

# SAFETY IN DESIGN

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# WHAT IS SAFETY IN DESIGN

Safety in Design means “*the integration of control measures early in the design process to eliminate or, if this is not reasonable practicable, minimise risks to health and safety throughout the life of the structure being designed.*”

- About unusual construction issues associated with the design
- Part of a wider set of design objectives, including practicability, aesthetics, cost and functionality

## WHAT IT IS NOT.....

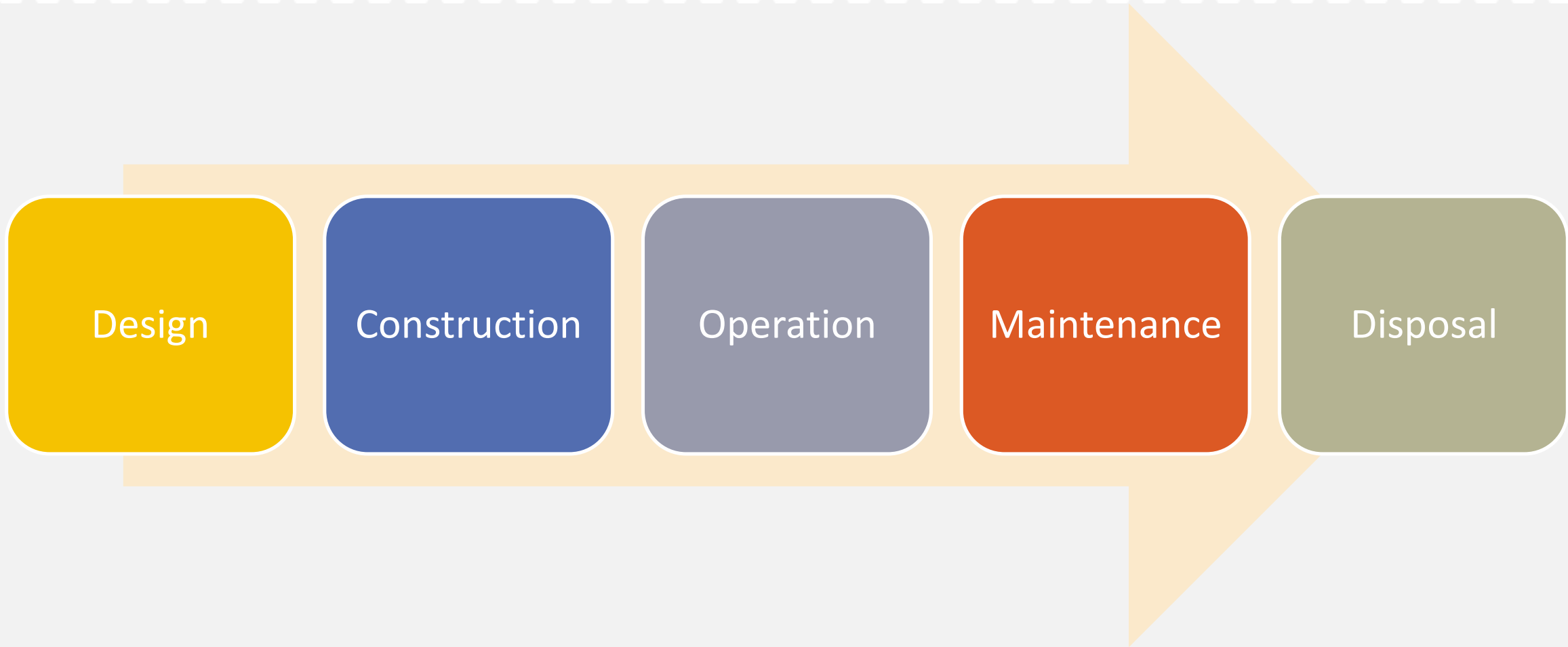
designers taking an  
active safety role  
**DURING**  
construction.

