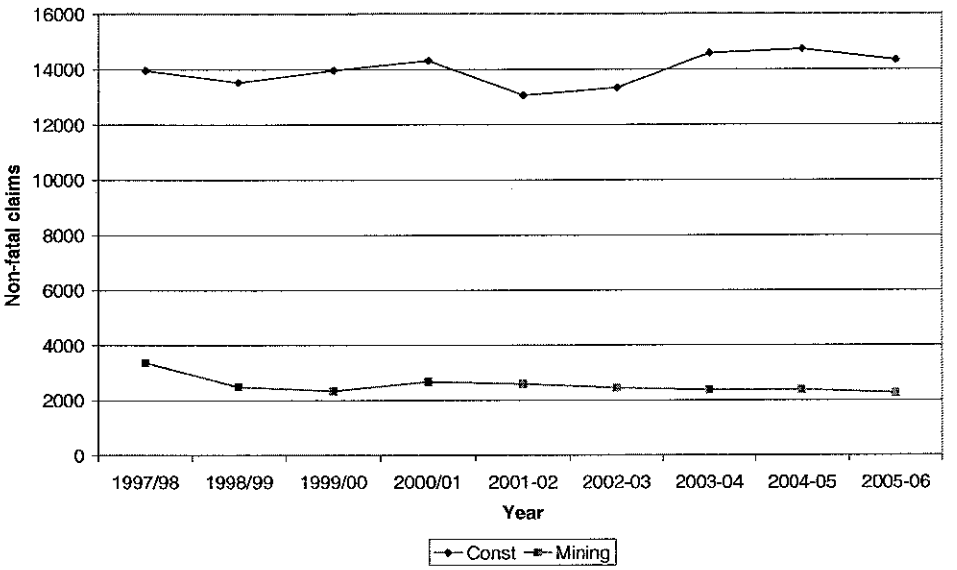
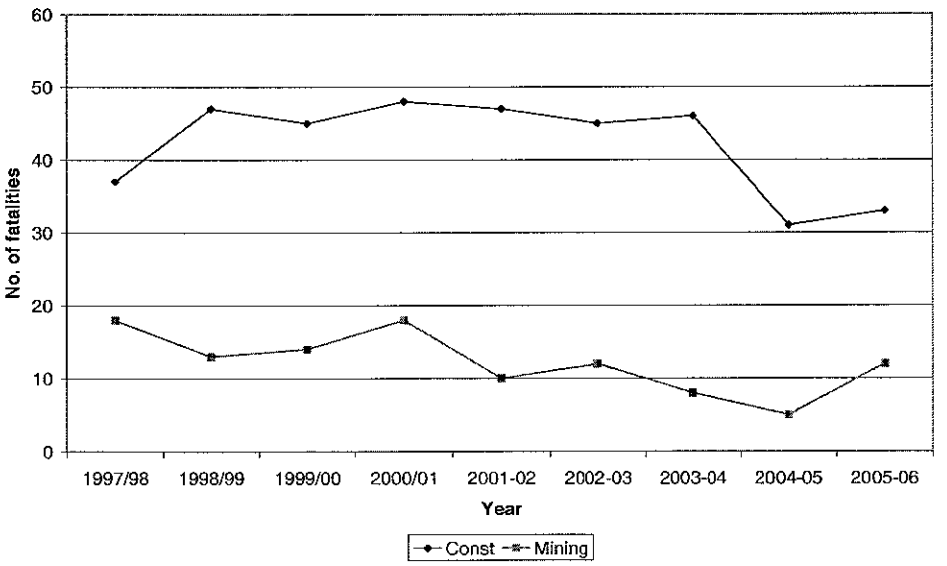


Figure 2 shows the data for reported work-related fatalities in the same period. Again, taking 2001-02 as the base year, recorded fatalities in the construction industry fell from 47 in 2001-02 to 33 in 2005-06, a decrease of 29.8%. In comparison, mining fatalities fell from ten in 2001-02 to 5 in 2004-05, but rose again to 12 in 2005-06, indicating an overall increase.

