



RiskNZ gratefully acknowledges the support of our premier sponsor



We also thank our hosts for this event:
Beca, Navigatus Consulting, Wel Networks,
Trustpower, Powerco, 3R Group, KPMG and
Christchurch City Council



Safety in Design

A Risk Management Perspective
10 March 2015



Nathanael Sterling
Certifications: BE(Civil), ME(Mgmt), CPEng, PMP
Institutes: IPENZ, PMI, RiskNZ, IRM



Beca. Creative people striving
together to transform our world



The New Zealand Herald

Aisling inquest: council under fire

By [Edward Gay](#)

5:30 AM Friday Jun 17, 2011

The stormwater pipe where Aisling Symes died was decades old and never designed to service infill housing.

An inquest into her death heard yesterday how the 2-year-old fell down a manhole on October 5, 2009.

Evidence showed it was likely that water pressure popped the manhole cover off while Aisling's mother, Angela Symes, was cleaning out the home of her late parents.



Aisling Symes. Photo / Supplied



Agenda

What is Safety in Design (SiD)?

Health and Safety Reform Bill

The Risk Management Methodology

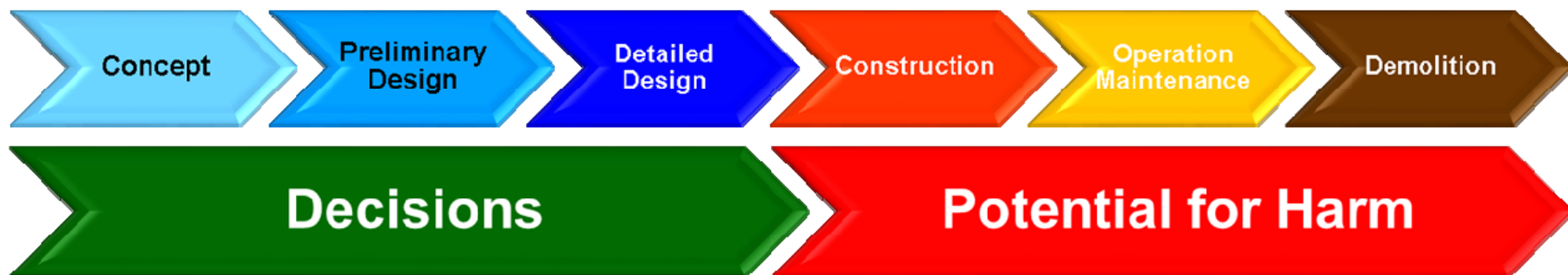
Experience / Application of Safety in Design



Safety in Design

A Safe Design is:

- Safe to use
- Safe to construct
- Safe to inspect, clean, maintain, repair
- Safe for people at or in vicinity
- Safe to deconstruct, dispose



Designer's Role in Safety in Design

Designer to:

- Design without risk to health and safety of persons (so far as is reasonably practicable)
- Carry out or arrange:
 - calculations,
 - analysis,
 - testing, or
 - examination
- Give Information / Communicate



Health Safety Reform - What's changing?



Key SiD related changes

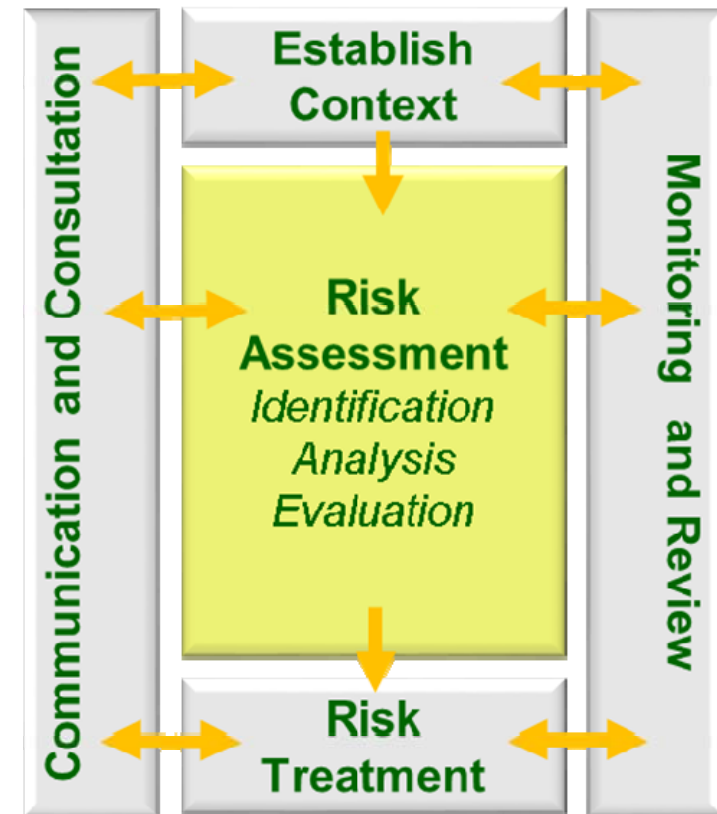
- PCBU
(Person Conducting a Business or Undertaking)
- Duties of upstream PCBU's
 - Designers
 - Manufacturers
 - Importers
 - Suppliers
 - Installation, Construction, Commissioning
- Duty to Manage Risk



