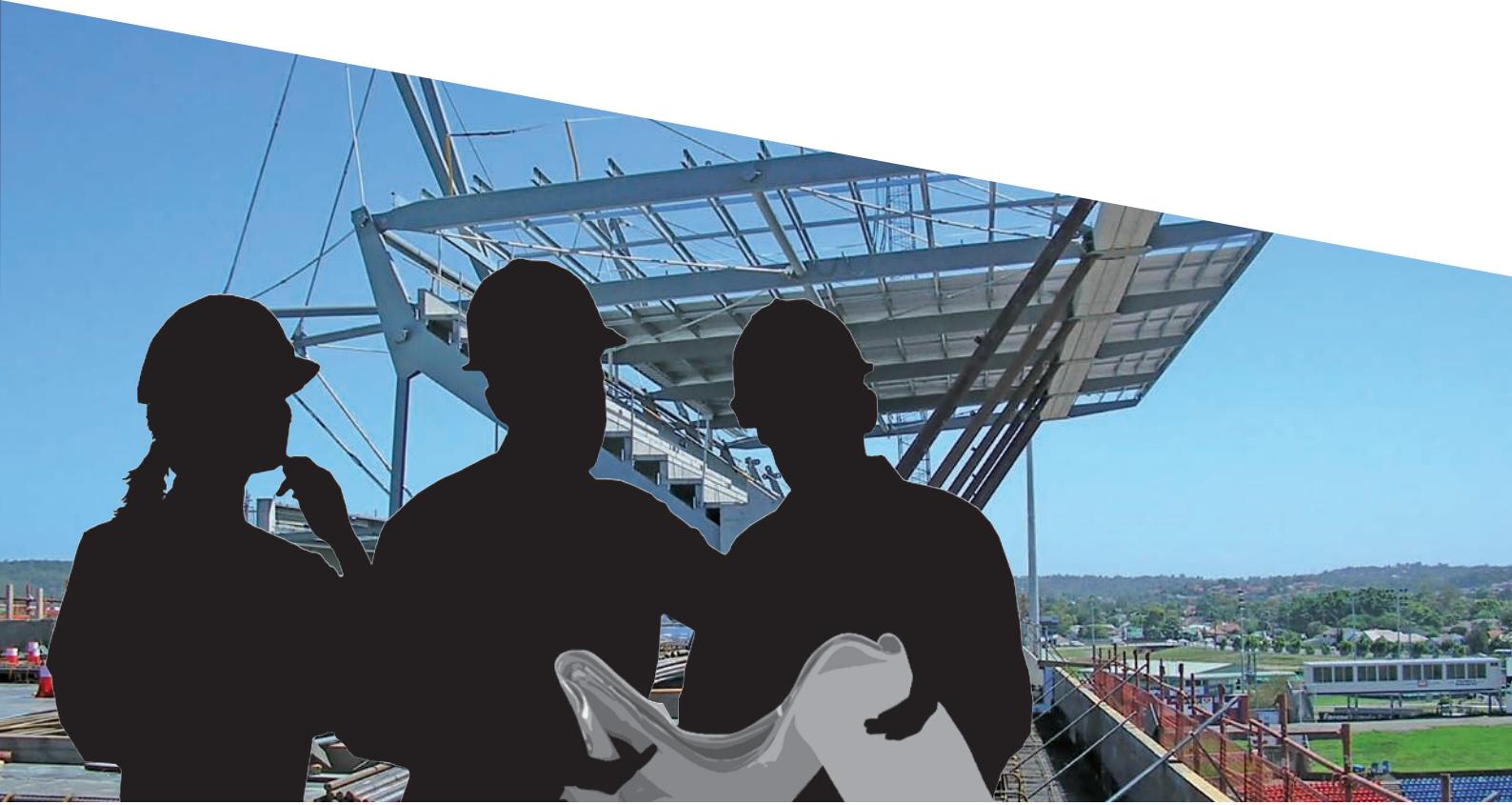


Guide to Best Practice for Safer Construction: Executive summary



Construction is Australia's third most dangerous industry, with an average of 49 workers killed at work each year since 1998. In 2002–2003, the incidence of workplace fatalities in the Australian construction industry was nearly three times higher than the national average for all industries. It is clear that there is still significant room for improvement in this aspect of Australia's construction industry.

