Guide to Best Practice for Safer Construction: Tasks

ENGINEERS AUSTRALIA

CRC Construction Innovation
BUILDING OUR FUTURE

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DISCLAIMER

The major industry associations representing clients, constructors and designers support this aspirational Guide. These associations recognise that many best practices suggested by the Guide exceed OHS legal obligations. Support for The Guide does not infer support for incorporation of suggested best practices in OHS legislation, which should continue to be based on minimum standards.

The best practices outlined in this guide are proposed to improve safety outcomes, but the value of the suggested methodologies, including the examples provided, is not proven. Therefore, support by these associations is not an endorsement of any part of this guide as an accepted standard by which the professional behaviour of individual practitioners may be judged.

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Foreword

I became truly conscious of the vital importance of safety in construction at the signing of the John Holland Group's first contract with the Snowy Mountains Authority – then under the leadership of the great Australian engineer, Sir William Hudson. The year was 1964.

In the early days, due to rock falls and the steep slopes of the surrounding terrain, the safety record of the Snowy Mountains Authority was anything but favourable, and I recall with clarity the most impressive attitude of the Authority in implementing measures to improve construction safety performance in the field.

Indeed, so concerned was Sir William to redress the situation, and to create a greater awareness of this national problem, that every Monday morning he convened and chaired a meeting of all Project Managers, at which all the Authority's projects safety performances and statistics for the previous week would be discussed. This action was remarkably effective and produced outstanding results, out of which many new safety initiatives were born.

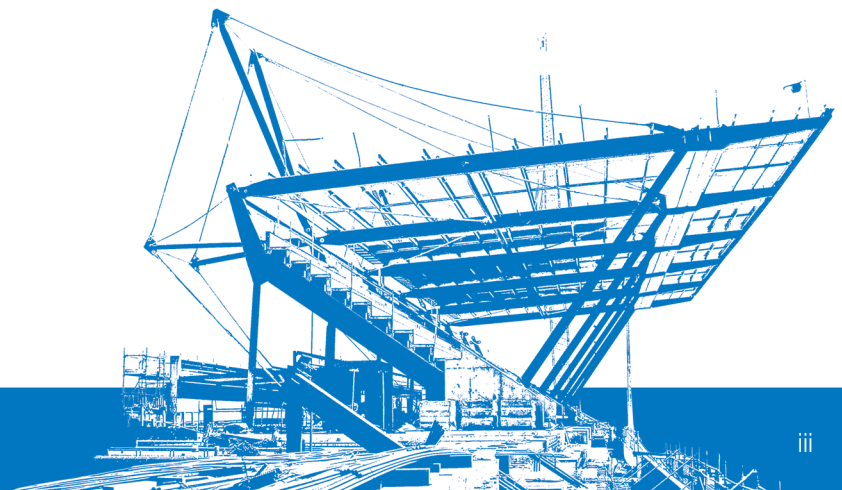
I remember Sir William's words to me just after the signing of our contract – not a large one in terms of the Snowy Mountains scheme as a whole: "If the company performs well and safely – it will be well looked after. You have a great responsibility to your staff and the rest of the workforce to ensure best practices are observed."

Sir William Hudson's enthusiasm and actions on this aspect of construction were inspiring, and had a most desirable influence on me personally, and on the entire Snowy Mountains scheme. It was leadership of the highest order which achieved the result it so richly deserved.

The John Holland Group ever afterwards made safety on construction sites the number one issue. We also endeavoured to show leadership to others in the field of safety practice. It worked well.

Sir John Holland AC

Flinders, Victoria
Australia
7 August 2007



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Preface

The Cooperative Research Centre (CRC) for *Construction Innovation* is committed to leading the Australian property, design, construction and facility management industry in collaboration and innovation. Our CRC works with business and government to improve productivity through innovation and best practice programs. We have created an unprecedented alliance of industry, government and researchers who are committed to saving lives and preventing injuries on Australia's construction sites.

The Federal Safety Commissioner commends the building and construction industry's commitment to safety as reflected through the development of this Guide to Best Practice and encourages those within the industry to use the document as a guide and a useful tool for improving occupational health and safety.

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

The Guide suggests a framework to improve safety performance on construction projects and covers all stages of a project: 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 create a methodology which integrates occupational health and safety into strategic and operational decision-making at all stages of the project.

The Guide is the culmination of over two years' work on one of our key research and implementation projects, *Safer Construction* – industry-led by Tim Fleming, Operations Safety Manager, NSW/ACT Region, John Holland Group, with a team comprising Verena Marshall and Kerry Pedigo (Curtin University of Technology), Greg Fraser (WA Department of Housing and Works), Kerry Brown, Michael Charles, Janet Pillay, Neal Ryan and Rachel Ryan (QUT), and Nick Blismas, Helen Lingard and Ron Wakefield (RMIT).

The *Guide to Best Practice for Safer Construction* was instigated by Engineers Australia, who established the Engineers Australia Taskforce for Construction Safety, chaired by Bill Wild, Chief Operating Officer, Leighton Holdings. The Taskforce comprised industry representatives from all sectors of the construction industry – clients, designers and constructors. Thanks go to Paul Dougas (Association of Consulting Engineers Australia), Murray Coleman and Tom McFadyen (Australian Constructors Association), Jane Montgomery-Hribar (Australian Procurement and Construction Council), Peter Scuderi (CRC for *Construction Innovation),* Peter Godfrey (Engineers Australia), Stephen Sasse (John Holland Group), Richard Calver (Master Builders Australia), Marton Marosszeky (National Committee for Construction Engineering), Wayne Artuso – observer (Office of the Federal Safety Commissioner), Peter Verwer (Property Council of Australia), and Bill Barlow (The Royal Australian Institute of Architects).

The Guide is intended to be an aspirational document that leads discussion and industry change, as well as a practical tool which can be used across the industry by clients, designers and constructors and by large firms and small and medium-sized enterprises.

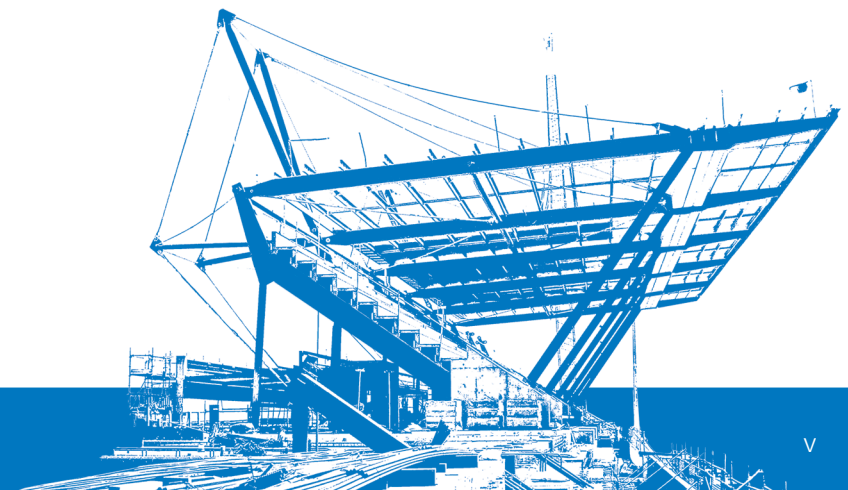
We look forward to continuing our work with you to improve safety on construction sites, and enhance the future of the Australian construction industry.

John McCarthy

Chair
CRC for *Construction Innovation*

Dr Keith Hampson

Chief Executive Officer
CRC for *Construction Innovation*



Preamble

I am delighted to present the *Guide to Best Practice for Safer Construction*.

Safety performance in the construction industry is a challenge to all of us who work in the industry. The rate of injury and death is unacceptably high, and significant improvement has been elusive. It is distressing that this is particularly so in terms of the number and frequency of fatalities.

The fact is that in spite of considerable effort by, and even successes in, some sections of the industry, the Australian construction industry's performance overall is a long way short of best practice.

It has become increasingly clear that sustained safety improvements will not be achieved without significant cultural and behavioural change in how the whole industry manages safety.

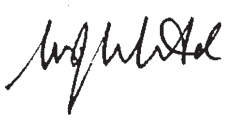
It has been the view of many that such change will not be achieved by heavy handed legislation, but rather that it requires the active cooperation of all sectors of the industry. It is no coincidence that the best performances of the industry have been achieved where there is a high degree of leadership and commitment shown by each of the main participants: the clients, the designers and the constructors.

Engineers Australia recognised that engineers play a substantial role in the industry and that, uniquely, engineers are prominent in the firms that comprise those main participants in the construction process – the clients, the designers and the constructors.

The Engineers Australia Taskforce for Construction Safety was established and embarked on its Safer Construction Project with a determination to make a real difference. I believe that the *Guide to Best Practice for Safer Construction* will do just that.

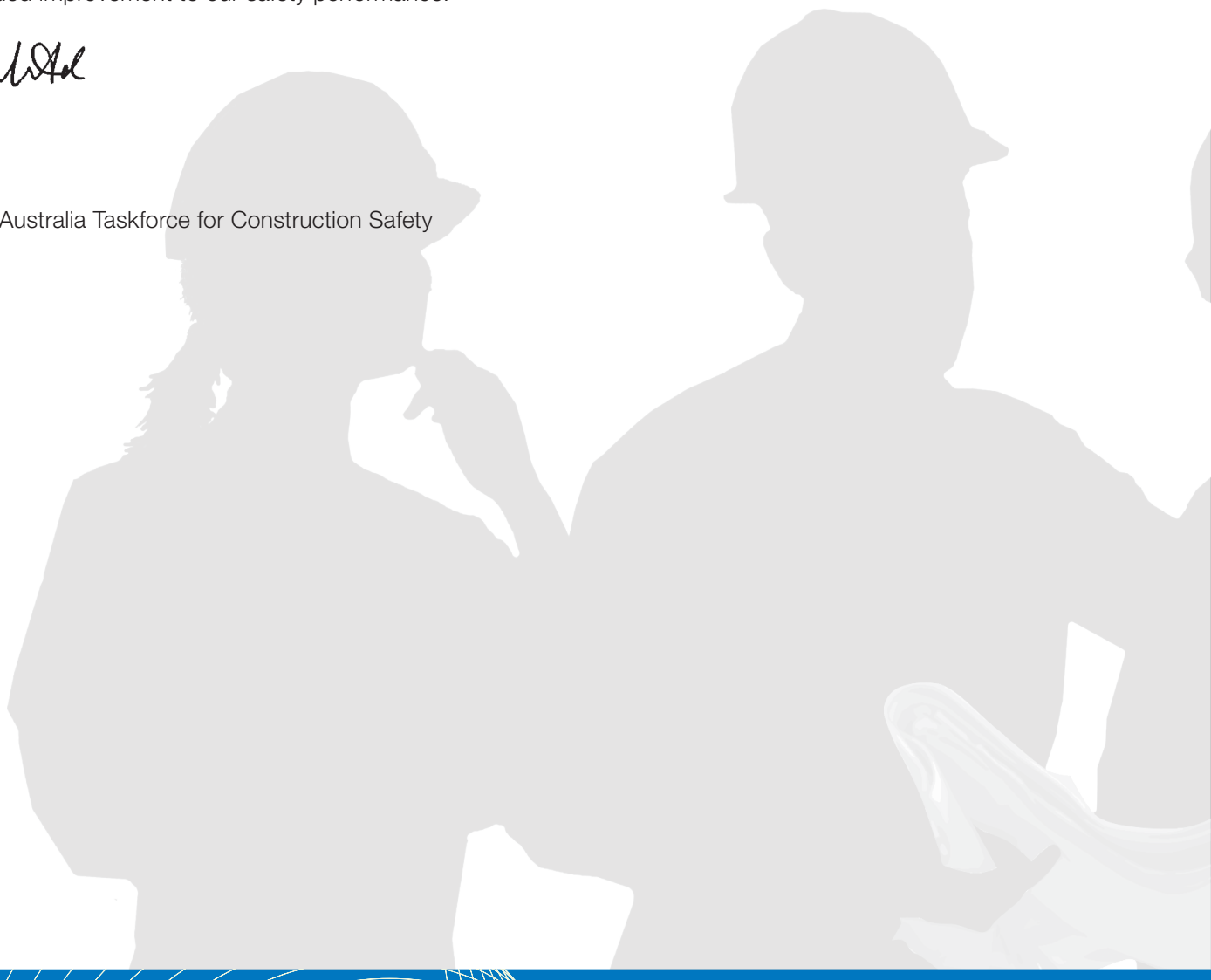
I offer my congratulations and thanks to everyone involved in the development of The Guide. In particular I would like to thank the CRC for *Construction Innovation* for its research leadership and for its role in funding and managing the development of The Guide. I also thank the other participating member organisations and those who provided additional financial support.

I hope and trust that The Guide will be embraced by the whole industry as a useful and practical tool that will help drive the much needed improvement to our safety performance.



Bill Wild

Chair
Engineers Australia Taskforce for Construction Safety



Acknowledgments

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 to Best Practice for Safer Construction* and associated kit materials.

The major funding for the project was provided by the CRC.

The *Safer Construction* project team members are:

Project leader: Tim Fleming – Operations Safety Manager, NSW/ACT Region, John Holland Group

Greg Fraser – Western Australian Department of Housing and Works

Nick Blismas, Helen Lingard and Ron Wakefield – RMIT

Kerry Brown, Michael Charles, Janet Pillay, Neal Ryan and Rachel Ryan – QUT

Verena Marshall and Kerry Pedigo – Curtin University of Technology

Engineers Australia Taskforce for Construction Safety

Chair: Bill Wild – Chief Operating Officer, Leighton Holdings

Bill Barlow – The Royal Australian Institute of Architects

Richard Calver – Master Builders Australia

Murray Coleman and Tom McFadyen – Australian Constructors Association

Paul Dougas – Association of Consulting Engineers Australia

Peter Godfrey – Engineers Australia

Marton Marosszeky – National Committee for Construction Engineering

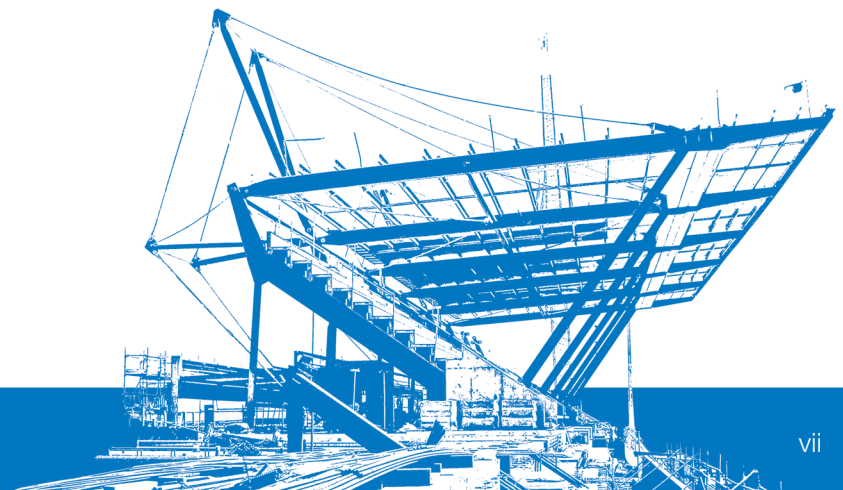
Jane Montgomery-Hribar – Australian Procurement and Construction Council

Stephen Sasse – John Holland Group

Peter Scuderi – CRC for *Construction Innovation*

Peter Verwer – Property Council of Australia

Wayne Artuso – Office of the Federal Safety Commissioner (observer)



The following project partners undertook the research, industry consultation and developed the content provided in the *Guide to Best Practice for Safer Construction*:

The project partners

Industry

John Holland

Bovis Lend Lease

Government

Department of Housing and Works

Research

Curtin University of Technology

QUT

RMIT UNIVERSITY

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

AUSTRALIAN CONSTRUCTORS ASSOCIATION

PROPERTY COUNCIL of Australia

ARTEM • PROMOVEMUS • UNA
THE ROYAL AUSTRALIAN INSTITUTE OF ARCHITECTS

ACEA
ASSOCIATION OF CONSULTING ENGINEERS AUSTRALIA

AUSTRALIAN PROCUREMENT AND CONSTRUCTION COUNCIL

Australian Government
Department of Employment and Workplace Relations
Office of the Federal Safety Commissioner

Master Builders Australia also provided valuable input to this project.

The *Safer Construction* project participants would like to thank and acknowledge Mel Kettle (Mel Kettle Consulting) and Colleen Foelz (Communication and publications, CRC for *Construction Innovation*) for their highly professional management of the communication and publication elements of this project.

Glossary

A **client** is a person or organisation who commissions the design and construction of a construction project.* It includes any agent appointed to manage the works on behalf of the client.

Construction, for the purposes of this document, covers all work carried out on a work site. It includes:

- the construction, alteration, extension, restoration, repair, demolition or dismantling of buildings, facilities/structures or works that form, or are to form, part of land, whether or not the buildings, facilities/structures or works are permanent
- the construction, alteration, extension, restoration, repair, demolition or dismantling of railways (not including rolling stock) or docks
- the installation in any building, facility/structure or works of fittings forming, or to form, part of land, including heating, lighting, airconditioning, ventilation, power supply, drainage, sanitation, water supply, fire protection, security and communications systems
- any operation that is part of, preparatory to, or for rendering complete, work covered by the activities above, for example —
  - site clearance, earthmoving, excavation, tunnelling and boring
  - the laying of foundations
  - the erection, maintenance or dismantling of scaffolding
  - the prefabrication of made-to-order components to form part of any building, facility/structure or works, whether carried out on-site or off-site
  - site restoration, landscaping and the provision of roadways and other access works.