Figure 2: Number recorded fatalities in the construction and mining industries, 1997/98-2005/06 (Source: Australian Safety and Compensation Council, 2007)



However, the numbers of compensation claims and recorded fatalities tend to be misleading as they do not account for the volume of work. Figure 3 shows the incidence rate of all claims (claims per 1,000 employees) in both the mining and construction industries for the period. The incidence rate in the construction industry fell from 30.3 in 2001-02 to 26.0 in 2005-06, a decrease of 14.2%. The mining industry incidence rate fell from 34.2 to 18.6 (45.6%) in the period. Figure 3 also shows that in 1997/98 the Australian mining industry had a higher incidence rate than the construction industry and that it has improved substantially. In 2002-03 the mining industry incidence rate fell below that of the construction industry and has continued to decline at a greater rate than that of the construction industry. Finally,

Figure 3: Incidence rate of occupational injuries and diseases (per thousand employees in the construction and mining industries, 1997/98-2005/06 (Source: Australian Safety and Compensation Council, 2007)

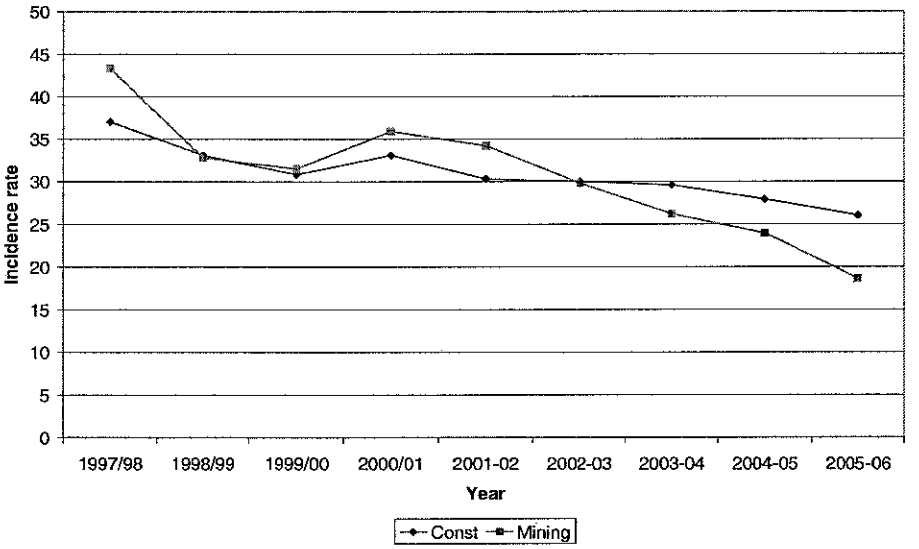
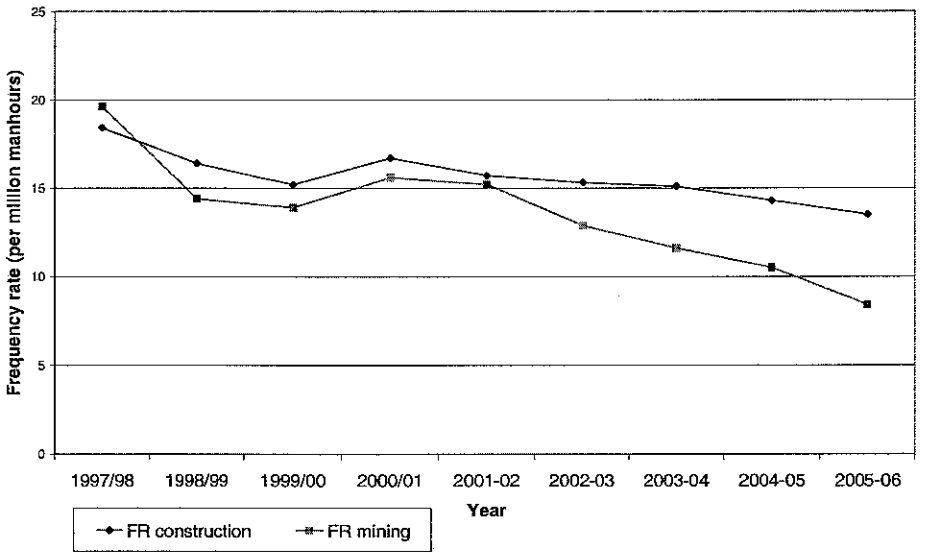


Figure 4 shows the frequency rate (claims per million man hours worked) for the mining and construction industries. Since 2001-02 the construction industry frequency rate has fallen from 15.7 to 13.5 (14.0%). In comparison, the mining industry's frequency rate fell in the same period by 29.6%. Figure 4 shows that between 1997/98 and 1999/00 frequency rate fell in both the mining and the construction industries. In 2001/02 (the base year), the frequency rates in these industries was roughly the same. However, since 2001-02, the frequency rate for the mining industry has declined at a faster rate than that of the construction industry.