listing all the typical  
hazards that a client  
would be reasonably  
expected to know

telling a contractor  
of risks they would  
be reasonably  
expected to know

liability of designers  
in case accidents  
occur

# LIFECYCLE PHASES OF SAFE DESIGN

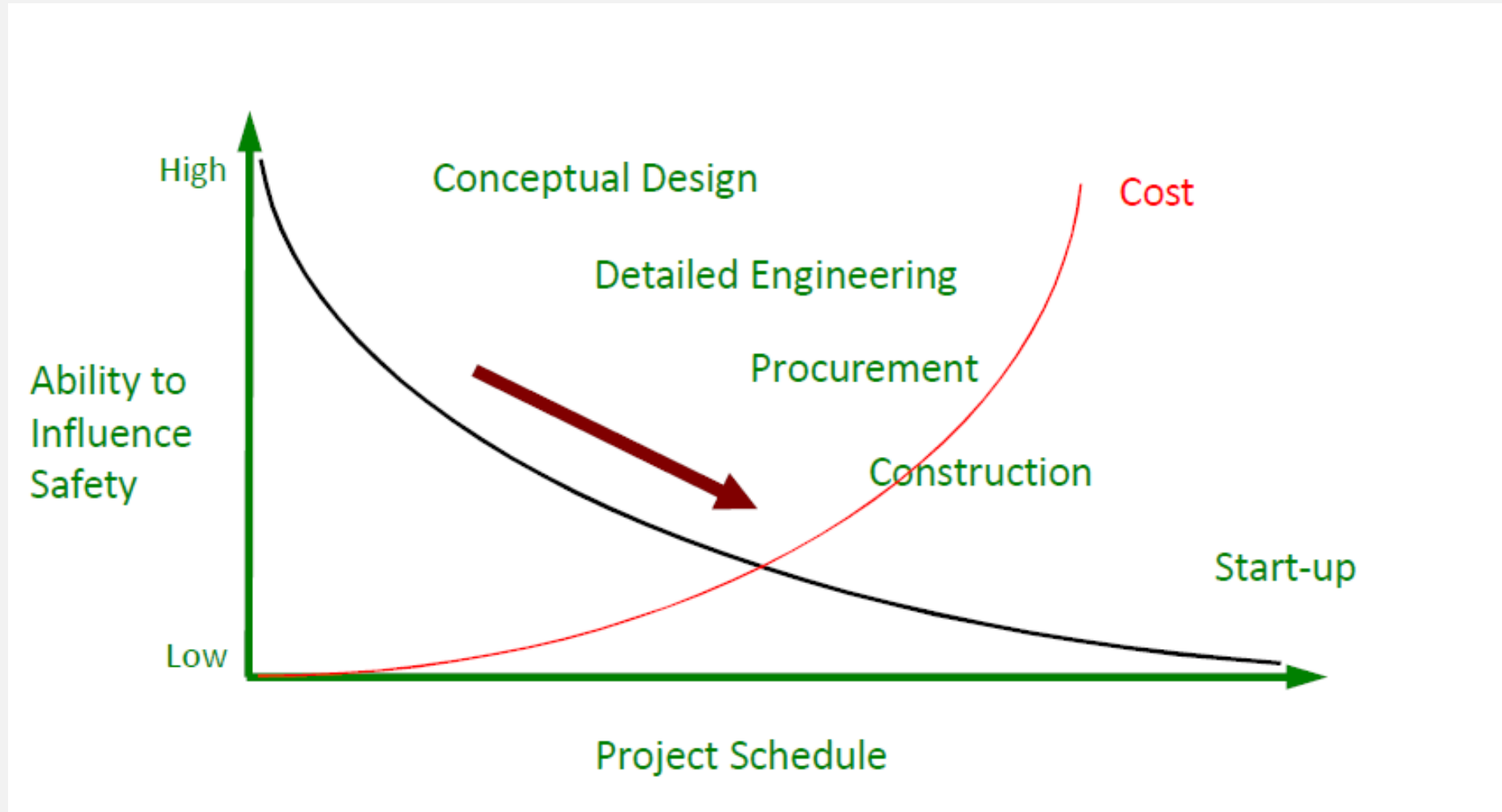


# BENEFITS OF SAFETY IN DESIGN

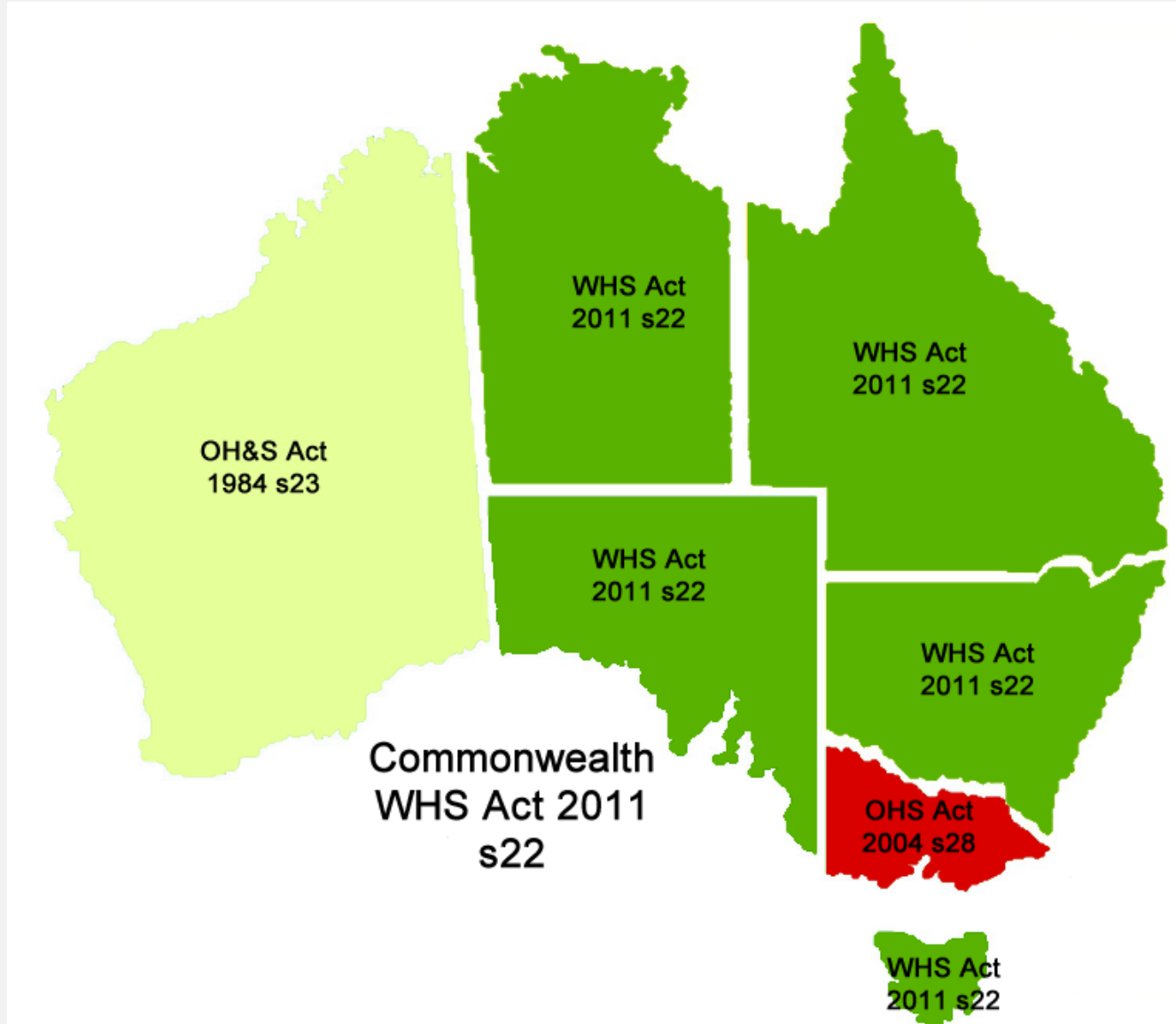


Lifecycle Phase	WHS Benefit	Project Benefit
Design	<ul style="list-style-type: none"> <li>Risks Identified</li> <li>Risks reduced/controlled</li> </ul>	<ul style="list-style-type: none"> <li>Reduced re-design or retrofitting</li> <li>Reduced lifecycle OHS costs</li> </ul>
Construction	<ul style="list-style-type: none"> <li>Communication of residual risks to contractor</li> <li>Reduced likelihood of accidents</li> </ul>	<ul style="list-style-type: none"> <li>Informed contractor reduces risk contingency</li> <li>Increased time and cost certainty</li> </ul>