A **construction project** is a project involving construction work, and includes design, preparation and planning.*

A **constructor** is a person or organisation who is responsible to a client for controlling the work of construction.

Design, in relation to any facility/structure, means any drawing, design detail, scope of works document or specification relating to the facility/structure.*

A **designer** is a person or organisation whose profession, trade or business involves them in:

- preparing designs for facilities/structures, including variations or changes to a facility/structure

or

- arranging for people under their control to prepare designs for facilities/structures.*

A **facility/structure** is any building, steel or reinforced concrete construction, railway line or siding, tramway line, dock, ship, submarine, harbour, inland navigation channel, tunnel, shaft, bridge, viaduct, waterworks, reservoir, pipe or pipeline (whatever it contains or is intended to contain), structural cable, aqueduct, sewer, sewerage works, gasholder, road, airfield, sea defence works, river works, drainage works, earthworks, constructed lagoon, dam, wall, mast, tower, pylon, underground tank, earth-retaining construction, fixed plant, construction designed to preserve or alter any natural feature, and any other similar construction.*

A **hazard** is any thing or situation with the potential to cause harm to people.

The **project risk register** is a repository for project risk information.

The **project safety charter** is a document publicly and explicitly stating the commitment of the client to achieving the highest level of safety performance in the project.

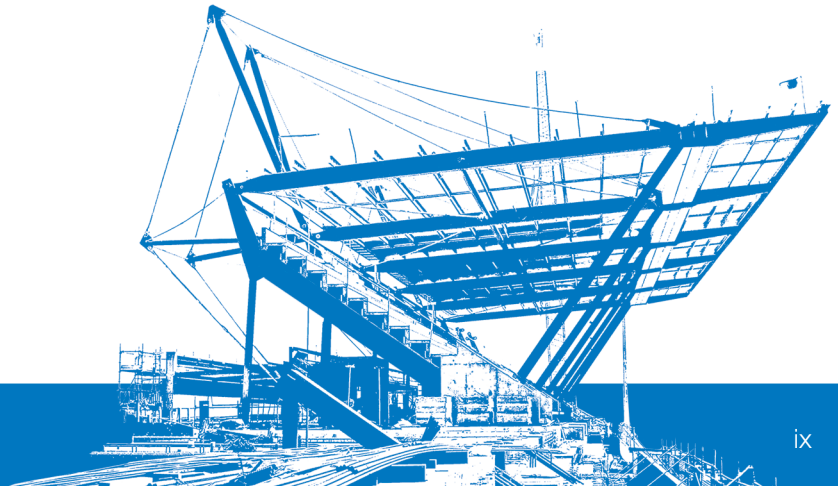
The **project safety master plan** is a plan developed in the planning stage of the project, outlining the overarching safety goals and objectives of the project, establishing performance criteria against which the attainment of these goals and objectives will be evaluated, and outlining ways in which these safety goals and objectives will be met.

Residual risk is the outstanding risk remaining after a risk control measure has been implemented.

Risk, in relation to any potential injury or harm, is the likelihood and consequence of that injury or harm occurring.

Risk control measure is an action recommended or taken to either eliminate or reduce the risk of death, injury, illness or other harm.

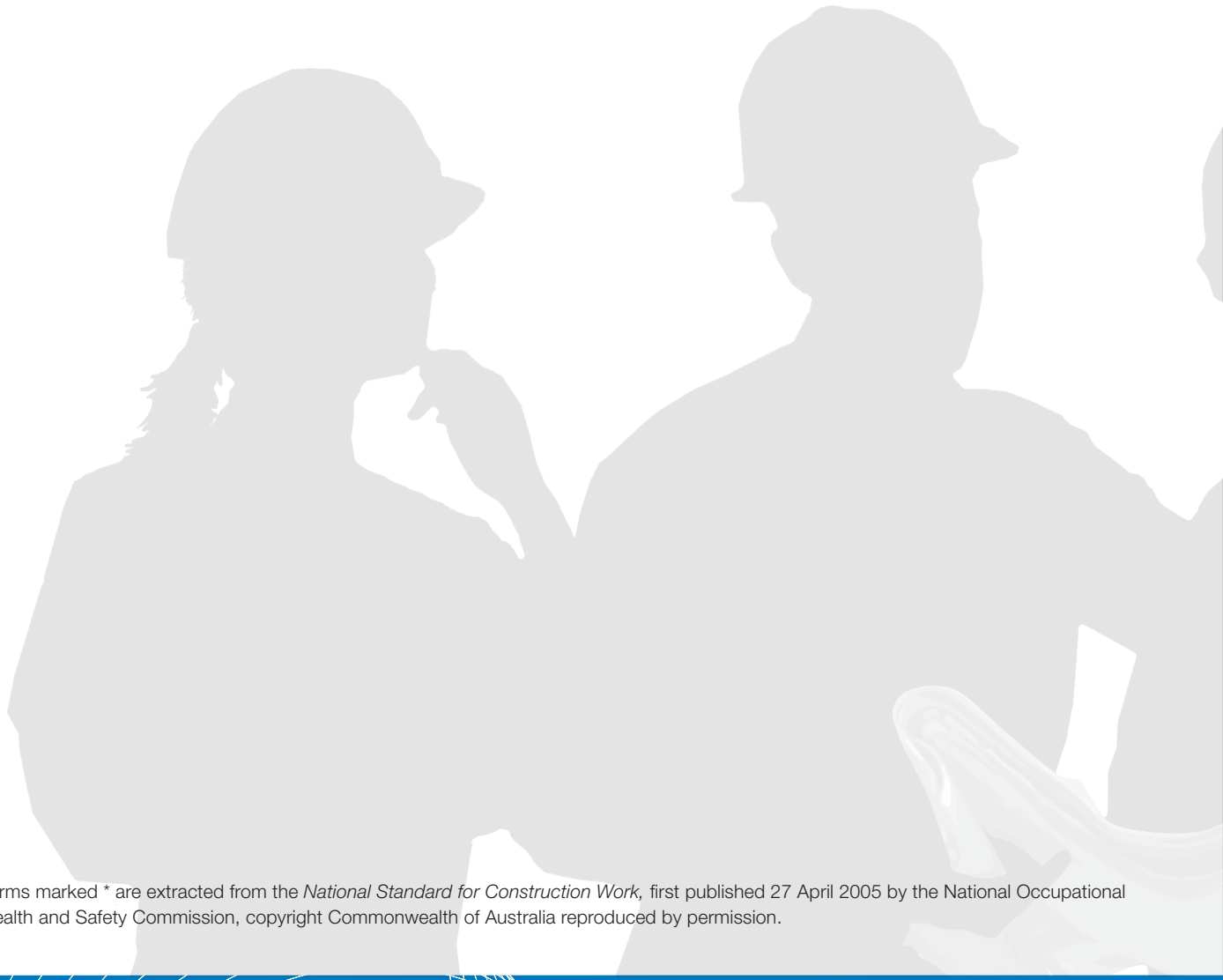
A **safety champion** is a person who will lead the safety effort from the outset of the project.



Stage review is a gateway separating project stages that reviews preceding tasks to ensure that they have been satisfactorily undertaken before moving on to the next stage.

A **subcontractor** is a person or organisation engaged by the constructor to undertake services necessary for the performance of a construction contract.

A **supplier** is a person or organisation engaged by the constructor to supply plant, equipment or materials necessary for the performance of a construction contract.



Introduction

Scope

The *Guide to Best Practice for Safer Construction* is intended to suggest 'best practice' in the management of safety on construction sites. It is a 'guide' and is not intended to replace or supersede any mandatory state, territory or Commonwealth law, or an instrument made under such a law, relating to construction safety. Rather, it is an aspirational document to guide the building and construction industry towards best practices to improve safety performance.

Project stakeholders should therefore refer to the occupational health and safety legislation relevant to the jurisdiction in which they are conducting construction work for information on mandatory requirements.

The Guide aims to improve safety during construction work as defined in the Glossary. It does not include best practice for managing safety during the post-occupancy operation, use, maintenance or cleaning of a facility/structure.

Clearly, all projects are unique and project stakeholders should determine the appropriateness and degree of applicability of the suggested tasks and procedures to their particular project, commensurate to the risk profile of that project. It is not envisaged that the methodologies, tasks and procedures suggested in this guide would be applicable to individually constructed domestic dwellings or domestic renovations.

The term 'safety' throughout The Guide is intended to include occupational health. The responsibilities apply to the reduction of risk of work-related illness, as well as to injury reduction.

The Guide does not specify all requirements that need to be satisfied to safely perform construction work, which are addressed in legislation, regulations, codes of practice, guidance notes and standards. The Guide intends to articulate management actions for key stakeholders in a project, and provide the framework for an appropriate allocation of responsibility for safety in construction projects.

Reasonably practicable

An obligation to comply with a provision of The Guide is an obligation to comply as far as is reasonably practicable. When determining what is reasonably practicable, the following factors should be considered:

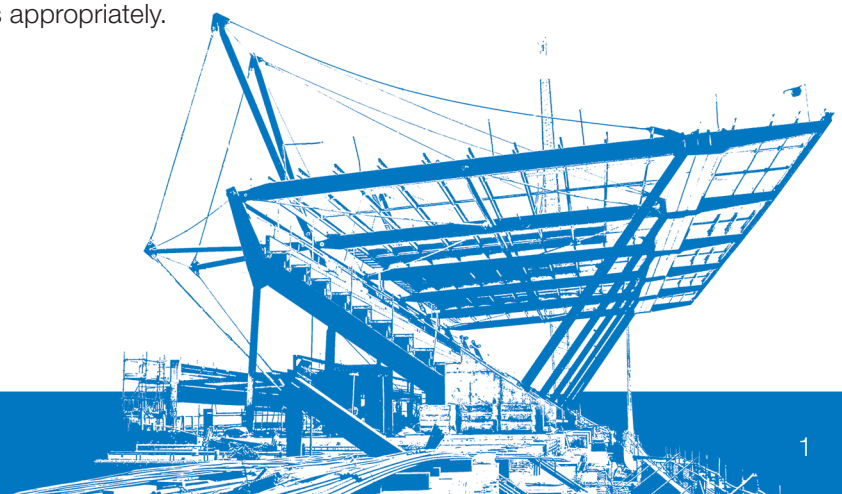
- the likelihood of the hazard or risk concerned eventuating
- the degree of harm that would result if the hazard or risk eventuated
- what the person concerned knows, or ought reasonably to know, about the hazard or risk, and any ways of eliminating or reducing the hazard or risk
- the availability and suitability of ways to eliminate or reduce the hazard or risk.

Project stakeholders

The major stakeholders in any project are the client, the designer and the constructor. However, these stakeholders may appoint agents or representatives to act on their behalf through any stage of the life of the project. For example, a client may appoint a specialist project manager to undertake the planning of a project on its behalf, and a constructor may appoint subcontractors to carry out specialist tasks during construction. Likewise, a designer may appoint organisations or individuals to undertake specialist tasks such as geotechnical design, building services and traffic management. Where The Guide refers to one of the project stakeholders, it is intended that all agents and subcontractors of that stakeholder should also be included.

Project delivery methods

The Guide refers to the three project delivery models of 'traditional' (where design and construction are separate), 'design and construct' (where both functions are the responsibility of one entity) and 'collaborative' (where the client forms an alliance with others to plan, design and construct a facility/structure). These cover all the processes necessary to plan, design and construct a facility/structure through financing arrangements such as BOT, BOOT and public–private partnerships. The Guide is based on the traditional model, but it can also be applied to design and construct and collaborative models by combining management actions appropriately.



Participants' control

For each project, consideration needs to be given to the degree of control that the various participants have. This may be determined by an examination of all the circumstances of the project, including the contractual relationships between the parties, or by the initial brief. The party with control of a construction project is usually the person appointed by the client to manage or undertake the project, and is usually defined as the principal contractor, head contractor, builder or constructor. Various participants may have control over different aspects of a project, and these may overlap.

The role of the designer

The designer's role in safety management of a project usually does not extend beyond the design process itself — except to review any design changes proposed by the constructor.

The designer's primary design consideration and expertise is the safety of the facility/structure for its intended use once constructed. The designer does not normally specify 'how' a facility/structure will be constructed. However, the designer can also contribute to the safety of the construction activity arising from the design decisions that are made. In some states, this is a legal requirement.

Not all design functions relating to site safety are undertaken by the designer of the facility/structure. There are other design activities that relate to construction safety, such as the design of the construction site layout and access, the design of temporary protection scaffolding, or the planning of work processes. These design functions are almost never carried out by the designer of the facility/structure, and are usually undertaken by the constructor or its agents.

Often the designer of the facility/structure is also appointed by the client to provide other services during the construction phase, such as the administration of the construction contract. In this regard, the designer is acting as an agent of the client, rather than as the designer. The Guide reflects this role in the construction stage by referring to the designer's involvement as 'the client's agent, if so engaged'.

When the client also appoints the designer as an agent to administer a traditional construction contract, The Guide defines the advisory role of the designer in project safety initiatives, using the designer's professional expertise and experience, during the construction and post-construction stages.[1] These activities as the client's agent include participation in the project safety leadership team and project safety meetings, management walks, stage reviews and post-project reviews. The aim is to provide the best possible resources to manage safety during the most critical stage of a project — the construction stage. The designer can make a valuable contribution at this stage, not only by the provision of additional professional expertise, but also by offering the constructor a more detached, independent review of safety initiatives.[2]

However, the role to be played by the designer will have to be determined by the client and clearly articulated in the contractual arrangements with the designer.[3] The Guide is predicated on the basis that the designer will have an ongoing role as the client's agent during the construction and post-construction stages. If the client chooses not to engage the designer to carry out the continuous role set out in The Guide, then the references to the designer in that role should be ignored.

Maintenance

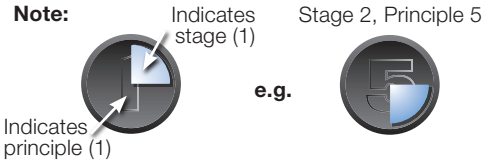
The Guide deals with safety management up to the post-construction stage of a project, when the facility/structure is handed over to the client. The Guide does not attempt to deal with operability and maintenance issues; however, a number of the suggested actions may also involve downstream operation and maintenance considerations.

1 This does not apply for design and construct contracts where the designer is normally employed by the constructor, or in collaborative contracts where the designer is an integral partner in the project, with a continuous role in contributing to safety management over the life of the project.

2 The designer's role in the construction and post-construction stage of a traditional project delivery model is an advisory role only, and does not negate in any way the constructor's responsibility to provide a safe workplace and environment in accordance with the relevant laws of the jurisdiction in which the facility/structure is being built.

3 Clients need to be aware that they cannot contract out of their legal OHS obligations.

Stage 1: Planning



In the planning stage, the client identifies and articulates the need for a particular facility/structure. Often, a number of options are investigated in order to select the option which best suits the client's needs. Project safety ought to be a criterion used in evaluating options and arriving at a preferred solution.

For a traditional project delivery model — where the client establishes the project and undertakes the planning of the project framework before engaging a designer of the facility/structure — most of the actions during the planning stage are the responsibility of the client. However, the client may engage a designer to assist during this stage. For a collaborative project delivery model such as an alliance, the constructor may also share these responsibilities with the client and the designer, subject to the particular allocation of responsibilities in the alliance agreement.

Clearly all projects are unique and the project stakeholders should determine the appropriateness and degree of applicability of the suggested tasks and procedures to their particular project, commensurate with the risk profile of that project.

Principle 1 – Demonstrate safety leadership

Task 1.1	Establish a project safety management framework
Action	At the outset of a project, the client should establish terms of reference for a project safety leadership team responsible for establishing a culture of safety across the project and overseeing the day-to-day management of safety throughout the life of the project.
Description	It is essential that the project safety leadership team is led by a senior member of the client's organisation, rather than delegating the role to a safety professional. The leader should have the ability and delegated authority to make independent, high-level decisions about safety matters on behalf of the client. The composition of the team should be fluid. At first, it might only comprise people from the client's staff, but as the project evolves, representatives of the designer, the constructor and subcontractors should join the team as those stakeholders become engaged. For some projects, it may be warranted for external stakeholders such as community groups, industry groups or government organisations to participate in the safety team. Procedures and rules of operation of the safety team ought to cover such aspects as: • development of a project safety vision setting out the commitment of the client to the creation of a robust safety culture • a general policy statement setting out goals and attitudes which will be linked to the project quality assurance plan, where relevant • composition of the safety team • determination of core practices which will support the desired safety culture • responsibilities of team members • delegations of authority • reporting protocols • communication plans and strategies • meeting frequency • meeting procedures • management of records • arrangements for establishing other workplace safety committees required by legislation (which will report to the project safety leadership team) • arrangements for expanding the team when other stakeholders such as the designer and the constructor become involved in the project.

