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Prevention through Design (PtD) Safe Design from an Australian Perspective

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1. Introduction

This paper aims to place current safe design activity in Australia into context by providing an overview of the regulatory environment, the history of safe design initiatives in Australia, and the influence of the National Occupational Health and Safety (OHS) strategy. The paper summarizes recent work in safe design policy undertaken at the national level in Australia.

The paper sets out the Australian experience that designing for safety can reduce injuries and fatalities at work. Design solutions already exist for most problems, but the challenge is to effect attitudinal changes to ensure hazards and risks are designed out of products before they enter the workplace. Setting targets and strategies at the national level, for OHS in Australia, has assisted in maintaining the engagement of key stakeholders and making real improvements in the area of safe design.

2. Australian regulatory environment

Australia is a federation of six states and two self-governing territories, the combination of which is known as the Commonwealth of Australia. The states and territories have significant power, under the Australian Constitution, as to the matters they can legislate. The Commonwealth's powers under the Constitution are limited in relation to matters over which the states control, but do include the ability to legislate on matters affecting its own employees and agencies, of national interest, and relating to corporations.

One of the issues for which the states and territories have responsibility for is occupational health and safety. As a consequence, each state and territory has developed their own OHS Acts, regulations and codes, and each operates their own inspectorates. The Commonwealth legislates for OHS for its own employees, defense personnel, and for maritime workers working in national waters, as well as having its own OHS inspectorate. Through agreement with the states and territories, Commonwealth legislation also covers the OHS of workers in the offshore oil and gas industry, which is regulated by the National Offshore Petroleum Safety Authority under a safety case regime.

At the state and territory level, in addition to the principal OHS legislation that covers most industry sectors, there may also be specific regulators that cover sectors such as mining, agricultural chemicals, dangerous goods transport, and radiation safety.

It is generally acknowledged within Australia that the multiple regulatory systems that have developed across a range of areas, including OHS, as a consequence of the sharing of constitutional powers, has led to unnecessary complexity and often inconsistencies. This in turn imposes an unnecessary administrative compliance burden on business. Stakeholders are placing significant pressure on governments in Australia to improve legislative consistency and to streamline administrative processes.

In response to this, the Australian Government, through the Council of Australian Governments (COAG), has developed a national Regulatory Reform Agenda created to address these issues. The Premiers and Chief Ministers of each of the states and territories, and the Prime Minister of Australia, make up the membership of COAG. Significant improvements have already been made in areas such as trade practices, financial regulation, and transport regulation. On the current reform agenda, occupational health and safety is included as a top 10 priority for regulatory reform.

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3. Towards greater consistency nationally in OHS

The vehicle responsible for delivering greater regulatory consistency for OHS in Australia is the Australian Safety and Compensation Council (ASCC). The ASCC is a tripartite consultative body made up of representatives from each of the state, territory, and Australian governments, industry (nominated by the Australian Chamber of Commerce and Industry, a peak industry body) and unions, (nominated by the Australian Council of Trades Unions, the peak union body). An independent chair is appointed by the Australian Government. The ASCC is supported in its work by the Office of the Australian Safety and Compensation Council (OASCC), a policy development and research group within the Department of Education, Employment, and Workplace Relations in the Australian Government.

The ASCC replaced the National Occupational Health and Safety Commission (NOHSC) in October 2005. The NOHSC was originally formed in the mid 1980s, with the mission of improving Australia's OHS performance, and level of harmony in the regulatory framework.

The work of both the NOHSC and the ASCC has related to improving consistency of legislation, which has included developing national OHS standards and codes of practice. National standards are intended to be used by the states, territories, and the Commonwealth as the basis for drafting consistent regulations. National codes of practice are guidance material that support the standards, and are intended to be adopted as 'approved codes of practice' under each jurisdiction's regulatory framework. National standards and codes only have an advisory status until they are adopted into a jurisdiction's legislative framework.

This approach to improving consistency has been possible, as each jurisdiction's principle OHS legislation is based on the UK Robens' model (Robens' Committee, 1972). This model includes setting out broad duties of care, based on common law principles, for those people who have responsibility for OHS matters. While there are slight variations between the jurisdictions, with regard to whom and what those with responsibility must do, generally the broad structure of duties is relatively consistent. Identified duty holders include employers, persons in control of workplaces and plants, designers (of plants and structures), manufacturers, and suppliers.

The national standards process achieved some success in the early to mid 1990s, with declaration of national standards relating to noise, plant, manual handling, hazardous substances, licensing of persons performing high risk work, and major hazard facilities. Not all of these standards were consistently adopted, however significant improvements were made in national consistency in legislation relating to noise, hazardous substances, licensing and manual handling.

The ASCC is currently working on a significant reform of the national standards structure to better align it with jurisdictional legislative frameworks. They hope to further improve the level of consistency and provide a more solid evidence-base for future decision making in this area.

4. Safe design in Australia

Work on safe design commenced at a national level in Australia under the NOHSC in the late 1980s. In 1990, a resource was produced by the NOHSC for teaching engineering students about the design role in improving OHS, but was not largely taken up. In 1994, the National Standard for Plant (NOHSC, 1994) was declared, which included positive duties for designers, manufacturers, importers, and suppliers of plant, to ensure that risks and hazards associated with the plant they were designing, manufacturing, and supplying, were eliminated, or where this was not practicable, minimized.

It was recognized through this initial work that a longer-term program was required, which would change the culture of the design professions. The need for them to think about safe design as a key philosophy underpinning all of their work was mandatory.

In 1998/1999, the Safe Design Project was initiated as one of five national solution projects undertaken by the NOHSC. It focused on design-related aspects of plant, buildings, and structures, and materials and substances that impacted OHS. This initiative was the start of a major focus on safe design that continues today. The project commenced with extensive consultations with industry, especially key designers, in the professions of engineering and architecture. A number of research papers were also commissioned as part of the project.