Risk Management Methodology

Risk Management Principles

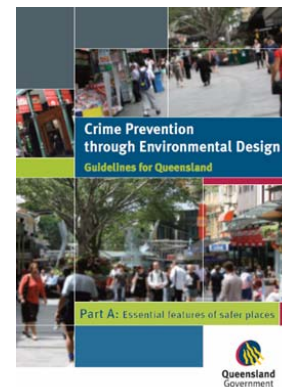
1. Creates Value
2. Integrated
3. Part of Decision Making
4. Explicitly Addresses Uncertainty
5. Systematic, Structured and Timely
6. Based on Best Available Information
7. Tailored
8. Takes Human & Cultural Factors into Account
9. Transparent and Inclusive
10. Dynamic & Iterative
11. Facilitates Continual Improvement



AS / NZS ISO31000:2009 Risk Management Principles and Guidelines

Risks Identification / Assessment Techniques

- Checklists
- Brainstorming
- Interviews (Structured / Semi-Structured)
- Cause and Effect Analysis
- SWIFT
- CPTED
- HACCP
- HAZOP
- CHAZOP
- Road Safety Audit
- Human Factors



Example – Capturing SiD Information

SAFETY RISK IDENTIFICATION INPUT SHEET

Example Identification Sheet

Name: Joe Bloggs

PROJECT PHASE:	Construction <input type="checkbox"/>	Operation <input checked="" type="checkbox"/>	Maintenance <input type="checkbox"/>	Demolition / Modification <input type="checkbox"/>																				
RISK DESCRIPTION: <i>Describe what could occur</i>	Expressway cycleway / walkway crossing local roads creating conflict between vehicles (trucks, cars...) at speed and vulnerable users (pedestrians and cyclists)																							
CAUSE: <i>Identify the source of the hazard relating to the event or situation</i>	Cycleway / walkway parallel to expressway with crossing points on local roads																							
CONSEQUENCE: <i>Identify the potential harm or consequence</i>	Potential fatality or serious injuries																							
SUGGESTED RATING:	Consequence: <table border="1"> <tr> <td>First Aid</td> <td>Minor Injury</td> <td>Medical Treatment</td> <td>Hospitalisation</td> <td>Permanent Injury</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> </table>		First Aid	Minor Injury	Medical Treatment	Hospitalisation	Permanent Injury	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Probability: <table border="1"> <tr> <td>Rare</td> <td>Unlikely</td> <td>Possible</td> <td>Likely</td> <td>Almost Certain</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>		Rare	Unlikely	Possible	Likely	Almost Certain	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
First Aid	Minor Injury	Medical Treatment	Hospitalisation	Permanent Injury																				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>																				
Rare	Unlikely	Possible	Likely	Almost Certain																				
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																				
POSSIBLE TREATMENT:	Eliminate: Investigate possibility of grade separating the cycleway / walkway Isolation: Install Barriers / guardrails to prevent unsafe crossing points Engineering Controls: Threshold Treatments, traffic signal control Administrative: Signage...																							
	RISK OWNER: Anne Smith																							

Risk Evaluation

		Consequence Rating				
		Very High	High	Medium	Low	Very Low
Likelihood	Very High	INHERENT RISK		CURRENT RISK		
	High					
	Medium					TARGET RISK
	Low					
	Very Low					



Safety in Design Risk Assessment Register Project XYZ

SID Facilitator: Nathanael Sterling

Job No:

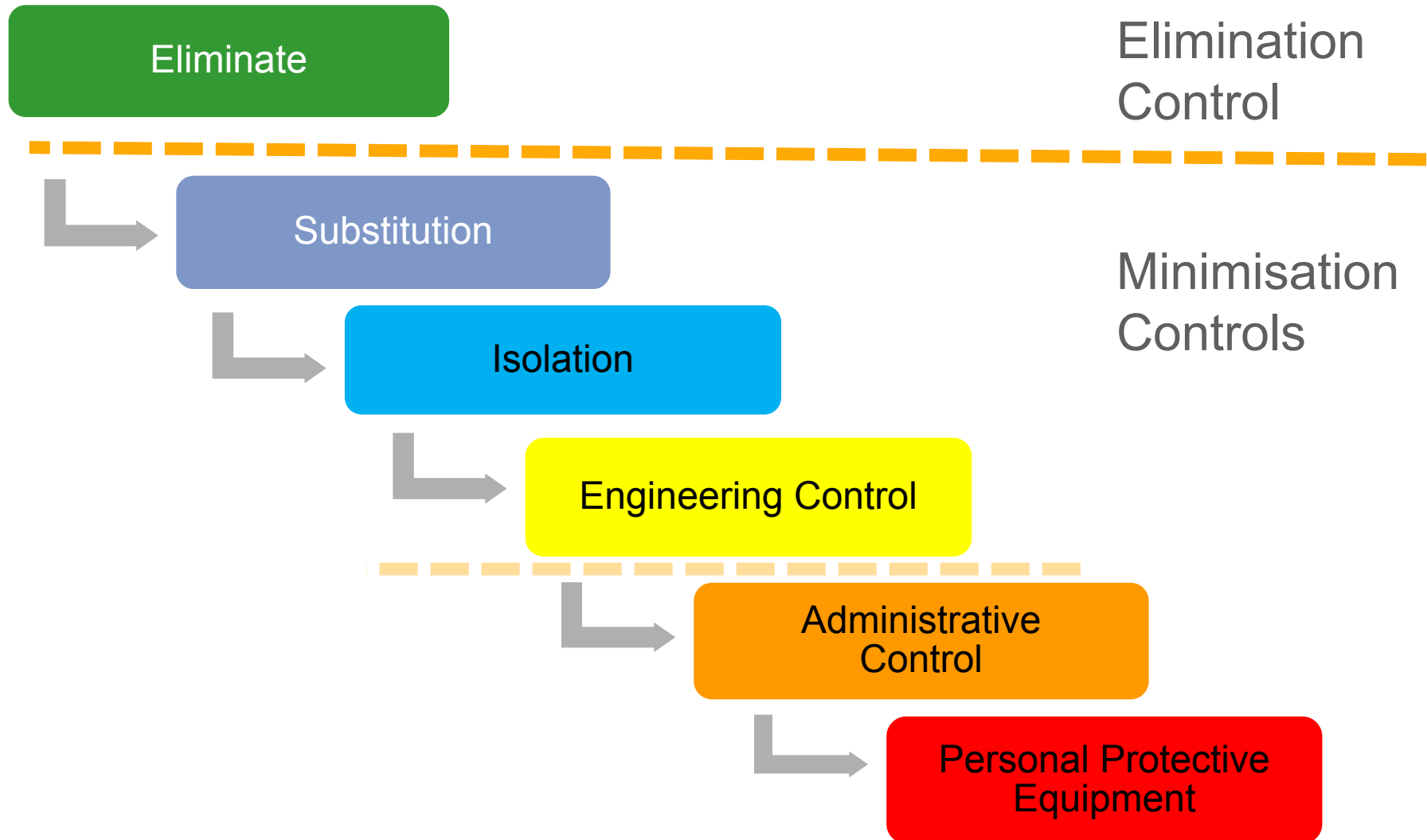
Approved By:

Date:

Stage of Design / Project:

IDENTIFIED SAFETY RISK					PROPOSED TREATMENT MEASURES					RESIDUAL RISK		
Ref	Risk Description, Cause & Outcome	Existing controls	Likeli-hood	Conse-quence	Severity Rating	Proposed Control <small>(Eliminate, Substitution, Isolation, Engineering Control, Personal Protective Equipment)</small>	Likeli-hood	Conse-quence	Severity Rating	Risk Owner	Residual Risk	Action Required
1 Construction												
1.01	Risk: Cause: Consequence:		Likely	Permanent Injury	Extreme		Rare	First Aid	Low			
2 Operation												
2.01	Risk: Cause: Consequence:		Possible	Hospitalisation	High		Unlikely	Medical Treatment	Moderate			
	Risk: Cause:											