Key benefits	• Clear management framework for safety. • Rules and procedures for the management of safety on the project.
Desirable outcomes	• Demonstration of the client's commitment to a strong culture of safety.
Performance measure	• Establishment of a safety management framework.
Leadership	• Client

Task 1.2	**Identify safety champions for appointment to the project safety leadership team**
Action	The client should identify safety champions from within its ranks to participate in the project safety leadership team to ensure that a culture of safety is instilled in the project.
Description	Ideally, safety champions should be drawn from line management positions across the organisation so that they cover a broad range of skills and functions. They should be advocates for safety as distinct from being safety professionals. Safety champions should have: • a philosophical commitment to a safety culture • an understanding of the range of disciplines required to undertake the project safely • an understanding of statutory obligations relating to safety • an ability to interact and relate with the workforce and be able to communicate safety policy and messages • an understanding of the project's in-service functions • a strong safety awareness and competence relevant to the management of the design and construction of the project, as well as the operation of the facility/structure. Safety champions don't necessarily have to be people directly involved in the project. It is often an advantage to have some champions who are not. They can act more independently and impartially than people who are involved in the project on a day-to-day level. Among the safety champions, there should be some senior managers of the organisation, and one of them should be the chair of the project safety leadership team (see Task 1.1).
Key benefits	• Enlistment of dedicated advocates for safety, with a range of diverse skills.
Desirable outcomes	• A dedicated team of people committed to an organisational culture of safety.
Performance measure	• Selection of project safety leadership team members for appointment in Task 1.3.
Leadership	• Client, but as the project evolves, the designer and constructor should also contribute and participate.

Safety leadership in the Roads and Traffic Authority (RTA) – NSW

The Roads and Traffic Authority (RTA) has developed a leadership matrix for road construction and maintenance safety, which identifies both proactive and reactive safety systems applicable to senior and frontline Road & Fleet Services managers within the RTA. The matrix clearly links these systems to various management positions. Each manager will participate in his/her nominated safety role and minimum participation rates are specified. The matrix forms part of the manager's performance requirements and is reported against twice a year.

The visible commitment of senior management has placed safety management squarely on the RTA's agenda. This translates directly into senior and frontline managers who are taking a leadership role in driving safety improvement. Safety improvement targets are set annually and performance against them is closely monitored.

The RTA's investment in safety leadership has produced strong bottom line results. The number of injuries sustained over the last 17 years has reduced by over 200% with a commensurate reduction in the incidence rate of claims and costs.

Task 1.3	Appoint a project safety leadership team
Action	A project safety leadership team comprising the champions enlisted in Task 1.2 should be established to be responsible for overseeing safety throughout the entire life of the project.
Description	The project safety leadership team should be formally appointed to operate within the project safety management framework established in Task 1.1. Initially, the chairperson should be a senior-level representative of the client, although as the project evolves, the position may rotate to a senior officer of one of the other major stakeholders as its sphere of control and its influence in a particular stage of the project demands. The chairperson should have: • authority and influence within the organisation to allocate resources • strong consultative and negotiation skills • familiarity and good relationships with external stakeholders with an interest or involvement in project safety, such as consultants, contractors, government agencies and unions • an 'open door' management style that encourages input from all levels in the organisation • a commitment to a culture that fosters open and honest dialogue • strong leadership and advocacy skills. The team composition may also change during the various stages of the project. During the construction stage, the chairperson should be a senior staff member of the constructor, and most of the team members should be from the constructor's staff. Team members should be representative of a vertical slice of the project's organisational structure, i.e. from senior management through middle management to workforce and operational levels. At least one representative of the client should also be appointed to the team during the construction stage. The project safety leadership team should be the peak safety management committee for the project. It will ensure that consultative workplace safety committees are established in accordance with any statutory requirements, and that appropriate collaborative mechanisms are developed to ensure full collaboration with workforce personnel. Some members of the workplace safety teams may also serve on the project safety leadership team.
Key benefits	• An authoritative safety team providing a single, unambiguous point of contact for safety matters. • Clear responsibilities for safety. • Representation on the project safety leadership team from all levels of the project's organisation.
Desirable outcomes	• During the planning stage, a client safety champion for the project who will provide proactive leadership in safety management. • A team capable of developing and managing a risk management strategy to eliminate hazardous work practices, materials and behaviours.
Performance measures	• Appointment of a strong, responsive project safety leadership team with accountability to direct and oversee project safety.
Leadership	• Client, but as the project evolves, the designer and constructor should also contribute and participate.

Safety leadership in Mirvac

All senior managers in Mirvac are required to be actively involved in safety management. Each manager's role and duty statement contains KPIs relating to safety and he/she has a nominated number of safety management tasks in which the manager must participate. In addition to managing the safety related KPIs, senior managers play an active role in the Workplace Leadership Teams – which are the safety champions of their respective sites. These teams are made up of management personnel and workforce members.

Task 1.4	Develop project safety charter
Action	A project safety charter should be developed. The charter should be a public document posted on the client's website and displayed prominently in project offices to declare the client's intentions in relation to project safety.
Description	The project safety charter is a project-specific statement of intent, indicating the commitment of the client to provide proactive management and oversight of safety through the life of the project. It should contain: • a statement of commitment to safety in the project • some details about the project with reference to any major or extreme safety risks • a mission statement • a statement of the client's safety objectives for the project • a statement of broad safety roles and responsibilities of stakeholders to the project, including those not yet engaged, i.e. the designer and constructor. The project safety charter should be a fluid document and may be modified as the project evolves and other stakeholders join the project.
Key benefits	• A public declaration of the project's commitment to best quality safety practice. • Consensus on the shared vision of the importance of safety. • Shared understanding of responsibilities of all project stakeholders. • Communication to field staff that the client is serious about safety and is prepared to invest in safety. • Field staff assurance of the high level of importance placed by the client on safety relative to other project goals.
Desirable outcomes	• Openly demonstrates the client's commitment to a safety culture. • Communicates information about the importance of safety to all potential project stakeholders at the planning stage. • Clarifies roles and responsibilities of stakeholders. • Articulates project safety objectives and targets.
Performance measures	• Publication and display of a project safety charter which has been signed off by the client's CEO (or equivalent) as a statement of intention to achieve best practice.
Leadership	• Initially, the client, but as the project evolves, the designer and constructor may also contribute to modifications.

Task 1.5	Develop project safety master plan
Action	A project safety master plan should be developed during the planning stage of the project. It is an overarching plan which will inform and guide the development of subordinate safety plans for design, construction and commissioning of the facility/structure.
Description	The project safety master plan should be a project-specific plan setting out: • roles and responsibilities for managing safety • allocation of resources to manage project safety • project-specific safety goals and targets • performance criteria for monitoring and evaluating project safety strategies to meet safety goals and targets. The project safety master plan may change over the course of the project to meet evolving challenges following the engagement of downstream stakeholders. It is the top level, strategic safety plan spanning the entire life of the project. It should be expressed in broad terms and formulated at senior levels of the organisation. It should aspire to exceed normal industry levels and aim at excellent performance. Below it will be project-level safety plans for design, construction and commissioning, and below these would be work face safety plans aimed at safely planning tasks within each project stage. This hierarchy of plans is illustrated in Figure 1.

Key benefits	• Establishment of clear goals and targets for safety. • Development of performance criteria (see Task 1.16). • A safety master plan which aims for game-breaking performance.
Desirable outcomes	• Provides guidance for the development of project stage safety plans. • Demonstrates the client's commitment to establishing a strong project safety culture by setting ambitious targets. • Communicates information about the importance of safety to all potential project stakeholders at the planning stage. • Clarifies roles and responsibilities of future stakeholders. • Clearly articulates project safety objectives and targets.
Performance measures	• A project safety master plan which has been endorsed by the client's CEO (or equivalent).
Leadership	• Client, but as the project evolves, other stakeholders may also contribute and participate relative to their spheres of control in the project.

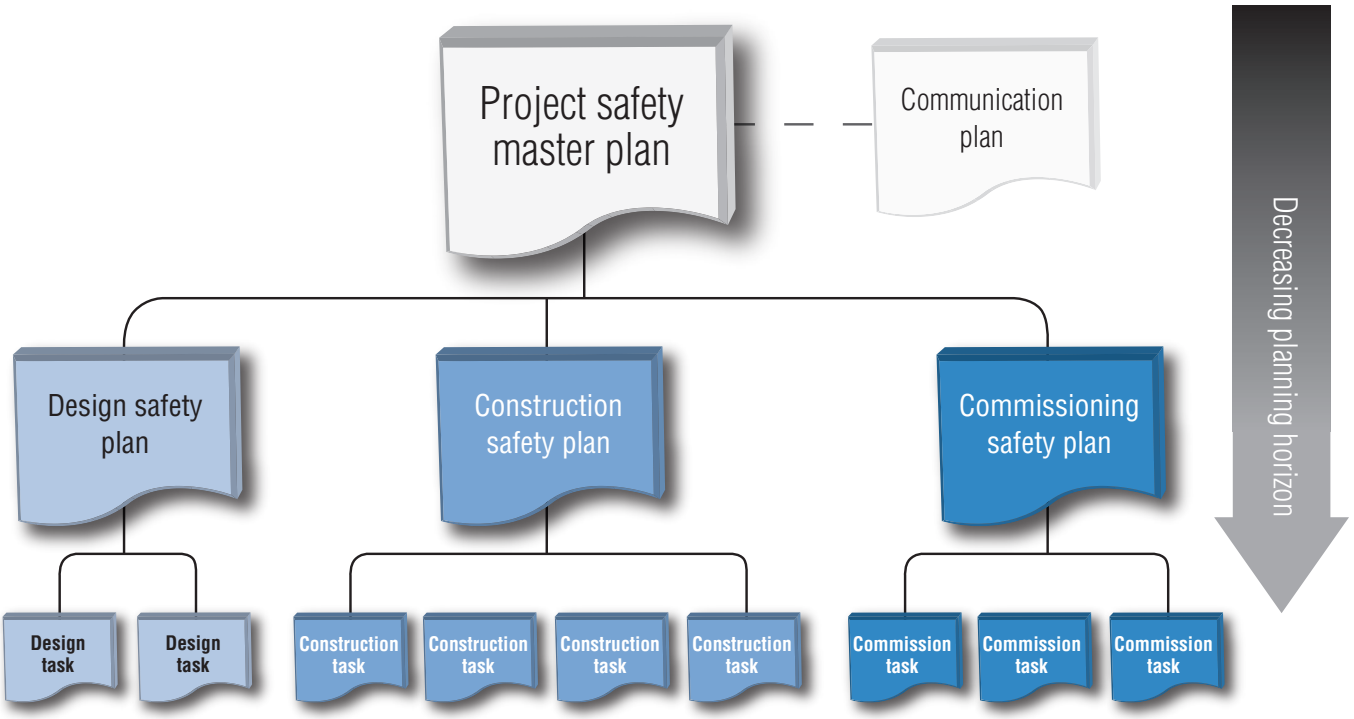


Figure 1 Multiple layers of safety planning

Multi-layered safety planning at the Sydney Airport Gate 24 project

A project-specific safety policy was provided in the contract documents distributed to prospective project participants during the tender process. The constructor was required to respond to this policy by providing a construction safety plan. The construction safety plan was independently reviewed by a specialist consultant, working on behalf of the client. This plan was approved before the construction team gained access to the site.

The construction safety plan established the way in which the site was to be set up safely, site emergency procedures and evacuation points, and arrangements for the provision of first aid. Each subcontractor subsequently engaged on the project was also required to draw up their own safety plan relating to their part of the works.

The client was responsible for establishing safety goals for the project and established a qualification procedure to evaluate the safety capability of all prospective contractors and subcontractors prior to their engagement. Key personnel of prospective project participants were interviewed before their selection in order to assess their commitment to safety.

Task 1.6	Specify safety requirements in project brief
Action	The client should prepare a project brief that, among other things, sets out the safety requirements and objectives for the project. The client should collate and provide to the designer all available data relating to the site that may affect safety considerations in the design.
Description	The project brief should establish performance criteria for safety in the design stage. Key stakeholders whose safety might be affected through the life of the project should be identified, including personnel involved in construction, occupation, maintenance, cleaning and the eventual demolition of the facility/ structure. The project brief should also include the details of the client's project safety management framework set out in Tasks 1.1 to 1.4, and specify how the designer is to be incorporated into that framework. The brief should also include a statement of the client's requirements for designing for safety – see Task 1.7.
Key benefits	• From the project outset, safety in design will be a key project driver. • Designers will have clear direction on the client's priority to promote and build safety into the project design.
Desirable outcomes	• Clearly documented client requirements to provide a shared understanding of safety expectations between the client and the designer. • A clear message to the designer that safety is a key driver of the project, to be given equal weighting to other aspects of design such as functionality, aesthetics, cost, program and quality. • Identification of project stakeholders whose interests must be considered.
Performance measures	• Preparation of a project safety brief relating to the design of a project.
Leadership	• Client

Incorporating safety in design at the Alice Springs to Darwin Rail Link

This was a Build, Own, Operate and Transfer (BOOT) project to construct a railway from Alice Springs to Darwin and take over an existing railway from Tarcoola to Alice Springs. It was a design and construct contract. A design working group was developed by the client, and included representatives of the client, state and territory governments and other external stakeholders.

Weekly meetings were held during the design stage to ensure that the design was both practical and safe to build and operate. An independent reviewer was engaged by the client to audit and certify all work performed by the design working group. Monthly design reports were required, documenting (among other things) the safety aspects of the design. Members of the design working group were located on-site during the construction work and were able to be directly involved. All subcontractors were required to submit a safety plan describing how they would manage safety in the project. These plans were reviewed by the client, with input from the design and construct team.

Design safety at Mirvac

Mirvac uses a process known as Designing Out Our Risk (DOOR). DOOR is used for every project, prior to the commencement of construction, with the aim of identifying all risks at the design stage – including occupational health and safety.

A hierarchy of control is used to form the basis of assessment, with elimination of a risk being viewed as the first option. If this is not possible, then the other hierarchies are reviewed against the risk sequentially. DOOR assists in finding solutions to safety issues without having to rely on personal protective equipment as the resolution.

DOOR is utilised for each of the project life cycle stages – concept design, detailed design, construction and pre-commission. DOOR has enabled Mirvac to identify issues that have continually occurred on various projects over time. These commonly occurring issues have been used as a learning tool, and now, every design incorporates standard design requirements to alleviate these common risks.

DOOR is not only used for new construction projects, but is also used when Mirvac acquires an existing structure such as a building. The use of DOOR in these cases has identified common safety risks associated with existing buildings as well as public liability issues. These can form the base line for bench marking against other projects.

Task 1.7	Include safe design requirements in design consultant contracts
Action	The client should ensure that the contract for the engagement of the designer contains requirements for design for safety.
Description	In selecting a designer, the client should ensure that safety requirements are adequately considered in the tender or proposal for the appointment of the designer, that all proposals are considered on an equal footing, and that these considerations are commensurate to the risk profile of the project. The non-statutory responsibilities of the designer in regard to designing for safety should, as far as is reasonable and appropriate, be specified in the contract. These responsibilities could include participation in the project safety management framework as set out in the project safety charter, and defined 'hold points' in the design process to review safety. The designer's control over safety outcomes will still be subject to the final decision of the client about resource allocation and priorities. The client cannot contract out of its legal safety obligations. The client may undertake a prequalification process for the selection of a designer, in which case, prospective designers could be asked to submit evidence of their previous track record, competency and performance in designing for safety. Interviews could be held with prospective designers to assist the client in evaluating attitudes to design for safety when making the final selection of the designer. The approach taken in Task 2.6 for selecting a qualified constructor could apply equally to the selection of a qualified designer.
Key benefits	• Provides the designer with a clear understanding of the requirements for safe design.
Desirable outcomes	• Engagement of a designer with a strongly entrenched safety culture.
Performance measures	• Appropriate clauses are included in the contract.
Leadership	• Client

Task 1.8	Select qualified designer
Action	Following the preparation of the project brief (Task 1.6), the client should engage the designer. The selection of the designer should be made on the basis that the designer has demonstrated competence in and commitment to design for safety and the principles proposed in the project safety charter (Task 1.4).
Description	In the selection criteria for the engagement of a designer, clear requirements for safety performance and competence should be included. Prior to the final appointment of the designer, the client should have clearly expressed the need for the designer to actively participate in safety reviews and abide by the general principles of the project safety charter. Clear and specific safety requirements for design documentation should be specified and communicated to prospective designers. In selecting the designer, the client needs to be satisfied that the designer has the appropriate knowledge, skills and resources to undertake project design with life cycle safety as a driving force. This will need evidence of: • understanding of statutory obligations relating to safety, including an understanding of the duty of care to ensure, so far as is reasonably practicable, that personnel are not exposed to risks or hazards • an appreciation of construction methods and their impact on design suitable to the project • an appreciation of the operation of the facility/structure, its maintenance requirements and issues relating to its eventual demolition • the environmental impact of the project • the methods of communication between the design office and the construction site to ensure that safety risks are fully conveyed to field personnel.
Key benefits	• Engagement of a qualified designer committed to a safety culture. • Client expectations relating to safety issues at the design stage unambiguously communicated to prospective designers.