In 2000, there were two pivotal reports prepared for the NOHSC. The first was a review of safe design literature and of initiatives of OHS authorities, and other key players, relating to safe design (Cowley et al., 2000). This report identified areas of deficiency in the understanding of legal requirements and knowledge related to safe design, and was a significant influence on the direction of future work in this area. The second report was an analysis of 225 fatality studies, involving machinery and fixed plant in Australia, between 1989 and 1992 (NOHSC, 2000; see Driscoll et al., 2008-this issue). Of these fatalities, 117 were found to have at least one design factor contributing to the outcome. In addition, 53 recommendations were made by coroners in relation to the fatalities that were associated with design. This report revealed the extent to which inadequate consideration at the design stage led to unsatisfactory safety outcomes.

Various other research papers (Caple & Associates, 2000; Gunningham et al., 2000; McGregor Tan Research, 2000; National Research Centre for Occupational Health and Safety Regulation, 2002) produced under the Safe Design Project, reinforced the previous findings and highlighted the impact that improving design could have on reducing injury and death, while collectively elevating safe design as a key OHS policy issue.

Another report on design-related work injuries (NOHSC, 2004) further reinforced the previous studies on safe design, and found that:

- 37% of 210 workplace fatalities studied definitely or probably had design-related issues involved
- In another 14%, circumstances suggested design issues were involved
- 90% of the fatalities involving machinery and fixed plant appeared to be due in part to design issues, and
- Design issues appeared to contribute to at least 30% of injuries.

This was followed-up with a report on design issues in work-related serious injuries (Driscoll et al., 2005), which found that:

- Similar design problems are involved in many fatal incidents
- Design is an important contributor to fatal injury in many industries, and
- Solutions already existed for most of the identified design problems.

5. National OHS strategy 2002 - 2012

In 2002, state, territory, and Commonwealth Ministers, and the heads of the Australian Chamber of Commerce and Industry, and the Australian Council of Trade Unions signed up for a 10-year national OHS strategy (NOHSC, 2002) to improve safety performance in Australia. The national strategy set two goals to be reached by 30 June 2012: to reduce work-related fatalities by at least 20%, and to reduce the incidence of workplace injury by at least 40%. The national strategy identified five national priorities:

1. Reduce high incidence/severity of risks
2. Improve the capacity of business operators to manage OHS effectively
3. Prevent occupational disease more effectively
4. Eliminate hazards at the design stage
5. Strengthen the capacity of the government to influence OHS outcomes.

The fourth priority reflects the importance that safe design had taken in the policy context in Australia, and it has ensured that “safe design” maintains a high profile as an OHS policy issue. The National Strategy has been an important tool in bringing a greater level of cooperation and coordination in compliance activities between the OHS jurisdictions.

6. Resources for designers

It was quite clear, from the research undertaken, that a significant amount of work was needed to educate and improve the knowledge of designers on their role in safe design, and of available solutions to design problems. Until recently in Australia, if safety in design was addressed in engineering curricula, it was usually included as a small add-on unit, and it often only covered the utilization of technical standards that incorporated safety. The challenge has been to develop strategies to elevate safe design as an intrinsic part of the underlying philosophy of design.

To start addressing this issue, in 2006 the ASCC published *Guidance on the Principles of Safe Design for Work* (ASCC, 2006a), and launched an educational resource package *Safe Design for Engineering Students* (ASCC, 2006b). The package was designed to enable educators to incorporate examples of safe design, and the implications of not considering them, into all aspects of the existing engineering curriculum. This was instead of building a stand alone module, which would be competing for prominence with other modules, such as sustainability and environmental design. The ASCC recently commenced the first evaluation of the package, which has been received very positively by the academic and engineering communities. One of the early findings of the evaluation is the need to develop further practical case studies.

The safe design material has strong support from Engineers Australia, the peak professional and registration body for engineers in Australia. Engineers Australia now prefers newly qualified engineers, applying for professional registration, to demonstrate knowledge of safe design principles in their project work. Recently, the ASCC was approached by a body representing practicing engineers, to consider developing a similar resource for engineers already in the workforce. This significant advance indicates that a change in thinking is starting to occur in relation to safe design in the engineering profession in Australia.

The ASCC is also in the early stages of developing a similar resource package for architects (the *Safe Design Resource for Architecture and Building Design Students*). Material has also been developed by state jurisdictions to assist the construction industry in implementing safe design principles (Workplace Health and Safety Queensland, 2007).

The ASCC is currently revising the National Standard for Plant and, as part of the revision, is developing Essential Safety Outcomes (ESOs) as the minimum standards for plant design. The ESOs are intended to provide a consistent basis to determine if technical standards or specifications will deliver a product meeting an acceptable level of safety. The starting point for this work has been the European New Approach Directives relating to plant. The use of ESOs should allow acceptance in Australia of a wider

range of plants built to technical standards that can demonstrate compliance with the ESOs, while allowing rejection of plants that are unsafe. The model will be coupled with a conformity process requiring evidence of compliance prior to the plant entering the workplace. One of the other anticipated benefits of taking this approach is that it will encourage and influence the development of better design solutions in technical standards.

As part of its work on safe design, the ASCC retains an interest in the work of other standard setting bodies, to ensure the national OHS agenda is considered in their areas of work, including:

- Standards Australia - responsible for national technical design standards
- The Australian Building Codes Board - responsible for national building standards, with the major focus on building integrity, as well as plant and fittings
- The Construction Industry Cooperative Research Council - research includes safe design initiatives for the construction industry. They have recently produced materials on safe design.

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