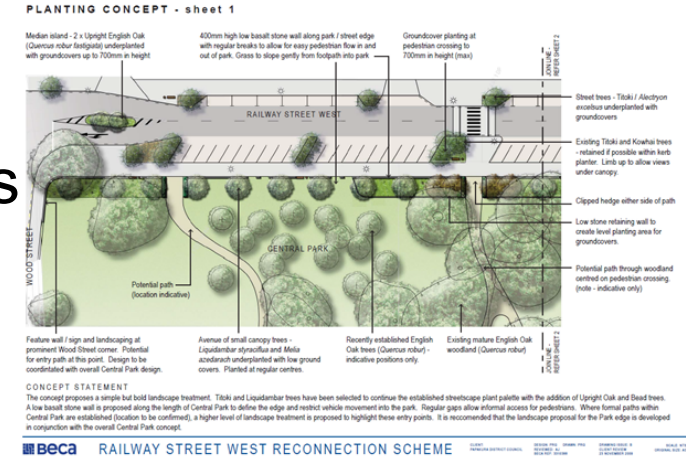
Treatment of Health and Safety Risks



Example – Planting Selection

Risk:

- Selected plant species in concept (Melia Azedarach) was identified as producing berries that may be poisonous if eaten



Treatment:

- Change plant species

EXAMPLE WHERE RISK NOT TREATED

Road of poisonous trees angers residents - National News | TVNZ

Page 1 of 1

Road of poisonous trees angers residents

Published: 6:23AM Friday September 21, 2012 Source: Fairfax


Melia azedarach - Source: Wikimedia Commons

Angry North Shore residents have objected to the planting of trees that produce a potentially fatal fruit along a busy road. Auckland Transport contractors have planted 64 white cedar trees along Glamorgan Drive in Torbay as replacements for "inappropriate trees" removed under resource consent. The deciduous trees are also known as melia azedarach and grow up to 12 metres tall.

They are prolific seed producers and are considered a weed in some countries. The trees produce a small yellow fruit poisonous to humans and some mammals. Reports suggest eating six to eight fruits can be fatal.