Desirable outcomes	• Designer fully integrates safety into design decision-making. • Elimination or reduction of risks at the design stage maximised. • Residual risks clearly identified and effective management strategies designed.
Performance measures	• Selection of the designer is based, among other things, on competence, performance and commitment in designing for safety.
Leadership	• Client

Task 1.9	**Establish requirements for safety in design**
Action	Following Task 1.6, the client should collaborate with the designer in order to establish and agree on the general design requirements to be considered during concept and final, detailed design. These requirements should be flexible to respond to any emerging safety issues that might arise as the project evolves.
Description	It is not always possible to identify safety risks at the start of a construction project, especially for fast-track projects where design may not be complete when construction starts. Nevertheless, early identification and safety risk assessment is important to start safety strategies and to entrench safety in project decision-making. There are many potential design issues that affect safety. Without being exhaustive, issues may include: • proximity to adjacent property or nearby roads • surrounding land use • clearances required for construction equipment and techniques • demolition of existing assets • proximity to underground or overhead services — especially electrified lines • rapid construction techniques, i.e. prefabrication versus in situ construction • staging and coordination with other works • exposure (and length of exposure) of field staff to adjacent traffic or other hazards • provision of safe working platforms • materials to be used in construction • site conditions — including foundations, and construction over other assets or over water • safety of the public • use of adjacent streets • safe operation and maintenance of the facility/structure after commissioning.
Key benefits	• Safety is built into the design both for construction and in-service conditions. • Designer is accountable for considering safety in the design. • Where possible, safety risks are eliminated or reduced through judicious design decisions.
Desirable outcomes	• A thorough understanding by the designer of the need for safe design and the safety issues that should be considered in the design of the project.
Performance measures	• A set of agreed principles for providing for safety in the design of the project.
Leadership	• Client

Task 1.10	Communicate safety commitments to prospective stakeholders
Action	Communication of safety policy to all stakeholders (and potential stakeholders) is essential. The client, in collaboration with other stakeholders, should develop a project communication plan and strategy to inform all stakeholders of its commitment (and their obligations as partners in safety) to a safety culture for the project.
Description	Communication and consultation with prospective stakeholders should start as early as possible in the life of the project. If a process of prequalification is used to appoint the designer and the constructor, the project safety charter developed in Task 1.4 — and any other relevant safety information — can be conveyed to the prequalified consultants or contractors as soon as possible to provide notice of project safety requirements. This would be done in expression of interest briefs or project-specific prequalification requests. If prequalification is not proposed, peak bodies representing consultants and contractors could also be informed of proposed arrangements so that they can inform their members. Because project safety management will adopt a participatory approach through progressive engagement, stakeholders should be invited to comment on the project safety charter, which will be amended and re-issued after any agreed modifications.
Key benefits	• Prospective stakeholders receive early notice of safety expectations and commitments and understand their role in the project in regard to safety. • Prospective stakeholders understand that management of safety is a shared responsibility and that collaboration and cooperation is required from all participants. • Dialogue about safety between project stakeholders is started as early as possible, providing an opportunity for stakeholders to express their views and opinions to enhance the project safety charter. • It is demonstrated to all stakeholders that they will be expected to treat safety as a high priority in the project, and that safety objectives stand on an equal footing with other project objectives.
Desirable outcomes	• All prospective stakeholders thoroughly understand, prior to engagement, the safety aims and objectives of the project and the level of commitment required of them and other partners.
Performance measures	• Confirmation from prospective stakeholders that they understand and agree to conform to the requirements of the project safety charter.
Leadership	• Client, with significant participation by the designer if already engaged at this stage, and appointed as an agent of the client for this task.

Task 1.11	Communicate project safety risk information to relevant stakeholders
Action	Following the creation of the project risk register in Task 1.15, all project safety risk information should be conveyed by the client and the designer to relevant stakeholders.
Description	Project safety risk information should be communicated to relevant (prospective) constructors and other relevant stakeholders to provide advance information on safety risks. This early notice will enable them to plan their work to either eliminate or minimise project safety risks.
Key benefits	• Provides advance notice of safety risks to all stakeholders. • Reinforces the project's safety culture.
Desirable outcomes	• All stakeholders have an improved knowledge of project risks and can plan their work accordingly.
Performance measures	• Project risk register communicated to relevant stakeholders.
Leadership	• Client, with significant participation by the designer if already engaged at this stage, and appointed as an agent of the client for this task.

Task 1.12	Conduct risk analysis of project options

Principle 4 – Manage safety risks

Description	A safety risk analysis should be prepared by assessing the relationship between the project stakeholders, the public, the eventual users of the facility/structure and the environment. It should concentrate on what can happen, and how and why it can happen in the implementation of the project. It should also concentrate on separating acceptable risks from major risks, and identify data to assist in the evaluation and treatment of each risk. Risks should be evaluated by comparing levels of risk so they can be ranked for further analysis. A range of options for treating risks should be identified and the feasibility of options determined together with appropriate risk treatment plans which aim to eliminate, contain or ameliorate the risks. For ease of ranking, risks may be entered into a matrix where the likelihood of a risk occurring (common, probable, possible, not likely and hardly ever) can be entered against severity of the risk (low, moderate, high and extreme). Further information on risk analysis can be found in AS/NZ 4360:2004 Risk Management, AS/NZ 3931: Risk Analysis to Technological Systems – Application Guide, and HB 205-2004: OHS Risk Management Handbook and HB 436:2004 (Guidelines to AS/NZS 4360:2004): Risk Management Guidelines Companion to AS/NZS 4360:2004.
Key benefits	• Most of the risks of all project options will be identified during the planning stage. • Management of the most severe risks will guide the feasibility of options — options with unacceptable risks can be eliminated. • Senior management of the client will become aware of the risks and be engaged in risk management strategy. • Key personnel involved in risk analysis and management will ensure that risk management strategy is streamlined into the project via documentation and communication.
Desirable outcomes	• A thorough safety risk analysis is undertaken by the client and designer to guide the evaluation of options. • Awareness of safety management issues is heightened at the planning stage.
Performance measures	• Documentation of a complete safety risk management analysis and review.
Leadership	• Client, with input from the designer if appointed.

Task 1.13	**Undertake technical feasibility studies of viable options**
Action	The client, with the assistance of the designer, should undertake preliminary feasibility studies of design options proposed to meet the facility/structure's need.
Description	Safety risks should be identified for each option and ranked for degree of severity. Options where risks are identified as extreme, may be declared not feasible, and other alternatives may need to be considered. Issues to be considered include those listed in Task 1.9, among others. The feasibility studies should take account of the risk assessment made in Task 1.12, as well as the usual aspects of technical considerations, cost, amenity, aesthetics and environment. Other considerations may include safer alternative construction processes and the levels of skills and resources required by the constructor to build the facility/structure using safe construction processes.
Key benefits	• Options that present severe safety risks can be quickly eliminated from consideration. • Confirmation that safety risks identified for other options for further development can be managed.
Desirable outcomes	• Identification of feasible project options with acceptable and manageable project risk profiles.
Performance measures	• Safety risk identification and assessment based on technical feasibility criteria.
Leadership	• Client, with input from the designer when appointed.

Task 1.14	Select preferred project option based on robust risk assessment
Action	Taking into account the feasibility studies conducted in Task 1.13, the preferred option should be selected.
Description	The selection of the preferred option should be based on all considerations, i.e. quality, cost, time, aesthetics, amenity, environment and safety. The preferred option should be accompanied by the project risk register described in Task 1.15.
Key benefits	• Selection of a preferred option which will proceed to detailed design.
Desirable outcomes	• Selection of a feasible design after undergoing a rigorous analysis in which project safety was a key performance criterion.
Performance measures	• Final design report.
Leadership	• Client, with input from the designer when appointed.

Task 1.15	Record safety information in a project risk register
Action	A project risk register should be compiled by the client with the designer's assistance following the selection of the preferred project option. This will be a 'living document'. It should be updated throughout the project life cycle as new risks are identified. When risks are eliminated, they should be recorded as such, but still remain on the risk register.
Description	The client, with the designer's assistance, should develop the project risk register during the planning stage of the project. As the project evolves, the risk register should be shared continuously with stakeholders, who should collaboratively review and update it to add new risks. At the end of the project, risks identified at all stages of the project life cycle should have been captured in a central repository to provide a clear history and insight into safety decisions throughout the project. The project risk register is a key tool for the communication of safety information between stakeholders, and during the transition between project stages. The project risk register will be owned by the client, but it should be easily accessible to all stakeholders throughout the life of the project. Before construction starts, the client and designer should ensure that the risk register is updated and transferred to the constructor. The constructor should update it as required during construction and pass it on to the owner at commissioning of the facility/structure, and the owner should pass it on to the user and, in the extreme, the demolisher of the facility/structure. The client will retain full ownership of the risk register at all times.
Key benefits	• A single source of risk information which can be shared with all project stakeholders. • A mechanism for monitoring the implementation of risk management actions.
Desirable outcomes	• All identified risks recorded in a central repository. • A mechanism for recording newly identified risks.
Performance measures	• Central repository for project risk information. • Continuous updating of all identified risks, risk management decisions and ongoing monitoring of risk management actions.
Leadership	• Client and other stakeholders as they become engaged in the project.

Task 1.16	Establish key performance indicators (KPIs) for safety
Action	Appropriate KPIs for measuring project safety performance against project and organisational objectives and industry standards should be established. These should be developed initially by the client, but they may be modified as other stakeholders engage with the project.
Description	Management of safety should be a process of continuous improvement where stakeholders strive for 'game-breaking' performance. It should facilitate industry-wide collaboration for benchmarking against other projects, and for information sharing. KPIs should be developed in accordance with project safety objectives and reflect an approach to safety management which aims for excellence. KPIs should include both leading and lagging indicators. Leading indicators measure how well an organisation is managing safety, e.g. how many workers have received training, how many safety inspections have been undertaken. Leading indicators measure positive actions to manage safety before the occurrence of incidents or injuries. Lagging indicators measure negative events after they occur, such as incidents, injuries, fatalities and other losses. Lost time injuries (LTIs) and medical treatment injuries (MTIs) are derived from lagging indicators.
Key benefits	• Standard methods of measurement of safety performance will facilitate continuous improvement and enable benchmarking performance against other similar projects. • Measurement of positive safety performance (leading KPIs) rather than reactive identification of things that have gone wrong. • Heightened stakeholder awareness of project safety aims. • Establishment of levels of responsibility and accountability for safety. • Provision of targets against which safety performance can be measured — both internally and externally.
Desirable outcomes	• 'Sets the bar' for all stakeholders. • Raises awareness of all personnel involved in the project. • Fosters teamwork, collaboration and cooperation. • Leading KPIs focus the constructor's attention on safety management. • Benchmarking provides opportunities to transfer best practice to other projects. • Alerts managers to non-performance so that immediate actions can be taken to improve. • Provides a mechanism to monitor project and organisational safety performance.
Performance measures	• A set of KPIs to measure the effectiveness of safety management. • Consistency of reporting against KPIs.
Leadership	• Client, with participation of the designer. When the construction stage is reached, the constructor will play a leading role.

Task 1.17	Continuously develop safety capabilities
Action	All project stakeholders should implement programs for induction and on-the-job performance of staff to ensure they are familiar with the aims and objectives of the project safety charter (Task 1.4), and that their safety capabilities are continuously enhanced.
Description	Improving safety performance embraces aspects such as redesigning work practices, training, raising awareness, recognition and acknowledgment of good performance, coaching, mentoring, proactive and preventative management, and standards of behaviour. A culture of safety should be fostered in which every individual is a driver and deliverer of safety. It requires an open and trusting approach, conducive to teamwork, but in which responsibility for safety is fairly and appropriately allocated. Good practices and effective results should be positively reinforced and communicated to others. Individuals should be empowered to provide feedback and express views in a collegiate environment to further develop safety capabilities. There are also statutory obligations for employers to consult with employees on matters that may directly affect their health, safety and welfare. Employers also have an obligation to provide and maintain safe working environments, safe plant and equipment and safe working systems, and to provide information, instruction, training and supervision to enable employees to perform their work in a manner that is safe and without risk to health.
Key benefits	• Improved safety experience and capabilities that can be applied to future projects. • Hazard reduction. • Reduction in unsafe incidents. • Decreased costs caused by LTIs and MTIs. • Reduced construction delays. • Improved field staff morale, efficiency and productivity.
Desirable outcomes	• Safety capabilities show continuous improvement.
Performance measures	• Measurement against KPIs exceeds targets and shows continuous improvement. • A register and auditable record of safety training and development activities. • A register of employees (or subcontractors) required to hold authorisations, permits, licences and certificates of competency to undertake tasks for which these instruments are mandated.
Leadership	• All major stakeholders, i.e. client, designer and constructor, when engaged.

Task 1.18	Develop long-term relationships within supply chain
Action	As early as possible in the project life cycle, the client should develop relationships with consultants, contractors, subcontractors and other key project stakeholders to engage them in project safety management processes.
Description	In addition to providing their knowledge — and lessons learned from other projects — other project stakeholders should be able to contribute productively to project safety strategies. This type of collective approach should assist in reinforcing the growth of a safety culture for the project, with all parties sharing information and contributing equally. It also fosters confidence between the participants and encourages innovation. These relationships may evolve through synergy between organisations with a successful history of working together, or they might be created through normal subcontracting processes, in which case, safety consciousness and capability is a consideration in the final selection of a subcontractor. The aim is to develop a collegiate approach to safety management, where all partners can openly express views about safety issues for mutual benefit and disputes can be resolved as harmoniously and quickly as possible.
Key benefits	• Improved understanding of safety issues through the supply chain. • Consistent and more effective safety processes in future projects. • Stronger project safety culture through shared understandings.

Desirable outcomes	• Earliest possible engagement of key stakeholders in project safety management. • Successful, long-term relationships could extend beyond the project for mutual benefits in continuous improvement of safety management.
Performance measures	• Contracts and agreements with project stakeholders. • Establishment of long-term partnerships or strategic alliances within the supply chain.
Leadership	• Client, with progressive involvement by the designer and constructor.

Stage 2: Design

The design stage converts the planning concepts and the preferred technical solution for a facility/structure into drawings and technical specifications. Project safety is an integral component of the design process.

For a traditional project delivery model — where the client directly engages a designer to undertake detailed design — the project safety decisions during the design stage are the result of collaboration between the designer and the client. However, in a design and construct or a collaborative project delivery model, the primary collaboration will be between the constructor and the client, with participation of the designer subject to the terms of their engagement.

Clearly all projects are unique and the project stakeholders should determine the appropriateness and degree of applicability of the suggested tasks and procedures to their particular project, commensurate with the risk profile of that project.

Principle 1 – Demonstrate safety leadership

Task 2.1	Develop design safety plan
Action	Once a qualified designer is selected and engaged (Task 1.8), a project-specific design safety plan should be prepared. The plan should be developed by the designer in collaboration with the client. The client may engage a suitably experienced third party to independently review the plan if no such expertise exists within the client's organisation. The client's involvement in checking the design safety plan does not relieve the designer of the responsibility for ensuring that safe design practices are employed and that a safe working environment will be provided from a design perspective.
Description	The design safety plan should be the first task to be carried out after the appointment of the designer. It should include, as a minimum requirement, the following details: • a nominated officer from within the designer's organisation who will be the design safety champion • a design risk assessment which identifies and evaluates potential design safety issues, including risks that could arise due to likely construction methods • a communication plan to inform all stakeholders on design safety issues • safety design monitoring (audits and inspections) and reporting processes • statutory obligations which may impact on design issues • approach to management of identified major areas of hazard and risk and proposed control measures • dangerous goods and hazardous substances management • general provisions for traffic management • arrangements for protecting the public and adjacent property. The design safety plan should conform to any requirements set out in the project safety master plan (see Task 1.5).
Key benefits	• Design safety issues are comprehensively considered before design work is undertaken. • Clear design safety management processes and responsibilities are established. • Appropriate resources are allocated. • A framework for monitoring safety through the design stage is provided.
Desirable outcomes	• Safety management through the design stage is enhanced through planning.
Performance measures	• A design safety plan is endorsed by the client before starting design.
Leadership	• Designer, in collaboration with the client.

Task 2.2	Specify how safety is to be addressed in tenders for construction
Action	The client and designer should consider how safety is to be dealt with in tenders, to provide a basis for evaluation and comparison between tenders.
Description	When a constructor is selected using a competitive tender process, the client could specify in tender documentation how tenderers must address safety issues — including the pricing of safety aspects of a construction project. This approach provides a standardised basis on which an objective comparison could be made in evaluating tenderers' safety processes and provisions. It ensures that tenderers responsibly identify their proposed investment in project safety by allocating a financial cost to safety management (this same provision can be also adopted if another process of engagement of the constructor is used, such as direct negotiation). If a prequalification process is adopted to short-list prospective contractors, applicants should be required to submit evidence of safety performance, innovations and management processes for previous projects — also references from past clients.
Key benefits	• Safety requirements are adequately considered in tenders and proposals. • Comparisons can be made between tenders because all tenderers are required to submit the same information on an equal footing.
Desirable outcomes	• Tenders that do not comply with safety requirements can be excluded from further consideration, or may be subject to negotiation. • All tenders will contain pricing based on a realistic estimate of the tenderers' investment in safety management for the project.
Performance measures	• All tenders contain complete and detailed safety information on an equal footing and in a standard format.
Leadership	• Client, with the participation of the designer.

Task 2.3	Include safety requirements in construction contract documents
Action	The client, in collaboration with the designer, should specify how safety is to be addressed in contract documents.
Description	Standard construction contracts do not usually specify safety requirements beyond compliance with relevant legislation. The client should carefully assess the safety provisions in its standard construction contracts, and consider the inclusion of specific safety requirements. Examples for consideration should include: • including the project safety charter in the contract • articulating the constructor's role and responsibilities in managing safety on the site • mandating the submission of a construction safety plan (see Task 3.1) • specifying reporting requirements for safety performance against agreed KPIs • requiring safety performance reports to be submitted monthly • mandating immediate submission of reports of injuries or incidents to the client • requiring specific safety management processes to be implemented.
Key benefits	• Constructors are contractually bound to implement specific safety measures over and above those required by legislation. • The inclusion of detailed safety requirements in construction contracts reinforces the importance that the client places on safety during the construction stage. • Procedures for non-compliance and issue resolution are clearly stipulated in contract documents and could apply to safety requirements.
Desirable outcomes	• The constructor fully understands safety requirements as a contractual responsibility.
Performance measures	• All construction contracts contain specific safety clauses.
Leadership	• Client, with the participation of the designer.