These compensation-based statistics are also considerably lower than those published by the Australian Bureau of Statistics (ABS). Using data collected in the Multi-Purpose Household Survey (MPHS) conducted in 2005 – 2006, the construction industry had an incidence rate of 86 per 1,000 employed people, almost twice that indicated in the ASCC compensation statistics (ABS, 2006). This

difference is largely due to the fact that the ASCC relies solely on workers' compensation claims data and excludes self-employed persons, when the ABS dataset includes non-fatal injuries or illnesses sustained by all categories of workers, irrespective of whether these have been claimed under workers' compensation. The ABS figures are not collected every year and therefore cannot be used to gauge the industry's progress against the objectives of the National Strategy, but they do suggest that compensation-based statistics do not reflect the magnitude of the OHS problem.

Figure 4: Incidence rate of occupational injuries and diseases (per thousand employees in the construction and mining industries, 1997/98-2005/06 (Source: Australian Safety and Compensation Council, 2007)



The ASCC statistics, though conservative, show that the Australian construction industry has not performed as well as it could have in improving safety performance since the National Strategy was instigated. The number of fatalities in the industry declined by 29.8% between 2001-02 and 2005-06, a greater reduction than the Strategy's target of 10% by 30th June 2007. However, the total number of non-fatal claims for occupational injury and illness in the construction industry has increased rather than decreased in the period since 2001-02. This might be partly due to an increase in the volume of work and hence risk exposure. But, even using the more meaningful safety measures of incidence and frequency rates, the construction industry appears to fall short of meeting targets established by the National Strategy. Incidence and frequency rates have both have fallen in the mining and construction industries since 2001-02. In construction both incidence and frequency rates have reduced by 14%, which falls short of the target reduction of 20% by 30th June 2007. In comparison, the mining industry's incidence and frequency rates fell by 45% and 29% respectively. Thus, even after factoring the increased volume of work arising as a result of a 'boom' in the construction and

resources sectors, the construction industry's safety performance relative to the mining industry's has been disappointing.

The 'Safer Construction' project

The relatively poor safety performance of the Australian construction industry was concerning to industry participants, prompting senior representatives of each of the key stakeholders groups in the construction industry, i.e. clients, designers and constructors, to embark upon a collaborative project to improve the safety performance of the construction industry. The project, titled 'Safer Construction' was commissioned by Engineers Australia and funded by the Cooperative Research Centre for Construction Innovation. A high level industry task force was established to oversee the development of a *'Guide to Best Practice for Safer Construction'*, hereafter referred to as 'the Guide.' The task force was made up of senior representatives of major industry stakeholder groups, industry peak bodies and professional institutions. Represented were: Engineers Australia; the Property Council of Australia; the Australian Procurement and Construction Council; the Association of Consulting Architects Australia; the Association of Consulting Engineers Australia; the Royal Australian Institute of Architects; the Australian Constructors Association; and the Master Builders Association. Also invited to participate in the task force was a representative of the Office of the Federal Safety Commissioner. Thus, the task force was representative of construction clients, the design professions and constructors, as well as government and policy makers.

The project sought to identify safety 'best practices' currently in use in the Australian construction industry. These best practices were to relate to the project lifecycle, from planning, through design and construction to commissioning. The best practices were to represent tasks for construction clients, designers and constructors, with an emphasis on cooperation, communication and reaching consensus about what is a reasonable allocation of responsibility for safety in a given project situation. The result was to be a voluntary Guide, documenting safety best practice.

Research and development

A research team was established to research and develop the Guide. The research team comprised of researchers from RMIT University, Queensland University of Technology and Curtin University.