Operation	<ul style="list-style-type: none"> <li>Occupant Health &amp; Safety</li> <li>Public Health &amp; Safety</li> </ul>	<ul style="list-style-type: none"> <li>Reduced costs (absence &amp; claims)</li> <li>Company image - Reduced civil claims</li> </ul>
Maintenance & Repair	<ul style="list-style-type: none"> <li>Safe access for maintenance and repair strategies</li> <li>Reduced likelihood of accidents</li> </ul>	<ul style="list-style-type: none"> <li>Informed contractor reduces risk contingency</li> <li>Reduction in maintenance costs</li> <li>Reduction in repair costs</li> </ul>
Demolition / Refurbishment	<ul style="list-style-type: none"> <li>Communication of residual risks to the contractor</li> <li>Reduced likelihood of unplanned events</li> </ul>	<ul style="list-style-type: none"> <li>Informed contractor reduces risk contingency</li> <li>Increased time and costs certainty</li> </ul>

# OPPORTUNITY TO INFLUENCE SAFETY OUTCOMES



# LEGISLATIVE FRAMEWORK



Section 22 (WHS Act) – Duty of Designers to ensure that designed plant substance or structure is without risk to Health & Safety of Persons:

- Who **use** the plant or structure
- Who **construct** the plant or structure
- Who **decommission** the plant or structure
- Who **maintain** the plant or structure

**INVOLVES THE LIFECYCLE OF THE PLANT OR STRUCTURE**  
**INCLUDES PERMANENT AND TEMPORARY STRUCTURES**



- Part 5.1 & 5.2 - Division 2 – Duties for safe plant design
- Part 6.2 Duties for designers or structure
  - Consult with designer
  - Designer to provide a **safety report**
  - Pass on of information to the Principal Contractor
- Other parts of WHS Reg (e.g. confined spaces, slips, trips & fall, etc)