The *Guide to Best Practice for Safer Construction* has been developed following a detailed review of practical Australian and international best practice initiatives.

The Guide is the key outcome of the *Safer Construction Project*, which was commissioned by Engineers Australia in response to the recognised need to reduce accidents and deaths in construction processes. The roles that engineers play for the main participants in the industry, the clients, designers/professionals, and the constructors, was also recognised and seen as a potential driver of change in the industry.

The Cooperative Research Centre (CRC) for *Construction Innovation* provided the industry research leadership in coordinating and funding this key project.

The Guide suggests a framework for improving safety performance on construction projects. It addresses all stages of the construction process: planning, design, construction and post-construction. Its overarching objective is to reduce the number of accidents and deaths on construction sites and to improve the ability of the industry as a whole to deliver safer construction projects and healthier employees.

The three primary stakeholder groups of the construction industry – clients, designers and constructors – have worked together to suggest best practice which integrates occupational health and safety into strategic and operational decision-making at all stages of the project.



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Creating a robust safety culture

The construction industry has an obligation to provide safety for workers, the public, suppliers, and other participants in the construction process.

In the past, traditional safety efforts focused on technical and engineering aspects, but this guide suggests that a strong and positive safety culture and correct behaviours are essential to the improvement of safety in the industry.

Creating a strong safety culture requires the involvement and commitment of all project stakeholders. Whether a business is a construction client, designer or constructor, consistent and effective operation of safety management systems throughout the business is assisted by a strong safety culture among senior management and board members overseeing its operations.

The principles of a safety culture

The framework for this guide suggests six best practice principles for creating a strong safety culture. They are intended to operate at an industry level as broad values for adoption at both the corporate and project level.

The best practice principles are:

- Principle 1: Demonstrate safety leadership
- Principle 2: Promote safety in design
- Principle 3: Communicate safety information
- Principle 4: Manage safety risks
- Principle 5: Continuously improve safety performance
- Principle 6: Entrench safety practices.

Guide to Best Practice for Safer Construction

The Guide to Best Practice for Safer Construction comprises two parts:

1. Guide to Best Practice for Safer Construction: Principles

This section identifies how the six best practice principles would be applied through the four stages of a project's lifecycle – planning, design, construction and post-construction. Best practice tasks are identified within each principle and at each stage of the project. Understanding these principles is important in identifying the responsibilities of client, designer and contractor in relation to OHS within project teams.

2. Guide to Best Practice for Safer Construction: Tasks

In the second part to *The Guide*, safety best practices are described for each stage of the project. Tasks for improving safety are outlined for each of the four main stages of a project: planning, design, construction and post-construction. The information provided includes:

- the suggested action to be taken to complete the task
- a detailed description of the task
- key benefits of the task
- desirable outcomes of the task
- performance measurement criteria
- a recommendation of who should lead the task.

As all projects are unique, the project stakeholders will need to determine which suggested tasks and procedures are most appropriate and applicable to their particular project, commensurate with the risk profile of that project.

Throughout this part of *The Guide* case study examples of the suggested best practice principles are provided to illustrate implementation in the Australian construction industry.



Guide to Best Practice for Safer Construction: Implementation kit

A kit has been developed to assist in the implementation of The Guide. It contains:

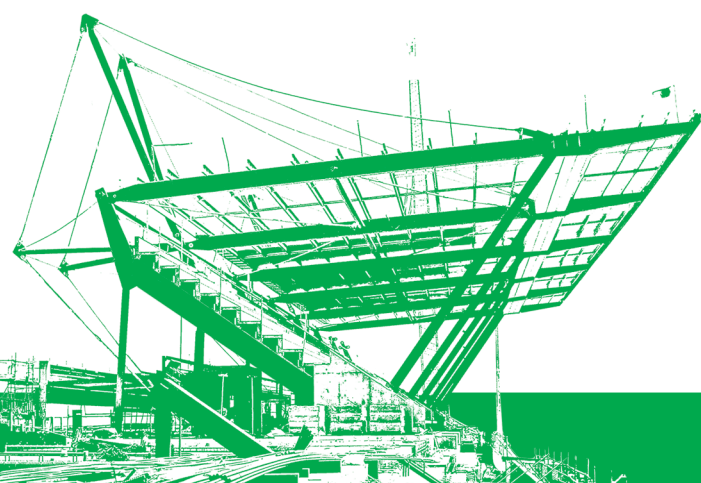
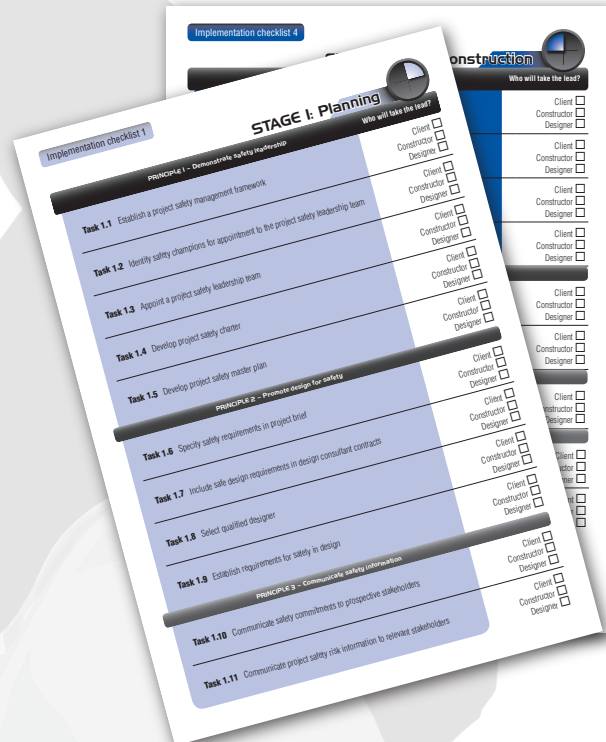
- *Guide to Best Practice for Safer Construction: Principles*
- *Guide to Best Practice for Safer Construction: Tasks*
- a range of support materials including:
 - » Implementation table: Creating a strong safety culture — A table outlining the safety tasks for each principle, across the stages of a construction project.
 - » Implementation checklists — The checklists, one for each stage, enable organisations to identify who (client, constructor or designer) would take the lead on each task through the project cycle.
 - » A CD featuring reports produced by this and other relevant CRC for *Construction Innovation* projects including the following documents:

- *Guide to Best Practice for Safer Construction: Literature review 'From concept to completion'*
- *Guide to Best Practice for Safer Construction: Case studies*
- *A Construction Safety Competency Framework: Improving OH&S performance by creating and maintaining a safety culture and its executive summary*

