Session Overview

- What is safe design?
- Legislation overview - Australian perspective
- Australian experience – what changed?
- Challenges and Opportunities

Disclaimer: Safe Design Australia has provided this overview of WHS relating to designers duties for the benefit of its clients. It covers the main duties for designers of structures. There are additional duties that do apply to designers (e.g. as a PCBU, or if designing plant or importing structures etc.)

*Designers should consult the full legislation to make their own interpretations*
Polls conducted by Safe Design Australia in 2011 show that the main concern that designers had with the introduction of the Australian legislation are due to:

1. Concerned due to lack of knowledge on safe design 44.5%
2. Concerned about being prosecuted 31.5%
3. Concerned that legislation will negatively impact their designs 19%
4. Not concerned 5%
SAFE DESIGN

SAFE DESIGN AUSTRALIA
What Is Safe Design?

Safe design is the integration of hazard identification, risk assessment and control methods early in the design process to eliminate or minimise risks to health and safety throughout the construction and life of the structure being designed.

(Safework Aust- Safe Design of Structures Code of Practice)
Benefits of safe design

1. Prevention - eliminating at the source
2. Compliance with legislation
3. Safer workplaces
4. Reduced costs
5. Innovation
6. Improved useability and productivity
7. Reduction in injuries and death
Pyramid of safety legislation

- **ACT** - outlines duties as a designer
- **Regulations** - mandatory and requirements and detailed information about duties
- **Codes of Practice** - guidance - compliance mandated unless same or better is achieved
- **Standards** - Australian and technical standards, some referred to in Legislation (law)
- **Guidance material** - industry specific safety guidelines, e.g., commercial kitchens etc., mining industry etc.

Source: Adapted from Archer, Bortwick, Travers and Ruschen (2012), WHS – A management guide, 3rd Edition, Figure 2.1 Pyramid of WHS legislation.
Duties of designers of structures

Section 22  WHS Act (NZ- Section 39 H&S at Work Act)

Designer must ensure so far as is reasonably practicable that the structure is designed to be without risk to the health and safety of persons who

• use the structure for the purpose for which it is designed,
• who manufacture or construct any component of the structure or
• are involved in the maintenance or disposal of that structure.

Essentially the new NZ legislation replicates the Australian legislation.
What is reasonably practicable?

Designer must design the structure to be without risk to health and safety so far is as reasonably practicable.
Duties of designers

Consider safety of workers throughout lifecycle

- Decommissioning and demolition at end of life
- Use for the purpose for which it is designed
- Construction including site establishment and demolition of existing
- Maintenance, cleaning, repair

Sect 22 WHS Act (NZ-Sec 39 H&S at Work Act)
What information is to be provided?

**WHS Act Sec 22  NZ sect 39 (4)**
Provide information to anyone who is issued with a copy of the design indicating:
- Purpose
- Testing and analysis
- Any conditions necessary for safety for construction, maintenance, use and demolition

Provide information on request

**WHS Regulation** (No NZ equivalent)
- Construction safety report to PCBU
Duties of designers - summary

- Design to eliminate or minimise risk when structure could be used as, or at a workplace
- Construction, Maintenance, Use for the purpose for which it is designed (workplaces only) and Demolition
- Consider people in vicinity
- Carry out and provide results of testing and analysis
- **Hazardous manual tasks – eliminated or minimised (WHS regulation)**
- **Confined Spaces – eliminated or safe entry/exit (WHS regulation)**
- Consult with other duty holders
- **Safety Report provided to PCBU covering construction risks for any features unique to that particular design (WHS regulation 295)**
- Information provided to anyone issued with plans
Duties of Clients

CLIENT

Consider safety of workers

Construction of the structure

Use for the purpose for which it is designed

Foreseeable activities in relation to use e.g. maintenance

Demolition at end of life

People in Vicinity
Duties of clients (Sec 43 H&S at Work Act 2015)

Clients must ensure that the way in which the structure is constructed, installed or commissioned is without risk to health and safety of persons who:

- Construct the structure
- Maintain, clean, repair
- Use the structure for the purpose for which it is designed
- Demolish structure at end of life

(Section 26, WHS Act 2011)

- Must consider people in vicinity
- Must consult with other duty holders
- Consult with designer regarding health and safety (regulation 294)
- Specific duty to consult with workers or their WHS representative
- Provide designer’s safety report to the principal contractor (regulation 296)
Consultation

WHS Act Section 46 (NZ Sect 34)

Consultation, cooperation, and coordination involve:

- Architect
- Plant designers and manufacturers
- Principal contractor
- Workers and WHS representatives
- Other designers - engineers, interior, landscape etc.
- Client or PCBU (who commissions work)
WHS Regulation 294-296 (No NZ equivalent – yet?)

Duties of designers of structure and person who commissions construction work

REG. 294
• Person conducting a business or undertaking (PCBU) “client” - must consult with the designer

REG. 295
• Designer must provide safety report to the client detailing hazards that:
  • create a risk to the persons who are to carry out the construction work; and
  • are associated only with the particular design and not with other designs of the same type of structure.