Interviews were conducted to identify what safety practices were currently implemented in the Australian construction industry. Data were collected for 42 construction projects. Consistent with the focus on best practice, the sample was skewed towards the better performing projects. The highest Lost Time Injury Frequency (LTIFR) rate for these projects was 25.5 and the lowest was 0. The mean LTIFR for the surveyed projects was 5.3. This compares to an industry average of 22.6 for general construction and 19.7 for construction trade services. Data were collected from a variety of different types of project. The project cost

ranged from $2.7 million to $2.5 billion, with a mean value of $205 million dollars. Nineteen of the projects were procured via a Design & Build strategy, five were traditional Design-Bid-Build projects and thirteen projects were procured using an alternative strategy.

The qualitative survey data was subject to thematic analysis, undertaken independently by two occupational health and safety specialists. The researchers coded the data from each project according to whether there was evidence of specific safety management practices in the project. The data revealed well established practices for the management of safety during the construction stage but far less activity during the planning and design stages of construction projects. For example, in only 50% of the projects was there evidence that project stakeholders other than the designer had input into design decision-making. In 64% of cases there was some attempt to eliminate safety risks during the design stage but in only 36% of the projects was this risk reduction considered to be innovative. In only 50% of the projects was project specific safety information communicated to prospective constructors and in only 40% of the projects was safety included in project specifications at the tender/award stage. Although not universal, 'best practice' in the pre-construction stages of projects was apparent, for example a process known as Construction Hazard Assessment Implication Review (CHAIR) was used in some projects to analyse design safety risks during the construction stage (New South Wales WorkCover Authority, 2001). In the construction stage there was evidence of more widespread safety management activity, largely undertaken by the constructor. For example, in 90% of projects detailed work methods developed prior to commencing major construction activity, meaningful arrangements were made for worker consultation in safety risk management and training needs were carefully analysed and appropriate training was provided. However, in only 57% of projects was there evidence that on-site design changes were subject to a rigorous risk assessment to determine and manage their safety implications.

The data collected were used to identify examples of best practice, as well as areas in which substantial 'gaps' existed for incorporation into the Guide. In particular, client-led safety management in the planning and procurement of construction work was not well established and the degree to which design safety processes were implemented depended largely upon the design and construction organizations involved in the project. These data were used to distil practical examples of safety best practice which are used throughout the Guide. Gaps were then filled by a comprehensive review of Australian and international literature addressing the issue of construction safety management.

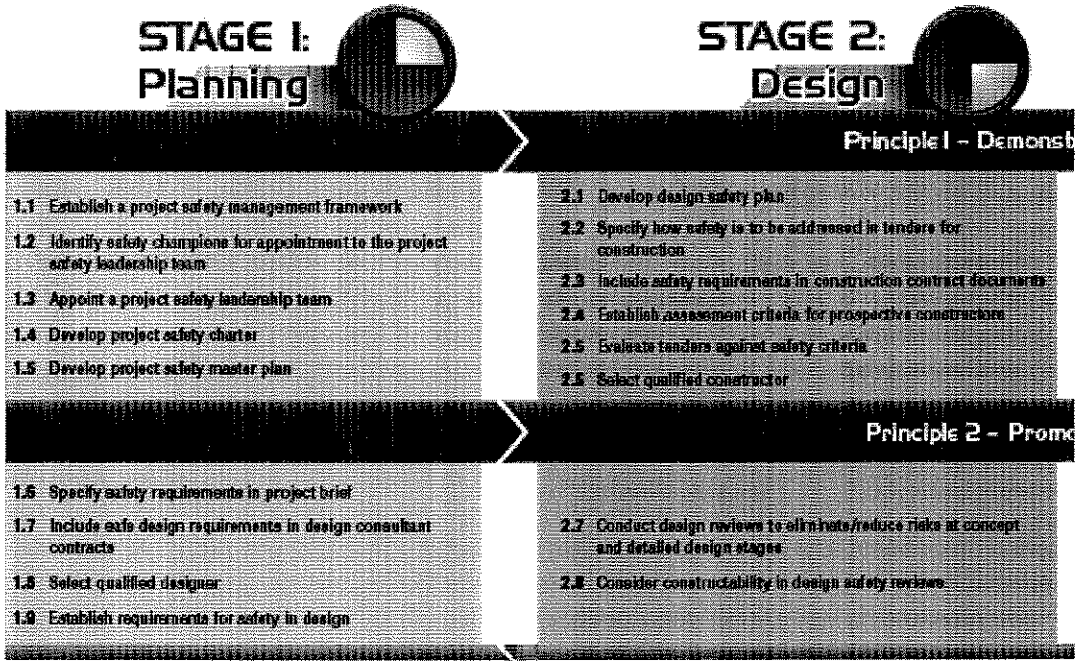
The *Guide to Best Practice for Safer Construction*