Task 2.4	Establish assessment criteria for prospective constructors
Action	The client should specify assessment criteria for the evaluation of tenders — including project safety management and performance.
Description	Tenders can be assessed using a number of criteria, such as price, quality, construction period, amenity and aesthetics. The weightings given to these attributes will vary from project to project, and often price is the only consideration — with quality and time requirements built into specifications. Safety management is also a valid attribute in assessing tenders. Weightings given to these criteria will be influenced by the nature and size of the project and its proximity to public areas. Tenders can also be assessed quantitatively (price, time), qualitatively (quality) or subjectively (aesthetics, amenity) — or any combination of these. It is the responsibility of the client to determine the appropriate assessment criteria and the weightings to be applied in order to evaluate tenders. Some suggestions for assessing safety competence include: • the submission of a draft construction safety plan as a precursor to Task 3.1 • a written response to the project safety charter with suggestions for improvements or modifications • presentations on safety management by tenderers • project data sheets outlining safety performance on previous projects • curricula vitae of proposed personnel responsible for managing safety on the project. A percentage weighting could be applied to these responses to be taken into account along with other selection criteria.
Key benefits	• An appropriate weighting can be given to safety according to the scope, nature and risk profile of a project.
Desirable outcomes	• Tenderers have a full understanding of the importance given to safety management for a project, and will strive to submit the most attractive proposal in a competitive environment.
Performance measures	• A specified weighting for safety in the contract documents.
Leadership	• Client

Establishing criteria for the selection of a 'safe' constructor at the Morwell River Diversion

Constructors were chosen on account of their ability to demonstrate that they could maintain safety as a key priority. In the tender phase, potential constructors needed to develop a detailed safety management plan and identify appropriate safety systems upfront. The client established a project team who undertook independent assessments of these plans and the constructors were then selected on the basis of their plans. The translation of the project management plans to the actual site was the critical aspect analysed.

The client also required the names of the key personnel who would be involved in the project and, as part of due diligence, undertook interviews with those people in order to identify whether safety was a priority and the way in which safety was to be managed *'because at the end of the day, companies can lay out their magnificent documentation, but if you don't get the key people, that is where you fall down'*.

Task 2.5	Evaluate tenders against safety criteria
Action	The client should evaluate tenders in accordance with the specified evaluation criteria.
Description	The establishment of evaluation criteria makes the assessment of tenders fair and impartial, at the same time reflecting the importance of safety management in the project.
Key benefits	• All tenders are assessed on a like-for-like basis. • The tender evaluation process is fair and transparent in its treatment of safety.
Desirable outcomes	• Acceptance of a tender in which safety management is a key attribute.
Performance measures	• A 'safe' tender is recommended for acceptance.
Leadership	• Client

Task 2.6	Select qualified constructor
Action	In selecting a qualified constructor, the client should take into account the safety competencies of the proposed project team and the proposed approach and innovation for the management of safety in the project.
Description	Other evaluation criteria — such as price, quality and construction period — should also be considered in the mix, but safety should be an equally important criterion on which tenders are assessed. It is essential that any specified safety components of tenders are carefully evaluated and given due weight as part of the overall selection process.
Key benefits	• The selection of the preferred constructor will be influenced by the safety management competence of the proposed team and the quality of safety content of tender submissions.
Desirable outcomes	• The selected constructor will have a clear vision for managing safety on the project and demonstrable competence in managing safety. • Selection decisions are, in part, contingent on the response to safety management aspects of tender submissions.
Performance measures	• Response to project safety requirements is given an appropriate weighting against other tender evaluation criteria. • An appropriately qualified constructor is selected.
Leadership	• Client

Principle 2 – Promote design for safety

Task 2.7	Conduct design reviews to eliminate/reduce risks at concept and detailed design stages
Action	The client, in collaboration with the designer, should review designs at both the concept and detailed design stages to identify potential safety hazards associated with design elements, and to assess the risks presented by these hazards.
Description	Design safety reviews should consider safety in the construction and commissioning (along with the operation and maintenance) of the project facility/structure. Wherever possible, design safety reviews should involve the people who will eventually construct the facility/structure. However, where this is not possible, the client and designer should make every effort to include people with knowledge and experience in the construction and maintenance processes in the design safety reviews. Their experience and expertise will assist in identifying safety issues which may have been overlooked in the design. Design safety reviews should conform to a systematic approach to safety risk management. This involves: • the identification of potential and known hazards • the assessment of risks • the evaluation of these risks against pre-established levels of tolerance • where practicable, the selection of measures to eliminate or reduce risks through design modifications. Residual safety risks should be recorded in the project risk register (see Task 1.15).
Key benefits	• Safety risks inherent in a design are systematically assessed. • Where practicable, safety risks are eliminated or reduced through design modification. • Design decision-making is based on a robust assessment of safety risks.
Desirable outcomes	• Safety risks arising from the design of a facility/structure are minimised.
Performance measures	• Design safety reviews conducted throughout the design process. • Risk mitigation changes during design are recorded in the project risk register.
Leadership	• Designer, with participation of the client.

Safe design at Bovis Lend Lease

Bovis Lend Lease has developed a process called Risk and Opportunity Analysis at Design (ROAD). In this process, safety risks and opportunities for safety improvements are identified at the design stage of projects. A ROAD analysis is performed in all projects, regardless of type, size or cost. Standard documents are completed prior to the commencement of the ROAD analysis clarifying the roles and responsibilities of participants. The client and other contractors involved in the project are included in the assessment process.

The project manager facilitates or chairs the process and is the 'owner' of the ROAD analysis. Participants are selected to ensure their experience and expertise match the specific requirements of the project. Once project risks and opportunities have been identified, the information is placed into a formal document and distributed to participants for review. The ROAD report becomes a 'living document' used throughout the whole of the project. This document continues to evolve as the project progresses through its life cycle stages.

The initial ROAD assessment is only designed to identify risks and opportunity. It is at subsequent project meetings in which appropriate mitigation strategies are selected. ROAD forms part of the ongoing project management activities, and discussion of the ROAD process becomes a standing agenda item in project meetings. The ROAD analysis is reviewed at least once a month.

Prior to construction, each project is required to have a safety plan. ROAD forms part of this safety plan. A safety plan will not be signed off unless a ROAD analysis has been completed for a project. Regular audits of the ROAD analyses are done.

One of the aims of ROAD is to ensure that all working drawings reflect safety issues. For example, the electrical plans will provide relevant details of existing cables on the site. To ensure adequate training in the ROAD process, training requirements are reflected in the company training matrix.

Details of the project are electronically recorded and able to be viewed by others within Bovis Lend Lease, who may not be associated with the specific project. The company intranet has a site dedicated to lessons learnt during ROAD analyses from which information can be downloaded for others to read/use as a reference. This facilitates organisational learning. Bovis Lend Lease also maintains an additional website through which questions can be posted asking for help, guidance, knowledge and/or experience on a particular safety topic.

Task 2.8	Consider constructability in design safety reviews
Action	The client and the designer should, as far as reasonable, take account of the proposed construction and maintenance methods and practices to ensure that they do not present inherent risks.
Description	Final design solutions should be capable of being built with a minimum of risk. Factors for consideration could include: • use of prefabricated elements which can be made under safer factory conditions and which reduce construction times and therefore limit exposure to risk • selection of durable and non-hazardous materials • built-in features in the design to assist in operation of maintenance equipment • specification of sufficient tolerances and features to aid safe alignment and initial connection of structural elements • standardisation of details as much as possible • provision of adequate ventilation in confined spaces • design of ready access for maintenance of services • safety during the demolition of the facility/structure • clear identification in the design of staged construction when the permanent facility/structure becomes self-supporting — and the criteria to be met to achieve this state • proximity to traffic • site access and storage areas • clearances for construction and maintenance equipment • emergency evacuation arrangements.
Key benefits	• Design takes into account how the facility/structure will be constructed and maintained.
Desirable outcomes	• Safer construction and maintenance.
Performance measures	• Design reviews have taken account of safety issues in the construction and maintenance of the facility/structure.
Leadership	• Designer, with participation of the client.

Task 2.9	Include safety information in design documentation
Action	In collaboration with the designer, the client should review all design documentation produced to ensure that safety issues and information about residual risks have been recorded in the project risk register.
Description	A final review of the production design documentation should be undertaken prior to calling tenders or negotiating engagement. Identified safety risks inherent in the design should be clearly and comprehensively listed. Hazards should be noted on the drawings together with any information that can be used by the constructor in planning the construction sequence to deal with safety requirements. Details of parameters for staged construction sequences should be provided. Likewise, any traffic management conditions should be provided in sufficient detail to guide planning for safe construction. Any identified residual safety risks should be brought to the attention of prospective constructors via the project risk register — in particular, any that may not be readily apparent to constructors in preparing their own risk assessments.
Key benefits	• Design documentation contains detailed information about safety risks. • The client's general specifications for safety in construction and maintenance.
Desirable outcomes	• Design safety information is fully communicated to those who will engage in the construction, operation and maintenance of the facility/structure.
Performance measures	• Design documents have recorded appropriate safety issues and information about residual risks.
Leadership	• Designer, with participation of the client.

Task 2.10	Communicate relevant project safety risk information to constructors via the project risk register
Action	Project safety risk information should be communicated to prospective constructors to provide information on safety as part of the tender or expression of interest process.
Description	The project risk register established in Task 1.15 is a living document, which should evolve throughout the life of the project. It is a repository of accumulated information relating to safety risks on the project. It should be made available to prospective constructors by the client in the tender process, or through a prequalification process, in order to identify interested parties to whom this information could be communicated.
Key benefits	• Provides information to interested constructors in sufficient time for it to be taken into account. • Reinforces the project's safety culture.
Desirable outcomes	• Provides time for constructors to develop strategies to manage safety risks.
Performance measures	• Project risk register provided to interested constructors.
Leadership	• Client

Principle 4 – Manage safety risks

Task 2.11	Record residual safety risk information in the project risk register
Action	Residual safety risks should be recorded in the project risk register throughout the project life cycle to inform all stakeholders of the current status of project risks.
Description	This is a continuing process. Safety risk information should be recorded and made available to those who manage or work with a risk. Wherever possible, safety risks should be eliminated or managed through the implementation of the hierarchy of control measures. All project decision-making that could have an impact on a safety risk should involve input from those parties that could be affected by that risk. The project risk register should be annexed to the project safety master plan and be reviewed regularly as part of the normal review cycle of the project safety master plan.
Key benefits	• Keeps an up-to-date record of project risks, which is available to all stakeholders.
Desirable outcomes	• Alerts managers and people working in an area of risk about the risk so that strategies can be developed to eliminate or reduce the risk.
Performance measures	• An up-to-date project risk register.
Leadership	• Client

Principle 5 – Continuously improve safety performance

Task 2.12	Review key performance indicators (KPIs) for safety
Action	In collaboration with the designer, the client should review the KPIs for measuring project safety performance established in Task 1.16.
Description	Management of safety is a process of continuous improvement, and KPIs will need to be reviewed during all stages of the project life cycle. During the development of the project design, KPIs should be tested for relevance and, if necessary, modified.
Key benefits	• Sharpens the focus on measurable KPIs. • Entrenches systematic continuous improvement. • Continues to raise awareness among stakeholders of project safety aims. • Refines targets against which performance can be measured.
Desirable outcomes	• Continuously improves the outcomes detailed in Task 1.17 as the project evolves.
Performance measures	• Systematic, continuous review — and if necessary, refinement — of KPIs to measure the effectiveness of safety management.
Leadership	• Client

Task 2.13	Continuously develop safety capabilities
Action	During the design stage, all stakeholders should continue to review, improve and implement programs for induction and on-the-job performance of staff — commenced in Task 1.17 — to entrench safety practices as an integral part of the safety culture.
Description	This task builds on the work begun in Task 1.17 to improve safety performance and entrench safety practices.
Key benefits	• Building on the benefits detailed in Task 1.17.
Desirable outcomes	• Continuous improvement of safety capabilities.
Performance measures	• Measurement of KPIs continues to indicate improvement in safety outcomes. • Training and development records show appropriate development of safety knowledge, skills and behaviours at all levels.
Leadership	• Client, with participation of the designer and any other stakeholders involved at this stage in the project. This task will become a prime responsibility of the constructor after its appointment.

Safety leadership at John Holland Construction

John Holland Construction has implemented a 'Passport to Safety Excellence' program. A large number of employees, including senior management and the company's Chairman, have attended leadership training as part of this program. The program contains 16 training modules. Employees who complete the training are awarded a Certificate IV – in Safety Leadership – Construction. John Holland is further developing this program with a view to establishing Passport to Safety Excellence as an industry-wide training program. John Holland Construction has also pioneered the use of e-learning in the area of safety training, developing online training in safety procedures and safety inductions for new starters on John Holland Construction projects.

Task 2.14	Provide mentoring schemes for SME designers
Action	The client and designer should actively support any SME designers involved in the project in developing safety risk management skills by designing for safety throughout the project life cycle.
Description	Larger enterprises may have greater resources to implement systematic safety risk management processes and to develop systems and skills in safety risk management. Larger organisations should proactively work towards assisting SMEs to develop safety risk management skills through sharing and dissemination of information on best practice, mentoring, and requiring SME subcontractors to participate fully in project safety management programs — including planning, training, monitoring and reporting processes. Raising awareness among SMEs can be achieved through: • establishing clear safety requirements for selecting SME consultants, subcontractors, or suppliers • inclusion of safety requirements in sub-contracts • development of long-term relationships with SMEs in the supply chain — as described in Task 1.18 — perhaps through preferred provider arrangements.
Key benefits	• Enhanced knowledge of safety risk management in the construction industry. • More effective risk reduction by full coverage of participants. • Reduced costs due to reductions in LTIs and MTIs. • Improved teamwork and morale.
Desirable outcomes	• A safer work environment through dissemination of knowledge and information.
Performance measures	• A mentoring system for SMEs in place.
Leadership	• Client and designer, within their spheres of control and influence.

Stage 3: Construction

The construction stage usually starts after the finalisation of design and the engagement of a constructor. The constructor is usually responsible for the prosecution of all works, including provision of all materials, labour and equipment required to complete the project, and the management of any subcontracts. On completion of the works, the facility/structure is handed over to the client. Commissioning of the facility/structure may also be included in the contract.

This is a critical stage for safety risk management. Construction personnel are exposed to risks in all activities, and neighbours and the public may also be exposed to risk as a result of construction activities.

For a traditional project delivery model, the safety risk management actions during the construction stage are the responsibility of the constructor. However, the client and the designer (when operating as the client's agent under the construction contract) will also have a role during this stage to inspect and monitor contract compliance with the required safety actions and management processes. For a project delivery model such as an alliance, the constructor may share these responsibilities with the client and the designer, subject to the allocation of responsibilities in the alliance agreement. However, it is a well-established principle that responsibility should lie with the party who is best able to manage it.

Clearly all projects are unique and the project stakeholders should determine the appropriateness and degree of applicability of the suggested tasks and procedures to their particular project, commensurate with the risk profile of that project.

Principle 1 – Demonstrate safety leadership

Task 3.1	Develop construction safety plan
Action	Following the selection of a qualified constructor (see Task 2.6), a project-specific construction safety plan will be prepared by the constructor prior to occupation of the site. The plan must demonstrate, as a minimum, compliance with statutory regulations of the state (or the Commonwealth) in which the project is located. The client, with the designer's assistance, will provide all relevant information under their control to the constructor for input into the development of the construction safety plan. The client may engage a suitably experienced third party to independently review the plan if no such expertise exists within the client's organisation. The client's involvement in checking the construction safety plan in this way does not abrogate the responsibility of the constructor to ensure that a safe working environment and processes are provided.
Description	This work will be one of the first tasks to be carried out after the appointment of a constructor. The constructor will be the main driver of the construction safety plan, as it will have to be developed to complement the constructor's proposed construction techniques and match the constructor's labour and equipment resources. However, the client and the designer (if engaged as the client's agent) will still play roles in monitoring and managing contract compliance with safety requirements as set out in the project safety charter. The construction safety plan will include, as a minimum requirement, the following details: • responsibilities for safety management • details regarding management of subcontractors • resources to be allocated to safety management • communication plan • incident and accident reporting procedures • safety monitoring (audits and inspections) and reporting processes • processes for employer/employee consultations • injury management and rehabilitation *cont...*

	• statutory obligations • safety training needs analysis and plans • safety requirements for proposed plant and equipment • approach to management of identified major areas of hazard or risk and proposed control measures • dangerous goods and hazardous substances management • traffic management arrangements • safety equipment and protective clothing • arrangements for protecting the public — including visitors to the site • site security • arrangements for deliveries to the site • emergency preparedness and response plans. Emergency procedures should be documented with the names of responsible personnel, contact numbers, training and rehearsal arrangements, emergency equipment and alarm systems. Constructors should be encouraged to consult with peer organisations that have carried out similar works with effective safety results. The construction safety plan should conform to any requirements set out in the project safety master plan (see Task 1.5). The client, with the designer's assistance, will review the construction safety plan and continuously monitor risk assessments and safety planning processes to inform the constructor of any safety risks that remain undetected. Notwithstanding this task, it is the responsibility of the constructor to ensure that safety risks are being systematically managed during the construction stage. The construction safety plan should also identify the range of work face plans for specific short-term tasks that will be required, and describe the mechanisms for collaboration with members of the workforce to ensure that their views have been taken into account. By reviewing method statements, job safety analyses and other safety plans, the client can confirm that safety has been appropriately considered before the start of construction, and that the constructor is applying the requisite resources to safety management. These aspects should also be continuously reviewed throughout the entire construction stage. Method statements, job safety analyses and other safety plans should be developed specifically for the project and the site. The construction safety plan should not just include generic risk assessments, i.e. those conducted on previous projects that can be transferred from one project to the next, using the justification that the work being conducted is similar. Rather, the construction safety plan should explicitly and clearly specify hazards associated with the particular project, its construction methods and the site. The client should also assess the extent to which the constructor's safety planning processes involve genuine participation of field personnel who will actually perform the construction work — including those working for subcontractors. It is also important to check the efficacy with which the contents of method statements, job safety analyses and other safety plans are communicated to ensure that that their intent is effectively and unambiguously understood by field personnel. This should include communication of safety information in languages other than English where necessary. The client should also examine the extent to which the constructor monitors the implementation of the project's safety management plan to ensure that all works are conducted with minimum and managed risk.
Key benefits	• Safety issues are comprehensively considered by the constructor prior to work commencing. • Clear safety management processes and responsibilities are established. • Appropriate resources are allocated. • A framework for monitoring safety through the construction stage is provided.
Desirable outcomes	• Safety management through the construction stage is enhanced through careful preconstruction planning.
Performance measures	• A comprehensive construction safety plan is agreed by the client well before starting construction.
Leadership	• Constructor

Active monitoring of safety at the Wivenhoe Alliance

The design and construction team in this project worked closely together. This arrangement provided a constant and seamless channel of communication. The alliance team was driven by an external facilitator supplied by the client, who worked through the alliance's goals and objectives.