Communication & Consultation



Safety in Design Risk Assessment Register

Project XYZ

SD Facilitator: Nathaniel Sterling

Approved By: _____

Stage of Design / Project: _____

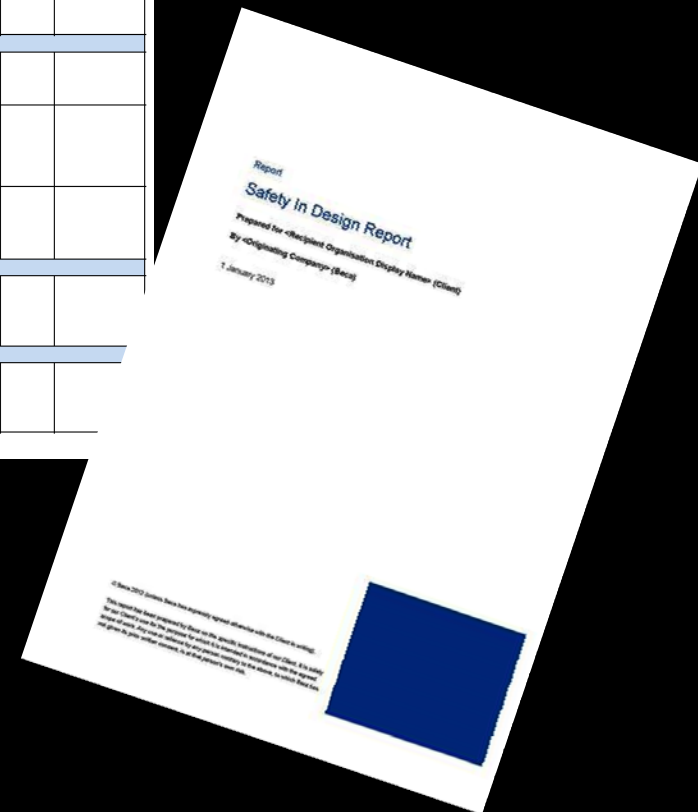
Job No: _____

Date: _____

IDENTIFIED SAFETY RISK					PROPOSED TREATMENT MEASURES					RESIDUAL RISK		
Ref	Risk Description, Cause & Outcome	Existing controls	Likelihood	Consequence	Severity Rating	Proposed Control <small>(Describe, Evaluate, Monitor, Improve, Control, Maintain, Review, Assess)</small>	Likelihood	Consequence	Severity Rating	Risk Owner	Residual Risk	Action Required
1 Construction												
1.01	Risk: Cause: Consequence:		Likely	Permanent Injury	Extreme		Rare	First Aid	Low			
2 Operation												
2.01	Risk: Cause: Consequence:		Possible	Hospitalisation	High		Unlikely	Medical Treatment	Moderate			
2.02	Risk: Cause: Consequence:		Rare	Permanent Injury	High		Possible	Minor Injury	Moderate			
2.03	Risk: Cause: Consequence:		Unlikely	Minor Injury	Moderate		Risk Eliminated					
3 Inspection, Cleaning, Maintenance, Repair												
3.01	Risk: Cause: Consequence:		Unlikely	Hospitalisation	High		Unlikely	Hospitalisation	High			
4 Demolition or Disposal												
4.01	Risk: Cause: Consequence:		Rare	Hospitalisation	Moderate		Rare	First Aid	Low			

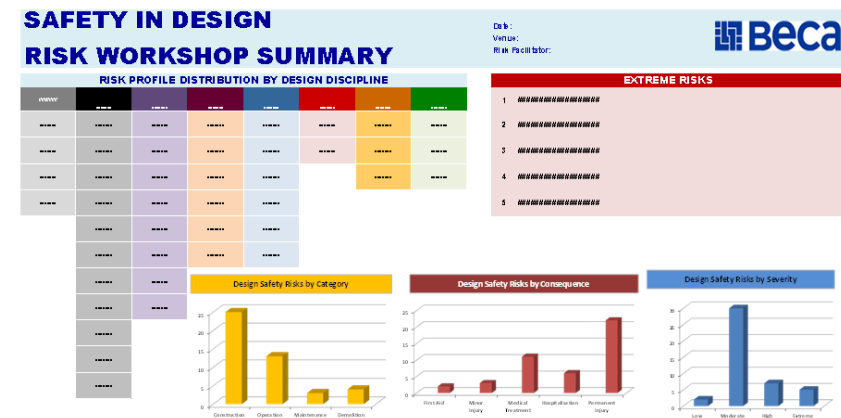
Workshop Attendance:

Worksheet Attendance



Monitoring and Review

- Design Coordination Meetings
- Safety in Design Reviews
- Meetings with Client
- Progress / Status Reports



Safety in Design Risk Assessment Register

Project XYZ

SID Facilitator: Nathaniel Sterling

Approved By: _____

Stage of Design / Project: _____

Job No: _____

Date: _____

IDENTIFIED SAFETY RISK					PROPOSED TREATMENT MEASURES					RESIDUAL RISK	
Ref	Risk Description, Cause & Outcome	Existing controls	Likelihood	Consequence	Severity Rating	Proposed Control Measures	Likelihood	Consequence	Severity Rating	Risk Owner	Action Required
1 Construction											
1.01	<div>Risk:</div> <div>Cause:</div> <div>Consequence:</div>		Likely	Permanent injury	Extreme		Rare	Fatal	Low		
2 Operation											
2.01	<div>Risk:</div> <div>Cause:</div> <div>Consequence:</div>		Possible	Hospitalisation	High		Unlikely	Medical Treatment	Moderate		
2.02	<div>Risk:</div> <div>Cause:</div> <div>Consequence:</div>		Rare	Permanent injury	High		Possible	Minor injury	Moderate		
2.03	<div>Risk:</div> <div>Cause:</div> <div>Consequence:</div>		Unlikely	Minor injury	Moderate		Risk Eliminated				

Beca SiD Journey

- Opportunity to learn from staff joining from UK (CDM Regulations) & Australia
Gain from best international practice
- Opportunity to have consistency across geographical hubs (NZ, Australia, Asia)
- Opportunity to have systems established ahead of legislation
- Opportunities for innovative and improved whole of life solutions



Safeguard Award, 2014

SiD Experience

- Initially some Clients reluctant
- Now being embraced by both public and private sector
- Organisations developing Safety in Design procedures or modifying Risk Management Frameworks to incorporate
- Interactive workshops adding value which extends beyond safety
- Strong inter-relationship with risk management



Questions



Safety
is a way of life