The Guide is made up of two parts: *Best Practice Principles* and *Best Practice Tasks*. The former document establishes broad principles for the management of OHS within the construction industry. There is some overlap between these

principles and the National Strategy Priority Areas. The 'Safer Construction' principles are:
Principle 1: Demonstrate Safety Leadership,
Principle 2: Promote Design for Safety,
Principle 3: Communicate Safety Information,
Principle 4: Manage Safety Risk,
Principle 5: Continuously Improve Safety Performance, and
Principle 6: Entrench Safety Practices.

At the heart of the guide is an 'Implementation Table', specifying safety practices to be undertaken at four life cycle stages of a construction project, i.e. Planning, Design, Construction and Commissioning. The practices are numbered and organised under the principles that they represent. Figure 5 shows a small section of this Table, indicating the layout of project stages, principles and practices.

Figure 5: Layout of the Safer Construction Implementation Table.



Part two of the Guide (*Best Practice Tasks*) documents each of the best practices using a standard layout that is intended to provide the user a concise tool for implementation, monitoring and review .The layout includes:

- Best Practice – the identifying name of the best practice,
- Description – a short description of the best practice,
- Key Benefits –the key benefits to be achieved by implementing the best practice,
- Desirable Outcome – the behavioural and procedural changes effected by the implementation of the best practice,
- Performance Measure – any output measures that can be recorded for the best practice, and

- Leadership – which party would typically take responsibility for this best practice and who needs to be consulted/involved.

Guidance in relation to the National Strategy Priority Areas

It is hoped that the Guide will accelerate the reduction in incidence and frequency rates of occupational injuries and illnesses in the Australian construction industry. It is a voluntary document designed to complement, state-based occupational health and safety legislation and the initiatives of compensation agencies and regulatory authorities. With considerable industry input into the formulation of the Guide, and its endorsement by many of the Australian construction industry's professional and stakeholder groups, the Safer Construction project constitutes an attempt by the entire construction industry to 'get its house in order.' As the ASCC statistics show, the industry need to improve its OHS performance if the targets established in the National Strategy are to be met. The Guide addresses the Five Priority Areas addressed in the National Strategy in several respects.

Priority area 1: Risk reduction. The Guide identifies management requirements for effective safety risk reduction at all stages in the project process. From planning through design, construction to commissioning, the Guide advises that decisions should be made on the basis of a careful consideration of the safety implications of available options. Decisions made about project options, design of the permanent structure, design of the construction process, choice of plant, equipment, materials and construction methods and project organisational arrangements should be made following an assessment of safety risks, using an appropriate and recognized risk assessment method.

The Guide recognises that all risk reduction measures are not equal and, wherever possible, safety risks should be eliminated through design or engineering solutions to create a safe workplace. It is always better to make the workplace safer than rely upon behavioural controls because people are fallible and will always make mistakes.

Where workplace risks cannot be physically removed, the Guide clearly states that they should be reduced so far as is possible. An established 'hierarchy of controls' is specified by the Guide, which states that, when a risk cannot be eliminated, risk control measures should be considered in the following order:

- Substitute the hazard giving rise to the risk with a 'less risky' hazard,
- Isolate the hazard from people whose safety could be at risk,
- Minimise the risk by engineering,
- Apply administrative measures, e.g. the adoption of safe systems of work, and
- Use personal protective equipment.

The Guide also provides for the capture and communication of safety risk throughout the project lifecycle, via a project risk register. The Guide expressly requires that this risk register be made available to those who must manage or work

with a risk. Consistent with the concept of equity in risk management, the Guide also advises that all project decision-making that could have an impact upon safety risk should involve input from those parties that could be affected by that risk.