At each new stage of the project, the designer and the constructor undertook a risk assessment process and induction procedures. These 1.5-hour inductions addressed specific safety and environmental requirements, emergency procedures and issues relating to the progress of the project. The client played a key leadership role in developing the safety inductions that took place during the construction stage and a representative of the client monitored the construction progress. Progress was monitored at board level and through project team meetings. The management board met monthly and included a representative of the client in addition to the other alliance participants. The alliance management team met weekly to discuss project issues. The team comprised management representatives of the client, designer and constructor.

Key performance indicators (KPIs) were set at initial meetings and used to monitor progress of the project. KPIs included safety, social and environmental indicators. Initiatives for meeting these targets could then be built into the project's operation. Senior management and the project team were able to map progress against KPIs. Flexibility in safety and design was encouraged, and all new suggestions to improve safety and to modify the design where necessary were considered.

However, it was also noted that any changes made to the design needed to be clearly communicated in order to ensure that all parties worked from the same design. The client recognised that the data management system used to record all information relating to the project was an effective method of information storage. It allowed ways to monitor progress on every part of the project, including safety, and ensured a system of monitoring the events of each day. The client also recognised the importance of team-building exercises, primarily sporting activities, in order to familiarise workers with each other and foster a considerate and caring safety culture. The client said that these initiatives encouraged workers to work better on-site as a team, *'not just showing up for work, but looking after each other'*.

Managing contractors' safety at Delfin Lend Lease

Delfin Lend Lease is primarily a residential developer. As a client, Delfin Lend Lease recognises that contractors undertaking work on their sites are 'the face' of Delfin Lend Lease, and so they have established a process of auditing the safety practices and management activities of all their contractors. The safety audit includes a desk top audit of the contractors' safety management processes in addition to visiting project sites where contractors are working. This enables Delfin Lend Lease to verify that the contractors' safety systems are actually being implemented on site. Contractors who demonstrate satisfactory safety processes are included in a preferred provider list of contractors, which is drawn upon for future projects.

At Delfin Lend Lease, contract documents specifically address safety requirements for the project and require contractors to include safety provisions in their costings. Safety details within the project documents are made clear to prospective contractors through workshops and discussions specifically designed to communicate Delfin Lend Lease's safety expectations.

The safety requirements stipulated within project documents are based on the safety requirements typically imposed on commercial projects. This has led to the implementation of safety processes that exceed minimum legislative requirements and which foster safety behaviour, rather than a 'compliance' culture.

At Delfin Lend lease, prospective contractors are required to submit site-specific contractor safety plans. These plans are carefully reviewed to ensure that all aspects of safety have been identified and factored into construction costing. To overcome the common occurrence of paper-based safety plans being submitted by office staff, with field personnel having little knowledge on the content of the submitted plan, Delfin Lend Lease conducts site-specific safety inductions that focus on the expected practices and behaviours on site that relate to the contractors safety plan. This ensures the contractors' safety plan becomes a 'living document' the requirements of which are clearly understood by field staff.

Once a contractor is engaged, periodic reviews of project safety are undertaken. Safety reviews include weekly site visits, quarterly desk top and site-based audits, and quarterly performance reviews. The quarterly performance reviews are based on feedback and communication between Delfin Lend Lease personnel and the contractor, allowing both parties to comment on safety performance.

Task 3.2	Demonstrate management commitment to safety processes at all levels
Action	Senior managers of the client, designer and constructor should actively participate in the on-site safety risk management program during the construction phase.

Description	The active involvement of senior managers in safety risk management programs during the construction stage can play a significant role in reinforcing the importance placed on safety by the major project stakeholders. It sends a clear message to field personnel, subcontractors and the public that safety is a critical priority. While the constructor is responsible for safety during the construction phase, there are roles that the client and designer can play to support the constructor's safety program, such as participation in: • safety training and induction programs • safety walks, site inspections and hazard-spotting exercises (see Task 3.3) • project safety meetings • investigation of incidents and near misses. Involvement of senior management personnel of the client and the designer in such activities demonstrates that all stakeholders are genuinely committed to the welfare and safety of the project, and not solely interested in transferring the risks of safety management to the constructor.
Key benefits	• Demonstration of senior management leadership of all project stakeholders in safety during construction. • The development of client/designer/constructor collaboration with regard to the management of project safety.
Desirable outcomes	• Strong project safety culture driven by a shared understanding that managing construction safety is 'everyone's responsibility'. • Visible demonstration that the stakeholders are 'caring clients' and service providers.
Performance measures	• Records of senior management involvement in on-site safety programs.
Leadership	• Client, designer and constructor jointly.

Safety leadership at Leighton Contractors Pty Ltd

Leighton Contractors Pty Ltd has implemented a national Safety Health and Environment (SHE) Leadership Program. Within this program the importance placed by Leighton Contractors Pty Ltd on safety, and the requirement for them to demonstrate leadership in the company's goal of achieving an injury-free workplace, is reinforced to managers at all levels. KPIs associated with every manager's position description also include positive safety KPIs. The safety leadership program requires managers based in corporate or regional offices to undertake a specified number of site visits within a twelve-month period. The number of visits required is based upon the seniority of the manager. Prior to going on to the sites, the manager undertakes a site induction and has an opportunity to learn about the idiosyncrasies of the project. Positive safety behaviours are recognised, but should the manager observe an unsafe work practice or behaviour, they are required to bring it to the attention of the work group or person involved in the non-conformance. It is not the role of the manager to 'police' safety, but to offer constructive advice about safe work practices. The manager would talk to the person or work group involved in the observed unsafe practice or behaviour, explain why the practice or behaviour is unacceptable, and suggest an alternative, safe way of working.

Upon completion of the site visit, managers have the opportunity to debrief site workers on their observations. Formal notification of these observations is then produced in a report that is forwarded to both the project manager and regional safety manager for action as required. The site visit outcomes are formally recorded and can be tracked. The safety leadership visit program serves as a safety communication tool and demonstrates managerial commitment to providing a safe workplace. Safety leadership training is also provided to all managers and is in line with the National Safety Competency Matrix.

Roads and Traffic Authority – NSW – Timely management of safety incidents

The Roads and Traffic Authority (RTA) is responsible for a large number of road and maintenance projects across New South Wales. To ensure that RTA managers take an active role in managing safety incidents on project sites, they have implemented a safety program called 'Incident Attendance (5 minutes + Travel Time)'.

When an incident occurs, regardless of its severity, the RTA works supervisor is required to attend the scene to ensure injured employees get appropriate care. The supervisor must attend the site within five minutes of being notified of the incident plus the time taken to travel there. If there is the potential for an LTI, then the Business Manager (or a delegate) must also attend the incident. All incidents are investigated in this way – including works undertaken by direct labour and subcontractors.

The program has had a positive impact. Field staff appreciate the interest of senior managers in their welfare, and managers report that they are able to better identify incident causes and implement more effective controls. Additionally the amount of time taken to 'close out' an incident investigation has reduced.

Task 3.3	Implement senior management-led ‘safety walks’
Action	Senior managers of the client, the designer and the constructor should undertake unscheduled ‘safety walks’ around the construction site.
Description	These ‘safety walks’ are spot checks by senior management to ensure the construction safety plan is being implemented in the proper way and in accordance with the spirit of the project safety charter. They should be conducted at regular but unscheduled intervals so senior management can observe construction processes and safety risk mitigation measures first-hand. The walks will provide an opportunity for senior managers to talk to field personnel at the work face to get feedback on the project safety master plan and to see if there are any suggestions for improvement.
Key benefits	• A strong message is conveyed to field personnel that senior management is committed to a culture of safety. • Project managers remain vigilant about safety.
Desirable outcomes	• Reinforces commitment to a safety culture at all levels of the project organisation.
Performance measures	• Number of ‘safety walks’ conducted by senior management.
Leadership	• Client, designer and constructor jointly.

Roads and Traffic Authority – NSW – Communications with the workforce

The Roads and Traffic Authority (RTA) has a program called Safety Awareness for Everyone (SAFE) which is aimed specifically at senior managers. It requires them to attend work sites to observe safety management practices, and to informally discuss with workers issues relating to safety. These discussions not only focus on any unsafe situations or practices that have been identified, but also give recognition and encouragement for best safety practices and behaviours.

SAFE is designed to send a positive message to the workforce that senior managers take safety seriously through active participation. It also takes managers out of their offices to the workforce, breaking down ‘silos’ and keeping managers ‘in touch’ with what is happening on-site. Issues identified by senior managers may be able to be resolved on the spot – otherwise they are referred to appropriate personnel for resolution.

Task 3.4	Conduct regular site inspections
Action	The client should undertake active monitoring of the constructor’s safety performance through planned inspections and audits. These inspections and safety audits should be undertaken with the constructor to reinforce a team approach to improving safety management.
Description	Active monitoring of project safety performance should be undertaken through inspections of the physical work environment, as well as through audits of the constructor’s safety management processes and performance. Active monitoring reinforces the client’s interest in the safety performance of their construction projects and is a key aspect of safety leadership. Where possible, ‘cross audits’ should be conducted at regular intervals. These are audits undertaken by the client’s safety team members, external safety specialists, or construction personnel from other projects. The benefit of cross audits is that they provide an independent review of safety management processes and provide a mechanism for sharing best safety practices between projects and organisations, thus strengthening safety culture industry-wide. The results of these inspections and audits should be clearly communicated to the constructor so that any non-compliance can be rectified and improvements can be implemented.
Key benefits	• Provides a systematic evaluation of project safety performance. • Enables the timely identification and rectification of safety problems. • Provides a basis for feedback to the constructor regarding safety performance.
Desirable outcomes	• Identification and resolution of safety issues before the occurrence of incidents.

Performance measures	• Client/constructor audit and inspection schedule. • Audit and inspection reports. • Communication to the constructor regarding audit and inspection findings and follow-up improvement processes.
Leadership	• Client and constructor.

Delfin Lend Lease's policy for protection of the public

Delfin Lend Lease has identified that access by the public to site areas presents a high risk. In the majority of projects, all work areas are to be fenced during construction. This requirement extends to all types of works, and includes activities like landscaping, as well as construction.

If the risk to public safety for a particular project is considered to be low, a risk assessment must be completed and submitted to the Safety Manager for review of the company's policy.

Only in exceptional cases, and only with the consent of the Safety Manager, is it permissible not to fence a work area.

Although this policy presents a significant cost, the protection of public safety is a higher priority and Delfin Lend Lease requires that cost estimates for fencing are included in all estimates.

Task 3.5	Consultation and talking safety
Action	The constructor will consult with workforce personnel about all aspects of work safety prior to commencing construction and regularly throughout the construction stage.
Description	This task requires a two-way conversation between the constructor's management and the workforce to talk about safety on the site. Subcontractors should also be included in this dialogue. The extent of consultation will vary from project to project, according to the scope and complexity of the work. For small projects, a preconstruction session may suffice, while for larger projects, regular consultations may be held, especially when projects evolve into new stages of work or new subcontractors are engaged on the project. Management needs to take a proactive, practical approach to motivate workforce personnel by: • providing them with an opportunity to express their views so that they feel their voices are being heard and that they are being encouraged to assist in solving safety problems • taking serious account of their views — they can help to shape decisions rather than hearing about them after the decisions have been made • sharing information which is provided to them at the right time, not after an incident • providing information in a form that is understood by the workforce — interpreters may be required for members who do not have a good command of English • if there are a number of employers — such as subcontractors — they should work together to ensure they all meet their respective safety responsibilities. For larger projects, weekly safety meetings could be held where staff can discuss safety issues and their wellbeing. Issues such as hours of work and work/life balance could be discussed at these meetings to ensure that staff have adequate time away from work. These meetings will also encourage individuals to adopt a responsibility towards the safety of their fellow team members. Good performance on the part of individuals can be rewarded along the lines suggested in Task 4.4. Exit meetings with workforce personnel can also assist in gathering valuable feedback that can be transferred to future projects (see Tasks 4.12 and 4.13).
Key benefits	• Demonstrates commitment to a culture of safety. • Raises awareness of safety in the workforce. • Provides opportunities for feedback.
Desirable outcomes	• Creates a cooperative spirit of teamwork where everyone is empowered to have a say on safety matters. • Workers feel able to freely and honestly express their safety concerns. • Safety issues identified during consultative processes are dealt with promptly and without prejudice to anyone involved.
Performance measures	• Regular and effective consultations held between management and the workforce.
Leadership	• Constructor

Mirvac's 'Lookout' program

Recognising that workforce members who are new to the construction industry are the most vulnerable group likely to be involved in an incident, Mirvac has developed its 'Lookout' program to 'keep an eye on the new guy'. It is an induction training and mentoring program aimed at workforce members less than 25 years of age or with less than two years industry experience.

Each 'new guy':

- undergoes special training aimed at safety awareness in the construction industry
- is allocated a mentor to supervise him or her
- is initially placed on restricted duties with limited safety risks
- has an identification sticker placed on their hard hat
- wears a high visibility shirt to distinguish them as a 'new guy'.

Principle 2 – Promote design for safety

Task 3.6	Design safe construction processes
Action	Prior to commencing construction, the constructor should develop safe construction methods to minimise safety risks on the project.
Description	This task applies to aspects such as: • design of false work, formwork, scaffolding and temporary access structures • safe handling and placement of slender components to counteract instability prior to their permanent incorporation into the works • the effects of erection sequence on stability • temporary prestressing requirements • attachment of construction equipment such as tower cranes • use of hoists and cranes of sufficient lifting capacity and reach within specified limits • shoring of excavations in unstable ground • checking with the designer regarding temporary or short-term loading and the stresses induced in structures during the construction process, e.g. in balanced cantilever construction or bridge jacking • applied loads of construction equipment • safe means of connecting components • the criteria to be met before installation of plant and equipment • protection against traffic incursions • low ground bearing pressures • design features that contribute to safe access and working platforms such as guard rails, toe boards and attachment points for ladders.
Key benefits	• Ensures that all realistic load combinations likely to be encountered during construction have been considered and accounted for in the design for construction. • Detailing is standardised as far as possible and is as simple as possible. • The selection and stability of construction equipment is assured within safety requirements.
Desirable outcomes	• Design of construction processes is undertaken in compliance with statutory obligations and in accordance with appropriate engineering design principles, codes of practice and standards.
Performance measures	• Submission of design details for construction processes.
Leadership	• Constructor

Task 3.7	Review safety risk in design changes
Action	Any changes to the design occurring during the construction stage should be examined to ensure that safety is not compromised — either in the design of the facility/structure or the design for construction — and any safety risks arising from the change should be recorded in the project risk register.
Description	Changes in design can often lead to a new set of safety risks. The intention of this task is to ensure that all changes are investigated for their risk potential and, if the change is accepted, that the new risks are recorded, communicated and eliminated or mitigated.
Key benefits	• New safety risks are identified with any change in design, and appropriate strategies are developed for their elimination or mitigation.
Desirable outcomes	• Design for safety applies to design changes just as it did to the original design (see Task 2.7).
Performance measures	• Changes in design are reviewed for safety implications and the project risk register is updated accordingly.
Leadership	• Designer and constructor jointly, with the participation of the client.

Risk reduction through design change at Bovis Lend Lease

In a design and construct project in Melbourne, the Risk and Opportunity Analysis at Design (ROAD) process identified a number of risks relating to the ongoing maintenance of the building under construction. As a result, design changes were made.

The building consisted of a glazed sawtooth roof with suspended lighting. Inside was a fully glazed atrium covering all nine floors. In the initial design, there had been some consideration given to the maintenance of all the glazing components and access to services installed on the roof. In the original design, protection from falling during maintenance work was to comprise a railing with rope access. The ROAD team deemed this to be unsuitable and designers investigated ways in which maintenance work could be performed more safely. The final design included a purpose-designed gantry to be installed across the atrium. On top of the gantry was a safe working platform. The platform was installed on hydraulic lifts enabling safe access to the services located high in the ceiling space. When the platform was not in use it was retracted and positioned on top of the gantry. Another moveable working platform was suspended under the gantry, allowing access to the glazed atrium below.