# RAMIFICATIONS OF POOR/UNSAFE DESIGN

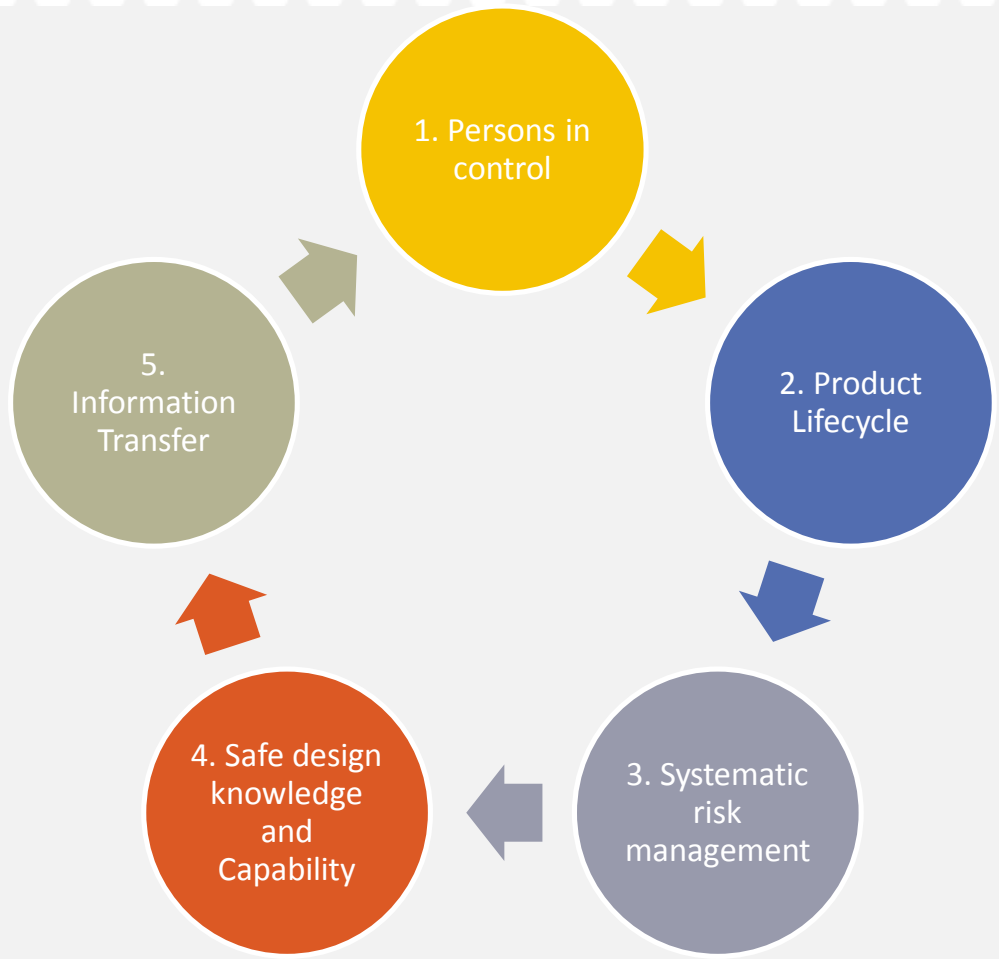


Lifecycle Cost Impacts

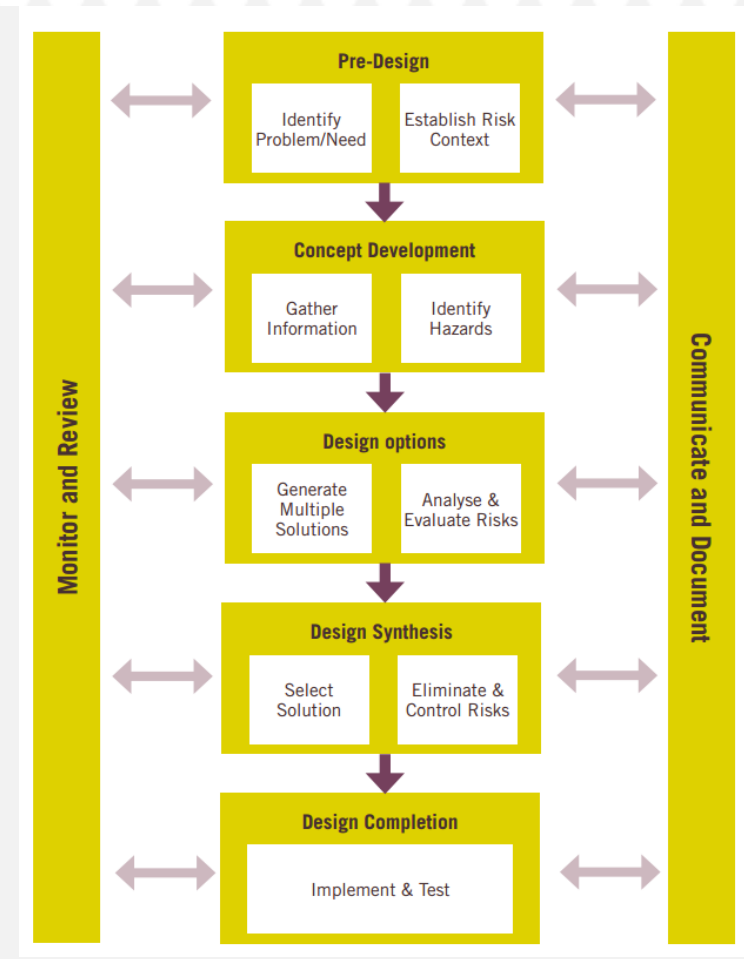
Health & Safety Impacts

Regulatory & Legal Impacts

# HOW CAN I COMPLY?



Principles of Safe Design



Model for Safe Design

# SYSTEMATIC RISK ASSESSMENT



Hazard identification should not be limited to one or two people’s experiences of situations and can include the following:

- Research to help in the identification of hazards and assessment of risks and controls,
- Consultation with all parties involved in the project including where possible contractors familiar with the construction works and fabricators/suppliers of the equipment being proposed.
- Guidance material including codes of practice, technical standards or industry protocols
- Hazard identification and risk assessment tools. (HazOP, ETA, FTA, FMEA, PHA, HRA, CHAIR)

	Demolition of Existing (if applicable)	Civil or Ground works	Construction	Use for Purpose	Repairs & Maintenance	Demolition (End of Life)
<b>Hazard Category Assessed</b>						
Access		✓	✓	✓	✓	✓
Adjoining areas		✓	✓	✓	✓	✓
Amenities & facilities		✓	✓	✓	✓	
Asbestos		✓	✓	✓	✓	✓
Biological				✓	✓	
Climatic conditions		✓	✓	✓	✓	✓
Confined spaces		✓		✓	✓	✓
Crane operation		✓	✓		✓	✓
Earthworks		✓	✓			
Electrical		✓	✓	✓	✓	✓
Ergonomics & space for occupants				✓		
Excavation & trenches		✓	✓		✓	
Falling objects		✓	✓	✓	✓	✓
Fire & emergency situations		✓	✓	✓	✓	✓
Formwork		✓	✓			✓
Hazardous substances		✓	✓	✓	✓	✓
Heat sources e.g. cookers, ovens, hot water systems				✓		