Priority area 2: Increase OHS management capacity. The National Strategy identifies the need to build the motivation and ability of employers to manage safety risks effectively and of workers to work safely and participating in safety consultation, highlighting the need for the development of safety competencies and provision of systematic OHS management guidance and training, targeted to meet the needs of stakeholders, including those in small to medium sized enterprises (SMEs). The Guide provides a clear, stage-by-stage set of tasks for the systematic management of safety based upon the construction project process. The provision of detailed information about each task, including its likely outcomes/benefits, will provide a greater understanding of the case for using the Guide, as well as its accompanying tools, thus addressing the need to motivate construction industry participants to adopt the safety management practices documented. Safer Construction Principle 6, Entrench safety practices' also focuses primarily of the development of safety management capability within the construction supply chain, with an emphasis on the development of longer term relationships, the provision of mentoring schemes for SME design firms and sub-contractors.

Prioriy area 3: Prevent occupational disease. The prevention of occupational disease is not directly addressed by any of the Safer Construction principles. However, it is implicit in all of the Safer Construction tasks. The Guide states that the term 'safety' is intended to include occupational health and therefore the Safer Construction practices apply as much to the reduction of risk of work-related illness as they do to injury reduction.

Priority area 4: Hazard elimination through design. The National Strategy defines the elimination of (physical) hazards at the design stage as an area of national priority. The strategy aims "to build awareness and observance of this approach and to give people the practical skills to recognise design issues and to ensure safe outcomes" (Commonwealth of Australia, 2002, p.9). The case for design OHS in construction is compelling. Recent analysis identifies design as a causal factor in fatalities and serious injuries in the construction industries of other developed economies (Suraji et al. 2001; Behm 2005; Gibb et al. 2004). Safer Construction Principle 2, 'Promote design for safety', responds directly to Priority Area 4. The outcomes for this priority area, as defined in the National Strategy, include the adoption of safer approaches across the lifecycle of the product or process, the raising of awareness of the importance of safe design among the design professions, clients and the community, more systematic and cooperative application of risk management principles by designers, clients and others and the integration of safe design considerations in procurement.

In taking a project lifecycle perspective and by recommending clients engage in the procurement of safe design, the Guide has the potential to produce these outcomes. The Guide suggests that construction clients ensure that they engage a designer

who has a demonstrated understanding and awareness of safety risk management appropriate to the project requirements. Where a number of organisations or individuals contribute to the final design with their contributions being coordinated by a prime design manager, the Guide suggests that all organisations and individuals should participate in appropriate risk assessments and safety management decisions appropriate to their sphere of control. Further, the Guide establishes the need for comprehensive and systematic design safety reviews to be conducted at appropriate intervals during the design process. The Guide recommends that design risk management activities are cooperative, involving clients and, where possible, those who will be exposed to the safety risks, including constructors and maintenance representatives. This is consistent with the systematic and cooperative application of risk management principles envisaged in the National Strategy. The Guide also specifies that safety risks arising as a result of the design should be eliminated wherever possible. Where elimination is not possible, efforts to reduce safety risk through design modification should be made. The Guide suggests that a similar risk assessment and reduction process should be applied to any design changes made during the construction stage. Not mentioned in the National Standard but considered important in the promotion of safe design in construction industry is the issue of communicating safety information arising as a result of design risk management to other project stakeholders, particularly those whose safety could be affected by design decisions. The Guide advises designers to document residual risk, i.e. the identified risks remaining following the design safety risk management process and to clearly communicate this information to relevant stakeholders - including the client, the constructor, and the owner/occupier.

Priority area 5: Strengthen the capacity for government influence. The National Strategy states that 'Governments are major employers, policy makers, regulators and purchasers of equipment and services. They have a leadership role in preventing work-related death, injury and disease in Australia (Commonwealth of Australia, 2002, p.9). Outcomes anticipated in the National Strategy for this priority area include the development of a whole of government approach to consider and account for the safety implications of government work, the improvement of governments' performance as employers, and the use of the supply chain for the improvement of safety by governments, project managers and contractors. In establishing a comprehensive set of safety management tasks for construction clients, the Guide has the potential to significantly strengthen the capacity for government influence concerning the safety performance of the construction industry. As clients of construction, Australian Government agencies can play a significant role in leading the industry's safety improvement efforts.