| Stage 4. Post-construction | |
|--|--|
| <p>Task 4.1 Develop a commissioning safety plan</p> <p>Action Where applicable, a commissioning safety plan should be developed prior to handing the facility structure over to the owner/occupier. The plan should be developed by the designer in collaboration with the client and the constructor. (The designer in this case may be the designer of the plant and equipment to be installed, rather than the designer of the facility/structure). The client may engage a suitably experienced third party to independently review the plan if no such expertise exists within the client's organisation.</p> <p>Description The commissioning safety plan will set out the procedures necessary to ensure that the facility structure and its plant and equipment are not put into service until deemed safe for use. After installation of any plant and equipment, all relevant safety data, including the project risk register, are to be provided to the owner/occupier.</p> <p>The commissioning safety plan should include:</p> <ul style="list-style-type: none"> a nominated officer responsible for the commissioning stage of the project to act as a safety champion for this stage of the project; a commissioning risk assessment which identifies and evaluates potential commissioning safety issues; a communication plan to inform all stakeholders on commissioning safety issues; safety monitoring (audits and inspections) and reporting processes; legal and statutory obligations, such as obtaining certificates and clearances and appointing registrars; processes to management of identified major areas of hazard or risk and proposed control measures; management of dangerous goods and hazardous substances. <p>The commissioning safety plan requirements set out in the project safety master plan (Table 1).</p> <p>Key benefits</p> <ul style="list-style-type: none"> Commissioning safety issues are comprehensively considered before installation of plant and equipment. Clear commissioning safety management processes and responsibilities are established. Appropriate resources are allocated. A framework for monitoring safety through the commissioning stage is provided. | <p>Desirable outcomes</p> <ul style="list-style-type: none"> Safety management through the commissioning stage is established through planning. <p>Performance measures</p> <ul style="list-style-type: none"> A commissioning safety plan is submitted to the client before installation of plant and equipment or before starting the facility/structure for service. <p>Leadership</p> <ul style="list-style-type: none"> Designer, in collaboration with the client and the constructor. |
| <p>Task 4.2 Perform post-construction review</p> <p>Description Prior to handover, and before users start operations, a review of the completed project should be carried out. The issue of a certificate of completion or occupancy does not necessarily mean that all safety hazards have been eliminated. It is at this stage that such a review could identify any safety issues unresolved during planning, design and construction. Any such issues identified should be subject to rigorous assessment, and strategies developed to reduce their impact. Residual risks should be recorded in the project risk register, and requirements for ongoing monitoring or further review should be documented.</p> <p>This is also a good time to conduct self-interviews with workers' personnel to gain a better understanding of how people at the work face feel about the safety management processes and strategies – and any suggestions for further improvements.</p> <p>Key benefits</p> <ul style="list-style-type: none"> Handover over a facility/structure with minimal safety hazards for users prior to occupation or operation. An assessment of the facility/structure prior to handover to ensure its safe operation. <p>Performance measures</p> <ul style="list-style-type: none"> Record of all the identified safety hazards placed in the project risk register. <p>Leadership</p> <ul style="list-style-type: none"> Client, designer and constructor. | <p>Desirable outcomes</p> <ul style="list-style-type: none"> Safety management through the commissioning stage is established through planning. <p>Performance measures</p> <ul style="list-style-type: none"> A commissioning safety plan is submitted to the client before installation of plant and equipment or before starting the facility/structure for service. <p>Leadership</p> <ul style="list-style-type: none"> Designer, in collaboration with the client and the constructor. |
| <p>Task 4.3 Evaluate project performance</p> <p>Description The client, designer and constructor should evaluate the risks contained in the project risk register during the planning, design and construction of the project, and the overall safety performance of the project.</p> <p>This post-project review should be a team exercise, involving the client, designer, constructor and major subcontractors. The review would assess aspects such as:</p> <ul style="list-style-type: none"> the efficacy of the project safety management plan through all stages of the life cycle; strategies and interventions which worked or did not work; the processes and systems that were successful which could be used in future projects. <p>It should also be useful to complete the outcomes of safety risk assessments during the design stage with those actually experienced during the construction stage. This could provide useful information about the efficiency of the design safety review process. Accidents, incidents and near misses should also be investigated, as well as the quality of safety communication and the cooperation between stakeholders.</p> <p>Key benefits</p> <ul style="list-style-type: none"> Feedback leading to improvements in the future provides a basis for continuous improvement of safety performance. <p>Desirable outcomes</p> <ul style="list-style-type: none"> A comprehensive post-project review report highlighting both positive and negative aspects of the project's safety performance, aspects where improvements could be made, and feedback and learning from all stakeholders. A record of lessons learned and communication of these to other industry organisations so that the information can be shared. | <p>Desirable outcomes</p> <ul style="list-style-type: none"> Safety management through the commissioning stage is established through planning. <p>Performance measures</p> <ul style="list-style-type: none"> A commissioning safety plan is submitted to the client before installation of plant and equipment or before starting the facility/structure for service. <p>Leadership</p> <ul style="list-style-type: none"> Designer, in collaboration with the client and the constructor. |