Not only did this arrangement provide a safe environment for routine maintenance, but the gantry, which was erected early in the construction process, was also used for access during the construction of the atrium and roofing. The gantry design also contributed to substantial cost savings and improved constructability of the atrium and roof, thus reducing construction time. The case highlights that careful analysis of safety issues at the design stage can improve outcomes in subsequent project stages.

Principle 3 – Communicate safety information

Task 3.8	Communicate safety risk information to relevant stakeholders
Action	Safety risk information should be communicated to all relevant stakeholders to ensure that all personnel are aware of the safety risks and the risk mitigation measures to be practised.
Description	Following on from Task 1.10, communication and consultation with all stakeholders should start prior to construction. All stakeholders should be provided with the current version of the project risk register and any other relevant information to provide them at the outset with the project's safety requirements. All stakeholders should also be informed of the project safety charter and be encouraged to submit any suggestions of their own which might improve safety management plans and arrangements.

Key benefits	• All stakeholders are informed of safety risk information and commitments and understand their role in the project in regard to safety. • Stakeholders understand their roles in safety management. • Dialogue on safety issues is encouraged and stakeholders are provided with an opportunity to express their views and opinions to enhance the project safety charter. • It is demonstrated to all stakeholders that they will be expected to commit to safety.
Desirable outcomes	• All stakeholders thoroughly understand the safety aims and objectives of the project and the level of commitment required of them and other partners.
Performance measures	• Confirmation from prospective stakeholders that they understand and agree to conform to the requirements of the project safety master plan and the project safety charter.
Leadership	• Client, designer and constructor.

Communication of safety risk information at EastLink

A proprietary software package was used to track the project throughout the planning and execution, as well as operating as a documentation repository. This system was used as a management tool to communicate and liaise with all parties on project issues including safety aspects. The 'risk' section of the package was utilised to monitor project safety risks identified from the safety and design workshops. Safety aspects were either resolved at the workshops and logged onto the database for future reference or entered for ongoing attention. For example, a lifting mechanism for a bridge identified as a potential problem was redesigned to solve a number of issues. The design was communicated by the designer to the constructor through the package and also through a handover workshop of the design. In this way, all the parties were made aware of the resolution of certain safety issues and there was a documented chain of information and responses relating to safety in the project.

Task 3.9	Provide regular safety performance feedback to project personnel
Action	All project personnel — office-based, field-based and subcontractors — should be kept appraised of project safety performance.
Description	Safety performance should be an agenda item for all project meetings, and the latest data available should be recorded in the minutes of meetings. Safety performance should also be discussed at field meetings, and foremen and supervisors should be encouraged to raise safety issues when planning new construction processes. Regular bulletins should be issued providing information to field staff about safety performance. These bulletins should be distributed and posted in all project offices, recreation areas, crib huts and other areas where field staff are likely to congregate. As well as providing the latest KPIs on safety management, the bulletins can also be used to: • acknowledge good practice in the field and name individuals responsible for good performance • alert personnel to imminent risks arising at various stages of construction, e.g. safety requirements for prestressing • provide details of recent incidents and the lessons that can be learned from them • invite suggestions for improving performance.
Key benefits	• All project personnel are kept up-to-date on project safety performance.
Desirable outcomes	• Raises awareness of all project personnel on safety issues.
Performance measures	• Records of safety performance in minutes of meetings and in bulletins posted regularly around the site.
Leadership	• Constructor, in close collaboration with the client and designer.

Safety communication at John Holland Construction sites

At John Holland Construction, safety communication between workers and site management is conducted through the standard channels of toolbox talks and site meetings. However, a suggestion box scheme has also been implemented to provide an opportunity for workers to contribute their own ideas for safety improvements. Any person on a John Holland site is able to place a suggestion in the safety suggestion box.

The scheme is not restricted to John Holland Construction employees and many useful suggestions come from subcontracted workers. All suggestions received are reviewed by the safety committee. Suggestions which result in safety improvement actions are recognised. The person who made the suggestion is provided with a monetary voucher and has their photo taken. The photo is displayed on the site noticeboard. Details of safety actions implemented as a result of the suggestions are publicised through the site noticeboard, toolbox talks, subcontractors meetings and site safety reports.

As site safety reports are distributed to other John Holland Construction sites, there is an opportunity for good safety ideas to be shared between projects. Photos of any safety-related incidents that have happened on the company's construction sites are also placed on site noticeboards. This enables any lessons learned to be shared between projects, and organisation-wide responses to be developed. If a safety incident occurs in construction organisations similar to John Holland Construction, available information about these incidents is also posted on site noticeboards to alert site workers and managers to the incident and enable appropriate safety measures to be implemented to prevent similar occurrences at the John Holland Construction site.

Principle 4 – Manage safety risks

Task 3.10	Implement systematic risk management processes
Action	This task is aimed at ensuring that the constructor implements the construction safety plan effectively and in the spirit of the project safety charter. The client should oversee the constructor's performance in regard to contractual requirements relating to safety, and work collaboratively with the constructor in analysing safety performance data with a view to further improving safety processes and performance.
Description	This task involves monitoring all aspects of the construction safety plan during implementation. This includes aspects such as: project hazard analysis, safety organisation and management, inspections of workplaces, plant safety, safe working procedures and instructions, dangerous goods and hazardous substances, safety training/induction/competencies, consultative arrangements, emergency procedures, accident and incident reporting and management of subcontractors. Reviewing and analysing safety data is essential for monitoring and evaluating the constructor's safety performance. The benefits of collecting and analysing these data include: • the provision of information about how the constructor is performing in relation to the project safety charter, industry standards and project goals • the quick identification of problem areas enabling the development of appropriate improvements or containment strategies • the ability to measure the effectiveness of the constructor's safety management interventions • the ability to provide timely feedback to subcontractors regarding their safety performance.
Key benefits	• Early and accurate diagnosis of project safety problems. • Focused development of continuous safety improvement strategies. • Evidence-based evaluation of the impact of safety improvement interventions.
Desirable outcomes	• The use of project safety data for benchmarking and comparative performance reviews.
Performance measures	• Regular safety reports, including analyses of data and performance measured against project goals.
Leadership	• Constructor and client jointly.

Implementation of systematic risk management at Rouse Hill

Safety was outlined from the outset with an environment, health and safety (EHS) plan, and in addition there was an 'Incident and Injury Free' program. The Incident and Injury Free program was divided into six imperatives: leadership, employees, systems, supply chain, client and community. A steering committee implemented and monitored the program. The role of the steering committee was to ensure that the program stayed on track and achieved milestones through the life of the project. The program also focused on 15 to 20 small initiatives to encourage a cultural shift within the organisation.

One component related to mentoring apprentices by getting them involved in work groups in a 'buddy system'. This encouraged younger workers to pay more attention to safety. In addition, site managers were rotated with a view to facilitating the sharing of safety information across projects.

An on-site safety team day was held once every six weeks over four hours. On the day, project members concentrated on an area of safety which was largely unfamiliar to them. The day was run so that people were split into teams with briefs to monitor safety in a number of different areas. One brief was to identify and remove hazards. If hazards could not be removed, they were made safe and notes were recorded for future rectification.

The other two items were: first to review at least two work method statements when they were in the field to check for accuracy and that they were working successfully and the fourth item was to engage with 20 workers in the field and ask for feedback on how the site was being run and if anything could be done better.

A proprietary web-based system was used which enabled all safety statistics to be recorded so that, for example, if there were first aid injuries or lost time injuries occurring these could be analysed with a view to looking for trends. As this is a real-time reporting system, on any given day the system provides the ability to understand trends and possible risks in comparison with other projects.

Roads and Traffic Authority – NSW – Managing safety risk

The Roads and Traffic Authority (RTA) recognises that it operates in one of the highest safety risk industries in Australia. Consequently, it has developed a series of leadership and accountability programs aimed at improving safety performance by example – led by management.

Safety management is included in the long-term strategic planning for the organisation. From the strategic plans, annual safety objectives are set to drive improvements in performance across the organisation via the Annual Business Plan. Managers responsible for designated areas report their safety performance against the business plan, monthly.

Since this approach was adopted, managers have taken a more active role in the development of initiatives to prevent injuries. The subsequent reduction in injuries reflects the greater understanding managers now have of the issues that impact on their safety performance – and a greater awareness of safety strategies to achieve better outcomes.

Task 3.11	Identify and rectify safety deficiencies
Action	All identified safety deficiencies should be rectified by eliminating the hazard or managing the risk by changing the work environment or work processes.
Description	The driving aim of the construction safety plan is to anticipate risks before they arise, and either eliminate them or manage them in such a way as to provide a working environment in which construction processes can proceed in a safe manner. However, unforeseen hazards do arise, and this is why it is important to be constantly vigilant during work processes and site inspections to identify and rectify any such hazards. As part of the culture of safety, all personnel are responsible for identifying hazards in the workplace. Sometimes, the person identifying the hazard can rectify it on the spot, if it is practical to do so. If this is not the case, a control such as a barrier, warning sign or a watch person should be posted until a proper treatment can be undertaken. When an immediate safety risk is identified, work should always be halted until the risk can be addressed and the workplace or process made safe. No work should be permitted to proceed until corrective action has been taken in accordance with the requirements of the construction safety plan. Where there is an immediate threat, work must be stopped. Where a dispute or a difference of opinion about a safety risk arises, it is best to resolve it in a collaborative manner using coaching and counselling to achieve cooperation. If the dispute cannot be solved on-site, work should be suspended and the dispute referred to the chairperson of the project safety leadership team and the client, whose decision will be binding. If the dispute relates to a specified contractual or statutory requirement, the requirements of the contract or the law will apply.
Key benefits	• All hazards are identified and rectified in a timely manner to provide a safe working environment.

Desirable outcomes	• Continuous improvement in managing safety risks.
Performance measures	• Corrective action reports submitted.
Leadership	• Constructor.

Task 3.12	Record risk information
Action	All hazards identified in Task 3.11 should be reported and recorded in the project risk register.
Description	Regardless of the potential severity of the hazard, it should be reported and, if necessary, investigated. Near-miss incidents should also be reported, investigated and communicated to stakeholders so that they can benefit from any lessons that can be learned from the incident. The potential for an LTI, MTI or serious incident should also be noted. The method of communication of this risk information should be included in the project safety communication plan (see Task 1.10).
Key benefits	• All hazards identified and communicated via the project risk register.
Desirable outcomes	• Continuous improvement in managing safety risks.
Performance measures	• Hazard identification reports submitted and entered into the project risk register.
Leadership	• Constructor, in collaboration with the client and designer.

Principle 5 – Continuously improve safety performance

Task 3.13	Undertake regular measurement of project safety performance using leading indicators, climate surveys and lagging indicators
Action	The major project stakeholders — the client, designer and constructor — should continuously monitor project safety performance and measure it against the agreed targets to identify trends and deficiencies.
Description	The aim of this task is to evaluate the efficacy of the project safety management processes and to enable corrective actions to be taken to further improve performance. By regularly measuring performance, emerging trends will reveal whether strategies are working or not. Regular measurement will also facilitate benchmarking against industry standards and other projects, and generally provide feedback to assist in continuous improvement strategies.
Key benefits	• Project safety management can see whether goals are being achieved. • Negative trends can readily identify deficiencies which require corrective action.
Desirable outcomes	• Continuous improvements are made in response to emerging trends.
Performance measures	• Regular reports on measurement of project safety performance.
Leadership	• Client, designer and constructor.

Safety performance measurement at the Tullamarine Calder Interchange Alliance

At the Tullamarine Calder Interchange (TCI) Alliance project, safety performance is routinely measured and monitored. Performance is measured using a combination of traditional lagging indicators — such as lost time injury frequency rates, medical treatment incidents and first aid treatment incidents — and 'leading' indicators. These leading indicators are designed to measure positive steps to manage safety *before* the occurrence of incidents or injuries.

A Project Safety Index was developed combining leading and lagging indicators. Each of these indicators was given a weighting as to its level of importance in determining the overall safety performance score. Performance against these indicators was assessed on a monthly basis to obtain a rating of overall project safety performance. The safety index was useful because:

- it could be applied to multiple projects, and data from each project could be easily compared
- areas of weakness in the safety management system could be quickly identified
- any necessary corrective action could be put in place.

The indicators and weightings that make up the index were developed collaboratively by the project team to encourage particular types of behaviour.

Also at the TCI project, a Wellbeing Indicator Survey was developed. All site and office workers were invited to complete this survey every three months. Survey data were analysed to reveal workers':

- perceptions about management commitment to safety in the project
- satisfaction with work conditions and the quality of safety training provided
- perceptions about supervisory safety leadership in the project
- satisfaction with work hours, work/life balance and wellbeing.

At the end of the survey, workers were invited to provide comments about what could be done to improve safety, work/life balance or wellbeing at the TCI project. All written suggestions were transcribed and listed in a large wall chart 'Action Plan.' This Action Plan allocated responsibilities for all items to be implemented. The Action Plan was then posted in the site shed/lunch room areas. Workers were able to monitor the implementation of their suggestions and site management was held accountable for this implementation. The Project Manager commented '*the biggest thing is that we listen and people feel and are heard because we respond to all of the comments that are made … people are heard in relation to how they feel about the project and their wellbeing*'.

Task 3.14	Regularly analyse project safety performance data
Action	The measurements undertaken in Task 3.13 should be regularly analysed in order to determine trends.
Description	Analysis of safety data will identify problem areas and evaluate the effectiveness of improvement strategies.
Key benefits	• Up-to-date status of performance can influence further interventions to improve performance.
Desirable outcomes	• 'Live' information can alert the safety team and managers to changes in performance.
Performance measures	• Regular reports on safety performance.
Leadership	• Client, designer and constructor.

Principle 6 – Entrench safety practices

Task 3.15	Continuously develop safety capabilities
Action	During the construction stage, all stakeholders should continue to review, improve and implement programs for induction and on-the-job performance of staff — started in Task 2.13 — to entrench safety practices as an integral part of the safety culture.
Description	This task builds on the work started in Task 2.13 to improve safety performance and entrench safety practices.

Key benefits	• Building on the benefits detailed in Task 2.13.
Desirable outcomes	• Continuous improvement of safety capabilities.
Performance measures	• Measurement of KPIs continues to indicate improvement in safety outcomes. • The project risk register continues to be updated.
Leadership	• Constructor, with participation of the client and designer.

Task 3.16	**Promote safety management practices within SME subcontractors**
Action	The constructor should proactively promote a safety culture in SME subcontractor stakeholders.
Description	Subcontractors commonly participate in projects, and sometimes their personnel outnumber those of the prime contractor. For example, large housing estate developments often engage subcontractors of different trades — including individuals. Many of these people have not worked under any guidelines for risk management. It is therefore incumbent on the constructor to induct and train these subcontractors to ensure that their workforces are familiar with the project safety charter and the construction safety plan. Where a subcontractor has an extended role in an important aspect of the project, it may be appropriate to have a representative of that subcontractor on the project safety leadership team. Subcontractors should be included in any safety consultation forums and their personnel ought to be encouraged to provide comments and feedback to improve safety performance.
Key benefits	• Subcontractors treated exactly the same as prime contractor personnel. • All subcontractor staff are aware of their rights and responsibilities under the project safety master plan. • Minimise LTIs and MTIs among subcontractor staff. • Continuous improvement of safety performance.
Desirable outcomes	• All staff members, regardless of their status, are part of the project safety culture.
Performance measures	• Records of induction and training of subcontractors in project safety systems and procedures.
Leadership	• Constructor

Delfin Lend Lease – managing safety in the supply chain

Delfin Lend Lease recognises the influence a client can have over the organisations that supply goods or services to them. As part of an initiative to ensure safer projects, Delfin Lend Lease has initiated a Supply Chain Safety Program. While this program is still under development, Delfin Lend Lease is seeking to enter into formal agreements with suppliers, committing both parties to providing safe work sites.

A memorandum of understanding (MOU) establishes, in broad terms, shared safety objectives and a commitment from each party to working collaboratively to ensure safe sites. The intention is to ensure that suppliers are made aware of Delfin Lend Lease's safety expectations and commit to meeting these.

Delfin Lend Lease also acknowledges that not all the organisations they engage will have the resources or the ability to implement proactive and innovative safety programs. But, by entering into the MOU, Delfin Lend Lease seeks to establish minimum safety requirements and assist in developing safety competencies, knowledge and practices within the supply chain.

The MOU will also document tools to be used in assessing contract performance, a safety action plan and methods for measuring safety performance at project sites.

Task 3.17	Implement safety mentoring system for SME subcontractors
Action	The constructor should implement a safety mentoring system for SME subcontractors.
Description	When subcontractor staff are inducted in Task 3.16, the constructor should allocate members of its workforce to act as mentors on matters of project safety. The mentors should work in close proximity to the subcontractor and have daily contact. At the beginning of each day, the mentor should briefly consult with the subcontractor to see if there are any specific risks likely to arise that day, and what are the appropriate actions needed to minimise the risks involved. The mentors should coach subcontractor staff on all aspects of project safety and generally provide advice on safety. Subcontractors should report accidents and incidents as per the project safety master plan and should submit data for inclusion on the project risk register.
Key benefits	• Subcontractors have a point of contact regarding safety issues. • LTIs and MTIs minimised for subcontractor staff.
Desirable outcomes	• Increased safety awareness and knowledge in subcontractors with a flow-on effect in the construction industry.
Performance measures	• Evidence of mentoring in project reporting.
Leadership	• Constructor

Stage 4: Post-construction

The post-construction stage follows the handover of the facility/structure to the client. This stage will usually involve a defects liability period that will involve working in occupied premises. Depending on the type of facility/structure, it may include commissioning of plant and management equipment into service. Some projects have a staged handover, whereby a part of the facility/structure is brought into operation ahead of another section which is still under construction. During this stage, the client may pass the facility/structure into the hands of the occupier, who will be responsible for the operation of the facility/structure and its maintenance.