As the initiators of projects, clients are in the best position to drive the cultural change needed to bring about further safety improvements in the construction industry. At the most basic level, the client's selection of project delivery strategy determines the timing and nature of engagement of both the designer and constructor, which can have an impact upon the extent to which safety issues are integrated into project planning and communicated within the project delivery

team. Clients make key decisions concerning the project budget, project objectives (including timelines) and other performance criteria, which can create the pressures and constraints known to have a significant impact upon safety in the construction stage (Suraji et al 2001). Research by the Health and Safety Executive (UK) identifies client requirements as being one of the most significant root causes of on-site accidents (HSE 2003). Bomel (2001) identified client company culture and contracting strategies as areas presenting considerable opportunities for safety improvement in the UK construction industry. In the USA, Huang and Hinze (2006a; 2006b) empirically evaluated the impact of a range of client-led safety initiatives on safety performance in the construction process. The US research revealed that the involvement of the client in pre-project planning, financially supporting the constructor's safety programme and participating in the day-to-day project safety activities were important requisites for excellent project safety performance. Winkler (2006) describes how client involvement in construction contractors' safety processes has created a set of shared values supportive of safety in the UK construction industry.

The Office of Government Commerce in the UK (OGC 2004) and the Scottish Executive have developed processes designed to help public sector construction clients to raise the health and safety standards of workers engaged in their construction projects. Adoption of the Safer Construction Guide by government agencies has the potential to further integrate safety management into the planning and procurement of public sector construction projects in Australia.

Conclusions

The Guide is intended to reflect 'best practice' in the management of safety on construction sites. It is a voluntary document and it was not intended that it replace or supersede any State/Territory or Commonwealth law relating to construction OHS. In particular, legislative requirements for constructors (as employers) establish minimum requirements for on-site OHS during the construction stage. However, the Guide recommends an increased role for construction clients (in the planning stage) and designers (in the design stage) in achieving OHS best practice during the construction stage. The Guide recognises that clients, in particular, can do a great deal to drive OHS best practice in construction projects. Clients (and/or their professional advisors) make decisions about what is to be constructed, the terms and conditions upon which each of the parties is to be engaged, as well as budget and schedule requirements for a project. The client's selection of project procurement method is particularly important because this dictates when and how other key project stakeholders will be engaged to advise on OHS in the project. For example, a designer could be expected to consider OHS during the design stage but would not reasonably be expected to advise upon the OHS risk implications of design issues during the construction stage, unless explicitly instructed to do so by the client. Defining, up-front, the roles and OHS responsibilities of each key stakeholder in a project is recommended within the framework of the Guide. In articulating best practice, the Guide provides an opportunity for property, design

and construction professionals to enhance the professional services that they provide and improve OHS performance within the construction industry.

As a voluntary document, the question of the Guide's adoption and impact is likely to be raised. The voluntary nature of the Guide is in contrast to legislative strategies adopted, for example, in the United Kingdom. In the UK, the Construction (Design and Management) Regulations were enacted in the mid-1990s and have recently been reviewed and re-written. These Regulations created statutory OHS responsibilities for construction clients and designers as well as creating a new overall OHS co-ordination role called the 'planning supervisor' (now replaced with an OHS Coordinator). Prior to the recent review, this legislative response was widely reported to have had limited impact on the UK construction industry's OHS culture or performance. Criticisms were based on the fact that clients and designers failed to integrate OHS into their decision processes and the creation of a new administrative role with overall coordination responsibility for project OHS, did not 'fit' comfortably with existing roles and relationships in the construction industry. It is hoped that, as a collaborative industry-initiated and endorsed document, the Safer Construction Guide will be widely adopted by industry stakeholders, thereby effecting cultural change in the Australian construction industry with regard to OHS. The Guide was launched in September 2007 and it is therefore too early to ascertain its impact. However, the extent of the Guide's adoption should be evaluated in future research.

The Guide and its supporting documentation can be downloaded and more information about the Safer Construction project found at the following website: http://www.construction-innovation.info/.

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