SAFETY IN DESIGN

Brad Matthews – Senior Consultant
GCG Health Safety Hygiene
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

- Design
- Construction
- Operation
- Maintenance
- Disposal
# Benefits of Safety in Design

<table>
<thead>
<tr>
<th>Lifecycle Phase</th>
<th>WHS Benefit</th>
<th>Project Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design</td>
<td>• Risks Identified</td>
<td>• Reduced re-design or retrofitting</td>
</tr>
<tr>
<td></td>
<td>• Risks reduced/controlled</td>
<td>• Reduced lifecycle OHS costs</td>
</tr>
<tr>
<td>Construction</td>
<td>• Communication of residual risks to contractor</td>
<td>• Informed contractor reduces risk contingency</td>
</tr>
<tr>
<td></td>
<td>• Reduced likelihood of accidents</td>
<td>• Increased time and cost certainty</td>
</tr>
<tr>
<td>Operation</td>
<td>• Occupant Health &amp; Safety</td>
<td>• Reduced costs (absence &amp; claims)</td>
</tr>
<tr>
<td></td>
<td>• Public Health &amp; Safety</td>
<td>• Company image - Reduced civil claims</td>
</tr>
<tr>
<td>Maintenance &amp; Repair</td>
<td>• Safe access for maintenance and repair strategies</td>
<td>• Informed contractor reduces risk contingency</td>
</tr>
<tr>
<td></td>
<td>• Reduced likelihood of accidents</td>
<td>• Reduction in maintenance costs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Reduction in repair costs</td>
</tr>
<tr>
<td>Demolition / Refurbishment</td>
<td>• Communication of residual risks to the contractor</td>
<td>• Informed contractor reduces risk contingency</td>
</tr>
<tr>
<td></td>
<td>• Reduced likelihood of unplanned events</td>
<td>• Increased time and costs certainty</td>
</tr>
</tbody>
</table>
OPPORTUNITY TO INFLUENCE SAFETY OUTCOMES
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

IN Volves 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
Principles of Safe Design

1. Persons in control
2. Product Lifecycle
3. Systematic risk management
4. Safe design knowledge and Capability
5. Information Transfer

Model for Safe Design

- Pre-Design
  - Identify Problem/Need
  - Establish Risk Context

- Concept Development
  - Gather Information
  - Identify Hazards

- Design options
  - Generate Multiple Solutions
  - Analyze & Evaluate Risks

- Design Synthesis
  - Select Solution
  - Eliminate & Control Risks

- Design Completion
  - Implement & Test

- Monitor and Review
  - Communicate and Document
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)**
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.](image1.jpg)

*Photo: J.Culvenor*

![Air-conditioning systems located at ground level with good access.](image2.jpg)

*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)

Brad Matthews
Senior Consultant
GCG Health Safety Hygiene
0429 163310
brad@gcg.net.au

www.gcg.net.au