REG. 296
• “Client” must give information to the principal contractor “builder”

Other Reg sections to do with manual handling, confined spaces, asbestos, lead, electrical and chemicals if relevant
Designers should follow a systematic risk assessment process

1. Hazard Identification
2. Risk Assessment
3. Risk Control
Systematic risk assessment process

1. **Pre Design**
   - Design context and consultation

2. **Concept Design**
   - Preliminary hazard analysis and consultation
     - Identify hazards that are affected by the design and are within the control of the designer

3. **Design Development**
   - Determine how hazards will be prevented or eliminated through:
     - Implementing recognised standard
     - Conducting a Risk Management Process
   - Implement recognised standard
   - Apply risk management process to hazards that can be controlled
   - Review designs to verify whether risk elimination or reduction has been achieved
   - Final design with hazards identified and recommended control measures
   
   ➤ Pass on residual risks to builder

*Source: Adapted from Code of Practice: Safe Design of Structures*
## Risk Matrix

### Example

Structure on steep site with prefabricated roof trusses

### Potential Hazard: Crane tipping

### Solutions

- Move structure up slope to area that is accessible by crane
- Change roof structure type
- Construct driveway first so that there is a stable area for crane operation
- Lighter trusses and lifting technique - builder advice

### Consult:

Crane operator, builder

### Code of practice

- Crane operation

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### Risk Matrix

<table>
<thead>
<tr>
<th>Likelihood</th>
<th>Consequences:</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Insignificant (no injuries)</td>
<td>Acute</td>
</tr>
<tr>
<td></td>
<td>Minor (first aid treatment only)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Moderate (medical treatment)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Major (extensive injuries loss of production)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Catastrophic (death; toxic release of chemicals)</td>
<td></td>
</tr>
<tr>
<td>Almost certain expected in most circumstances</td>
<td>3 H</td>
<td>4 A</td>
</tr>
<tr>
<td>Likely will occur in most circumstances</td>
<td>2 M</td>
<td>3 H</td>
</tr>
<tr>
<td>Possible might occur at some time</td>
<td>1 L</td>
<td>2 M</td>
</tr>
<tr>
<td>Unlikely could occur at some time</td>
<td>1 L</td>
<td>1 L</td>
</tr>
<tr>
<td>Rare may occur, only in exceptional circumstances</td>
<td>1 L</td>
<td>1 L</td>
</tr>
</tbody>
</table>

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More technical risk methodologies can include FTA, FMEA, SWIFT, Chair.

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Risk Matrix, Total Safety Services, Adapted from AS31000 Risk Management Principles and Guidelines  © Safe Design Australia 2014
## Hierarchy of risk control

<table>
<thead>
<tr>
<th>Control</th>
<th>Effectiveness</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elimination</td>
<td>100%</td>
<td>Design the hazard out e.g. relocating plant from roof level to ground level to eliminate hazard of working at heights for maintenance.</td>
</tr>
<tr>
<td>Substitution</td>
<td>75%</td>
<td>Hazard substituted with something of lesser risk e.g. specifying low emissions paints, finishes or cabinetry. Replacing a manual process with an automatic process.</td>
</tr>
<tr>
<td>Isolation</td>
<td>50%</td>
<td>Hazard controlled through isolation e.g. isolating hazardous plant or chemicals.</td>
</tr>
<tr>
<td>Engineering</td>
<td>50%</td>
<td>Hazard controlled through engineering e.g. Safety switches, mechanical ventilators, guards around machinery.</td>
</tr>
<tr>
<td>Administration/Training</td>
<td>25%</td>
<td>Use administrative controls to influence people e.g. traffic management plan, procedures, safe work methods, signage.</td>
</tr>
<tr>
<td>Personal Protective Equipment</td>
<td>5%</td>
<td>Use personal protective equipment e.g. hearing protection or hard hat.</td>
</tr>
</tbody>
</table>

The Australian Experience
Australian experience - what changed?

- Designer obligations now more clearly defined to eliminate hazards/risks, but understanding of process inconsistent.
- Clear intent is to drive obligations higher up the chain of control - Government tender requirement/DA approval.
- Need integrated & defined process – it doesn’t need to be onerous, but must be consistent & robust.
- Focus on elimination – Use hierarchy of control in solutions.
- Increased collaboration/consultation is key – engage the right people.
- Managing knowledge/reference materials.
### Lessons for NZ - Challenges & Opportunities

<table>
<thead>
<tr>
<th>Challenges</th>
<th>Opportunities</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Authorities inconsistency of approach/lack of guidance</td>
<td>• Opportunity to drive innovation and change current obsession with low level controls – training/PPE</td>
</tr>
<tr>
<td>• Limited case law</td>
<td>• Drives collaboration - Do it right first time!</td>
</tr>
<tr>
<td>• Industry/Discipline differences (language, focus)</td>
<td>• Safety is fully integrated in design process</td>
</tr>
<tr>
<td>• Project models, cost &amp; time pressures impact consultation</td>
<td>• Align on process and outputs</td>
</tr>
<tr>
<td>• Justifying decision making process – e.g. why not eliminate a hazard</td>
<td>• Addresses full life cycle design</td>
</tr>
<tr>
<td>• Accessing constructor/expert stakeholders for input</td>
<td>• Focuses on whole picture and can provide significant cost benefits.</td>
</tr>
<tr>
<td>• Dealing with client expectations</td>
<td></td>
</tr>
</tbody>
</table>
Case studies/examples