The safe operation of the facility/structure will have been considered in the design, including maintenance, servicing, cleaning, and facilities management. Design issues to improve safety include access for internal and external maintenance and cleaning, floor surfaces, elimination of manual handling, storage areas, fire evacuation, disabled access, security systems and access.

During this stage, a review should be conducted of the entire construction project process to see if there are any lessons that can be learned that could be fed into safety management processes for future projects.

Clearly all projects are unique and the project stakeholders should determine the appropriateness and degree of applicability of the suggested tasks and procedures to their particular project, commensurate with the risk profile of that project.

Principle 1 – Demonstrate safety leadership

Task 4.1	Develop a commissioning safety plan
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.
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. The commissioning safety plan should include: • 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 appropriate registrations • approach to management of identified major areas of hazard or risk and proposed control measures • management of dangerous goods and hazardous substances. The commissioning safety plan should conform to any requirements set out in the project safety master plan (see Task 1.5).
Key benefits	• 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.
Desirable outcomes	• Safety management through the commissioning stage is enhanced through planning.
Performance measures	• A commissioning safety plan is endorsed by the client before installation of plant and equipment or before opening the facility/structure for service.
Leadership	• Designer, in collaboration with the client and the constructor.

Task 4.2	Perform post-construction review
Action	The client, designer and constructor should undertake a safety review of the facility/structure to identify any hazards requiring rectification prior to occupation.
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 unforeseen during planning, design and construction. Any such risks 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. This is also a good time to conduct exit interviews with workforce personnel to gain a better understanding of how people at the work face felt about the safety management processes and strategies — and any suggestions for further improvement.
Key benefits	• Proactive OHS risk control strategy.
Desirable outcomes	• Handing 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.
Performance measures	• Record of all the identified safety hazards placed in the project risk register.
Leadership	• Client, designer and constructor.

Task 4.3	Evaluate project performance
Action	The client, designer and constructor should evaluate the risks captured in the project risk register during the planning, design and construction of the project, and the overall safety performance of the project.
Description	This post-project review should be a team exercise, involving the client, designer, constructor and major subcontractors. The review would asses aspects such as: • 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. It would also be useful to compare 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 analysed, as well as the quality of safety communication and the cooperation between stakeholders.
Key benefits	• Feedback leading to improvements in the future provides a basis for continuous improvement of safety performance.
Desirable outcomes	• 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.
Performance measures	• Post-project review report completed within one month of project completion. • A final repository of data. • Post-project review reports circulated to all project stakeholders to assist them in future projects.
Leadership	• Client, designer and constructor jointly.

Promoting a safety culture at Baulderstone Hornibrook Pty Ltd

Baulderstone Hornibrook Pty Ltd has developed a company 'Safety Journey' to support its safety policies, processes and systems. The Safety Journey is an innovative behaviour change program designed to reduce workplace incidents, injuries and illnesses. The Safety Journey establishes principles by which the company's employees and projects are to operate. These principles are:

(1) That safety and business objectives must both be achieved. Neither is to be compromised.

(2) That all injuries are preventable.

(3) That managers are to be accountable for safety performance.

(4) That everyone has a responsibility for safety performance, which is a condition of employment.

(5) That risk assessment, audit and review, training and recognition are essential elements of an effective safety system.

The program emphasises personal responsibility for safety and is designed to encourage people at all levels to talk about safety in their day-to-day activities. The program seeks to bridge the gap between formal policies and procedures and safety practices by clearly communicating that safety is not to be compromised by production and encouraging counselling for people who are not working safely and, where necessary, stopping activities to support safety. Baulderstone Hornibrook Pty Ltd requires subcontractors to participate in the Safety Journey program along with Baulderstone Hornibrook Pty Ltd employees and also encourages client organisations to adopt the program.

Task 4.4	Recognise and reward good safety management and leadership
Action	The project stakeholders should recognise and reward their staff members who have contributed to good safety outcomes on the project.
Description	It is important to recognise — and celebrate — excellent performance in safety management and leadership. This recognition should extend from the work face up to senior management. Recognition and reward acknowledges the contributions made by individuals and helps in further promoting safety in the workplace. The types of rewards offered will vary according to different company policies and practices — and generosity. It should be remembered that a good safety record on a project provides excellent returns to a company through reduced work stoppages, LTIs, MTIs, insurance claims and premiums, and through increased motivation and morale in the workforce. Suggested ways of rewarding good performance include plaques, certificates, letters of appreciation from the CEO, gifts and dinners. The real message is the expression of acknowledgment of a job well done and appreciation for the participation and cooperation. Everyone likes to be thanked.
Key benefits	• Workforce members and safety management personnel are motivated by management's recognition of their efforts. • Safety champions are identified who can pass their knowledge on to others or who can participate in future projects. • Promotes increased awareness of safety in the workplace.
Desirable outcomes	• Safety culture becomes entrenched in the corporate culture.
Performance measures	• Evidence of formal acknowledgment and rewards.
Leadership	• Client, designer and constructor jointly.

Recognising safe performance at Leighton Contractors Pty Ltd

Leighton Contractors Pty Ltd has developed an internal safety program to recognise good safety performance and innovation in safety management within the Leighton Contractors Group. The categories of awards to be presented are the Safety and Health (S&H) Initiative Award, which recognises S&H initiatives by individuals or a team that has contributed to improve S&H, the Safety Health and Environment (SHE) Project Excellence Award, which recognises excellence in safety at the project level, and the Managing Director's Leighton 'Safe Aware', which recognises the most outstanding contribution to S&H within Leighton Contractors Group.

Rewarding safety performance at Delfin Lend Lease

Delfin Lend Lease has incorporated safety behaviour requirements in the roles and responsibilities contained in the job descriptions of senior managers. Each manager is set a number of safety KPIs. Performance in relation to these KPIs is reviewed yearly and is directly linked to the manager's financial remuneration.

The KPIs are based upon a competency matrix. The competency matrix identifies a range of safety behaviours. An assessment is conducted and results plotted against the competency matrix to identify the manager's level of safety competence. Staff development plans contain goals and targets to extend these competencies and managers' progress in attaining safety competency is reviewed on a quarterly basis.

Principle 2 – Promote design for safety

Task 4.5	Evaluate effectiveness of design safety review
Action	On completion of construction, the project safety leadership team should review and evaluate the effectiveness of the design safety reviews conducted in Tasks 2.7 and 2.8.
Description	The post-construction stage is a time for reflection on successes and failures — what worked in the design reviews and what didn't. This task will ensure that the most effective design practices are identified so that they can be adopted for future projects. This review could best be carried out in a post-construction workshop attended by all stakeholders, but with a strong workforce representation. A record of the workshop should be posted on the websites of the relevant stakeholders and distributed via their intranets to inform other personnel — not involved in the project — of the effectiveness of the design reviews.
Key benefits	• Provides feedback to project stakeholders and informs the wider construction industry of safety design innovations that can be used on other projects.
Desirable outcomes	• Good safety design practices can be identified to continuously improve safety management of future projects.
Performance measures	• Record of a post-construction workshop on design reviews.
Leadership	• Client, designer and constructor jointly.

Task 4.6	Record effective design solutions for future projects
Action	From the workshop conducted in Task 4.5, the effective design solutions identified should be recorded in a permanent record for use on future projects.
Description	The record should identify people involved in the design solution so that they can be contacted to clarify any points, or for consultation on any future, similar problems. The completed report could be distributed via the company's intranet and on the website to inform the widest possible audience.
Key benefits	• Best design safety practices are captured in a permanent record to enable the industry to learn from the experience of others. • Designers become more aware of designing for safety.
Desirable outcomes	• Continuous improvement in the industry with respect to designing for safety. • Wide dissemination of lessons learned will lift industry-wide design standards for safety.
Performance measures	• A permanent record of the project's effective design solutions to be provided to managers of future projects.
Leadership	• Client, designer and constructor jointly.

Principle 3 – Communicate safety information

Task 4.7	Communicate safety knowledge to all project participants
Action	The evaluation of safety performance arising from Tasks 4.2 and 4.3 should be communicated to all project stakeholders.
Description	This task should ensure that all stakeholders receive feedback on their performance, and provide valuable assistance in continuous improvement of safety management in future projects. Responsibility for this task lies with the project safety leadership team. Both positive (strength) and negative (weakness) outcomes should be communicated. In fact, more benefit is likely to arise from the lessons to be learned from things that went wrong — and how they might be corrected in the future — than from the positive events. It is important also that knowledge be conveyed to the SME subcontractors. Because of their size and the nature of their work, these stakeholders are the least likely to have been exposed to a strong safety culture. Potentially, they will have the most to gain from the lessons learned that can be applied in future projects. Communication in an open and honest way is the best way to improve safety risk management for future projects and to promote a strong safety culture. There is nothing to be gained by glossing over the facts.
Key benefits	• All stakeholders are informed of all the safety issues and actions on the project and can assess their performance against other benchmarks. • Lessons learned from their experiences can be applied in future projects.
Desirable outcomes	• All stakeholders can continuously improve their safety performance.
Performance measures	• Confirmation that an overall report on safety performance has been issued to all participants.
Leadership	• Client, designer and constructor jointly.

Principle 4 – Manage safety risks

Task 4.8	Conduct appropriate testing of plant/equipment prior to commissioning
Action	For projects which include the commissioning of plant and equipment, the client should ensure that the plant is appropriately tested and commissioned and only put into active service when it is deemed safe for use.
Description	Once plant and equipment are installed, all relevant safety information regarding the plant and equipment should be provided to the occupier. All necessary certificates and approvals should be obtained according to statutory requirements. The location of plant and equipment should be designed to have sufficient clear space for the plant to be operated, serviced, maintained and repaired safely. The occupier must ensure that all equipment is used safely and all personnel conducting maintenance operations have all the necessary information, training and supervision needed to work and operate on the plant. Any warning devices or other safety features for the plant must be identified and used. All safety information is to be provided to anyone involved in installing, commissioning, testing, inspecting, maintaining, decommissioning, dismantling and disposing of plant. The occupier must also ensure that plant which is subject to registration is not used until it has been registered.
Key benefits	• Maintenance staff have a clear understanding of inherent safety risks during operations and maintenance.
Desirable outcomes	• Safety risks are eliminated or managed appropriately during testing and maintenance of plant and equipment.
Performance measures	• Identification and registration of all required plant and equipment as per the requirements of the applicable statutory regulations.
Leadership	• Client

Task 4.9	Record safety information relevant to facility operation
Action	All safety information relevant to the operation and maintenance of the facility/structure should be entered into the project risk register.
Description	This is a responsibility of the client, designer, constructor and the owner/occupier. Aspects such as checklists, parts registers, inspection personnel and history, must be recorded in the risk register, and the owner/occupier will ultimately be responsible for ensuring that the register is maintained and updated and all identified risks are addressed. In this way, the safety culture will be sustained throughout the entire life cycle.
Key benefits	• Operation and maintenance personnel will have a complete picture of the safety management of the project and will be in a strong position to manage any residual risks.
Desirable outcomes	• The culture of safety translates into the operational stage of the facility/structure.
Performance measures	• Evidence that the project risk register has been updated to include information relevant to the operation and maintenance of the facility/structure.
Leadership	• Client

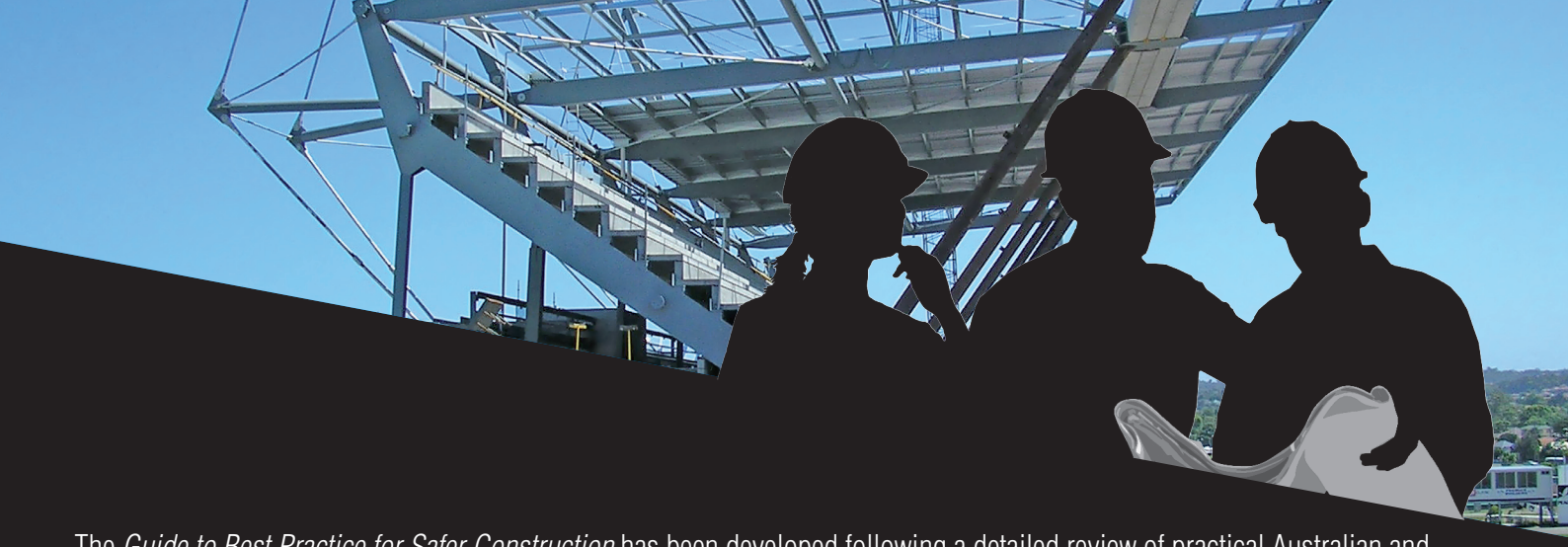
Principle 5 – Continuously improve safety performance

Task 4.10	Undertake collaborative post-project review of safety performance
Action	• A post-project review of safety performance should be carried out by all project stakeholders.
Description	This task is strongly linked to Task 4.2. Its aim is to provide feedback to all stakeholders — in an open and non-threatening way — about the lessons that can be learned from the project and how they can be applied in future projects. Both strengths and weaknesses should be considered, and it is important that subcontractors be included — for the reasons stated in Task 4.7. The review should be conducted honestly and frankly and should not hide any issues, using the premise that we learn by our mistakes.
Key benefits	• All stakeholders have a better understanding of their safety performance on the project, and are better able to use the lessons learned from their experiences in future projects.
Desirable outcomes	• Continuous improvement across the industry in safety performance.
Performance measures	• A record of the post-project review.
Leadership	• Client, designer and constructor jointly.

Task 4.11	Capture and record lessons learned for future projects
Action	The lessons learned from safety performance on the project should be separately recorded and distributed for the benefit of the industry.
Description	This action evolves directly from Task 4.10. The lessons learned from the post-project review in Task 4.10 need to be collated separately and made available for others to learn. This report could be posted on websites and distributed to others in the industry — perhaps with the assistance and cooperation of peak industry bodies.
Key benefits	• All stakeholders have a better understanding of their safety performance on the project, and are better able to use the lessons learned from their experiences in future projects.
Desirable outcomes	• Continuous improvement across the industry in safety performance.
Performance measures	• A report on the safety lessons learned from the project.
Leadership	• Client, designer and constructor jointly.

Task 4.12	Review long-term relationships with SMEs
Action	Major project stakeholders (client, designer and constructor) should review their relationships with SMEs involved in the project with a view to seeing if these can be further strengthened.
Description	At the end of the construction stage, major project stakeholders could review the safety performance and cooperation of their SME subcontractors, and consider ways in which these relationships could be strengthened for joint participation in future contracts. This is a time for frank discussion about safety management issues — what safety initiatives worked well and what didn't — and the effectiveness of the cooperation between the prime contractors and the subcontractors.
Key benefits	• Strengthens the safety culture between the various parties.
Desirable outcomes	• Long-term relationships in the supply chain can be further enhanced and strengthened to continuously improve safety performance for future projects.
Performance measures	• A record of a meeting between prime contractors and subcontractors to review long-term relationships.
Leadership	• Client, designer and constructor.

Task 4.13	Future interface between prime contractors and subcontractors
Action	Following on from Task 4.12, prime contractors and subcontractors should consider their long-term relationship for future project involvement.
Description	If a major stakeholder was satisfied with a subcontractor's safety performance, the relationship could be further strengthened through cooperation in future projects. If, on the other hand, a major stakeholder was not satisfied with a subcontractor's safety performance, discussions could centre on how improvements can be made for future work, or in the worst case, the relationship could be severed.
Key benefits	• Cooperation between major stakeholders and SMEs is strengthened to improve safety performance on future projects.
Desirable outcomes	• The ability of under-performing SMEs in safety management and systems is enhanced for the good of the industry.
Performance measures	• A record of discussion between prime contractors and subcontractors.
Leadership	• Constructor



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 suggests a framework to improve safety performance on construction projects and covers all stages of a project: 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 create a methodology which integrates occupational health and safety into strategic and operational decision-making at all stages of the project.

The Guide is intended to be an aspirational document that leads discussion and industry change, as well as a practical tool which can be used across the industry by clients, designers and constructors and by large firms and small and medium-sized enterprises.

Guide to Best Practice for Safer Construction: Implementation kit

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

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