Lighting & ventilation		✓	✓	✓	✓	✓
Manual handling		✓	✓	✓	✓	✓
Mobile plant		✓	✓		✓	✓
Noise		✓	✓	✓	✓	✓
Plant & equipment		✓	✓		✓	✓
Psychological				✓		
Radiation		✓	✓	✓	✓	✓
Site security		✓	✓	✓	✓	✓
Slipperiness of surfaces		✓	✓	✓	✓	✓
Steel construction		✓	✓		✓	✓
Stepping on or striking against objects		✓	✓	✓	✓	✓
Structural			✓		✓	✓
Temporary instability		✓	✓		✓	✓
Tilt up construction		✓	✓			✓
Traffic management & loading areas		✓	✓	✓	✓	✓
Underground services		✓	✓		✓	✓
Work at heights		✓	✓	✓	✓	✓
Work on or near water		✓	✓	✓	✓	✓
Other workplace issues		✓	✓	✓	✓	✓

# PRACTICAL SAFE DESIGN EXAMPLES

## 3.1 Positioning of Air-conditioners for Maintenance

Split system and other air-conditioning systems require maintenance access. Air-conditioning systems are sometimes located on roofs or attached to upper story walls creating fall risks for maintenance workers.

Air-conditioning systems should ideally be placed at ground level. If this is not practicable then fall protection can be provided through guard railing.



Air-conditioning system high on a wall in a commercial setting.

Photo: J.Culvenor



Air-conditioning systems located at ground level with good access.

Photo: J.Culvenor

## OTHER GUIDANCE AVAILABLE



- Safe Work Australia
  - Guidance on the principles of Safe Design
  - Safe Design of Structures 2012 CoP
- Worksafe Qld
  - Safe Design of Structures 2013 CoP
- Construction Hazard Assessment Implication Review (CHAIR)

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