| STAGE 1: Planning | STAGE 2: Design | STAGE 3: Construction | STAGE 4: Post-construction |
|---|--|---|--|
| Principle 1 – Demonstrate safety leadership | | | |
| <p>1.1 Establish a project safety management framework</p> <p>1.2 Identify safety champions for appointment to the project safety leadership team</p> <p>1.3 Appoint a project safety leadership team</p> <p>1.4 Develop project safety charter</p> <p>1.5 Develop project safety master plan</p> | <p>2.1 Develop design safety plan</p> <p>2.2 Specify how safety is to be addressed to tender for construction</p> <p>2.3 Include safety requirements in construction contract documents</p> <p>2.4 Establish assessment criteria for prospective constructors</p> <p>2.5 Evaluate tenders against safety criteria</p> <p>2.6 Select qualified contractor</p> | <p>3.1 Develop construction safety plan</p> <p>3.2 Develop management commitment to safety processes at all levels</p> <p>3.3 Develop contractor management led safety review process</p> <p>3.4 Conduct regular site inspections</p> <p>3.5 Conduct safety talks</p> | <p>4.1 Develop a commissioning safety plan</p> <p>4.2 Perform post-construction review</p> <p>4.3 Evaluate project performance</p> <p>4.4 Recognise and reward good safety management and leadership</p> |
| Principle 2 – Promote design for safety | | | |
| <p>1.6 Specify safety requirements in project brief</p> <p>1.7 Include safety design requirements in design consultant contracts</p> <p>1.8 Select qualified designer</p> <p>1.9 Establish requirements for safety in design</p> | <p>2.7 Conduct design reviews to eliminate/identify risks of concept and detailed design stages</p> <p>2.8 Consider constructability in design safety reviews</p> | <p>3.6 Design safety risk information to project</p> <p>3.7 Review safety risk in design changes</p> | <p>4.5 Evaluate effectiveness of design safety review</p> <p>4.6 Record effective design solutions for future projects</p> |
| Principle 3 – Communicate safety information | | | |
| <p>1.10 Communicate safety commitments to prospective stakeholders</p> <p>1.11 Communicate project safety risk information to relevant stakeholders</p> | <p>2.9 Include safety information in design documentation</p> <p>2.10 Communicate relevant project safety risk information to construction in the project risk register</p> | <p>3.8 Communicate safety risk information to relevant stakeholders</p> <p>3.9 Provide regular safety performance feedback to project</p> | <p>4.7 Communicate safety knowledge to all project participants</p> |
| Principle 4 – Manage safety risks | | | |
| <p>1.12 Conduct risk analysis of project systems</p> <p>1.13 Undertake residual facility safety or viable system assessment</p> <p>1.14 Select preferred project option based on robust risk assessment</p> <p>1.15 Record safety information in a project risk register</p> | <p>2.11 Record residual safety risk information in the project risk register</p> | <p>3.10 Implement operational risk management processes</p> <p>3.11 Identify and notify safety deficiencies</p> <p>3.12 Record risk information</p> | <p>4.8 Conduct appropriate testing of plant/equipment prior to operation</p> <p>4.9 Record safety information relevant to facility operation</p> |
| Principle 5 – Continuously improve safety performance | | | |
| <p>1.16 Establish key performance indicators (KPIs) for safety</p> | <p>2.12 Review key performance indicators (KPIs) for safety</p> | <p>3.13 Undertake regular measurement of project safety performance using leading indicators, criteria, targets and reports/indicators</p> <p>3.14 Regularly analyse project safety performance data</p> | <p>4.10 Undertake collaborative post-project review of safety performance</p> <p>4.11 Capture and record lessons learned for future projects</p> |
| Principle 6 – Enhance safety practices | | | |
| <p>1.17 Continuously develop safety capabilities</p> <p>1.18 Develop long-term relationships within supply chain</p> | <p>2.13 Continuously develop safety capabilities</p> <p>2.14 Provide mentoring schemes to SME designers</p> | <p>3.15 Continuously develop safety capabilities</p> <p>3.16 Promote safety management practices within SME subcontractors</p> <p>3.17 Implement safety mentoring system for SME subcontractors</p> | <p>4.12 Develop long-term relationships with SMEs</p> <p>4.13 Foster feedback between prime contractors and subcontractors</p> |

The Guide to Best Practice for Safer Construction: Implementation kit is available from www.construction-innovation.info.





The *Safer Construction Project* was commissioned by Engineers Australia. The CRC for *Construction Innovation* provided the industry research leadership and coordinated the development and funding of The Guide. The major funding for the project was also provided by the CRC.

The project partners

Industry



Government



Research



Vital to the success of this project has been the involvement and consultation with the major industry stakeholders:



Master Builders Australia also provided valuable input to this project.

The CRC for *Construction Innovation* is a national research, development and implementation centre focused on the needs of the property, design, construction and facility management sectors. Established in 2001 and headquartered at Queensland University of Technology as an unincorporated joint venture under the Australian Government's Cooperative Research Programme, *Construction Innovation* is developing key technologies, tools and management systems to improve the effectiveness and productivity of Australian industry.

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