

## HSW Risk Assessment – Structures Test Laboratory

For additional information refer to HS\*\*\*[Risk Management Procedure](#)

**Document Number: RA10**

**Faculty/ Service Division: Faculty of Engineering**

**School/Department: Department of Civil and Environmental Engineering**

**HSW Risk: Uncontrolled Risk is Extreme, Controlled is Moderate**

**Assessment date: 08 Jun 15**

**Form completed by: R.A. Powell, HSW Manager**

**Signature:**

**Date:**

**Responsible Line Manager: Dr R. Henry**

**Signature:**

**Date:**

**Description of activity and/or location:**

*Specimen construction and testing.*

**Potential Hazards** – Structure collapse, work at height, manual handling.

**Potential Harm** – Death, Strain/Sprain injuries, Shoulder injuries, Lower/Upper back injuries, Crushing

Injury, Bruising, Fractures, Dislocation

<b>CEE RISK ASSESSMENT 10</b>		
<b>Establishment:</b> Structures Test Laboratory	<b>Assessment by:</b> R.A. Powell	<b>Date:</b> 08 Jun 15
<b>Review Date:</b> 08 Jun 16	<b>Approved by:</b>	<b>Date:</b>

**WORK ACTIVITY**  
Specimen construction and testing.

**Reference/s**  
Guidelines For The Provision Of Facilities And General Safety In The Construction Industry — October 1995

**Risk Rating: (C) Consequence x (L) Likelihood = (R) Rating**

Hazard / Risk	Who is at Risk?	Normal Control Measures <i>(Brief description and/or reference to source of information).</i>	Risk Rating			Additional Control Measures Required <i>(To take account of local/individual circumstances).</i>
			C	L	R	
<b>Untrained/unsafe personnel</b>	<ul style="list-style-type: none"> <li>Staff</li> <li>Students</li> </ul>	<ul style="list-style-type: none"> <li>Construction equipment must not be used by personnel who have not passed the appropriate operator or supervisor level training.</li> <li>Operators must be in a fit state to operate the equipment and not impaired by drugs, alcohol or fatigue.</li> <li>Operators are to comply with Safe Work Instructions relevant to the equipment.</li> </ul>	4	1	4	

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<b>Inadequate Planning</b>	<ul style="list-style-type: none"> <li>Staff</li> <li>Students</li> <li>Visitors</li> </ul>	<ul style="list-style-type: none"> <li>Construction and deconstruction plans to be developed prior to specimen construction.</li> <li>Notifiable work is to be avoided where possible.</li> <li>If the construction requires notifiable work to be carried out, WorksafeNZ is to be notified via email.</li> </ul>	2	2	4	<p>Construction plan is to include:</p> <ul style="list-style-type: none"> <li>Design of the test setup.</li> <li>Erection/construction sequence.</li> <li>Prediction of test specimen response and consideration of all possible modes of failure.</li> <li>Support and catch frames when required</li> </ul> <p>Activities that may comprise notifiable work include:</p> <ul style="list-style-type: none"> <li>Work in which a risk arises that any person may fall five metres or more</li> <li>The erection or dismantling of scaffolding from which a person may fall five metres or more;</li> <li>Work using a lifting appliance where the appliance has to lift a mass of 500 kg or more a vertical distance of five metres or more, other than work using an excavator, forklift, or self-propelled mobile crane.</li> </ul>
<b>Unsafe equipment</b>	<ul style="list-style-type: none"> <li>Staff</li> <li>Students</li> </ul>	<ul style="list-style-type: none"> <li>All equipment is to be inspected by the operator before the first use each day it is operated.</li> <li>Non-conformities to be reported to supervisor and rectified before being used.</li> </ul>	4	1	4	
<b>Construction</b> General Hazards – Noise, Dust.	<ul style="list-style-type: none"> <li>Staff</li> <li>Students</li> <li>Visitors</li> </ul>	<ul style="list-style-type: none"> <li>Work methods that produce less noise and dust to be used where possible.</li> <li>PPE appropriate to the task to be worn by all personnel.</li> </ul>	2	2	4	<ul style="list-style-type: none"> <li>Given that most construction methods cause noise and dusts to be produced, minimisation may be the primary method of control. Non-essential personnel should observe from afar, preferably from the control room or mezzanine.</li> </ul>

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<b>Construction Cement</b>	<ul style="list-style-type: none"> <li>• Staff</li> <li>• Students</li> <li>• Visitors</li> </ul>	<ul style="list-style-type: none"> <li>• Skin Disease:                             <ul style="list-style-type: none"> <li>○ Avoid skin contact</li> <li>○ Use Barrier creams</li> <li>○ Wear appropriate clothing and PPE</li> <li>○ Shower after work if cement dust is on the skin</li> <li>○ Ensure eye wash facilities are available.</li> </ul> </li> <li>• Respiratory problems:                             <ul style="list-style-type: none"> <li>○ Ensure dust masks are used if cement dust could be inhaled.</li> </ul> </li> <li>• Physical injury/engulfment:                             <ul style="list-style-type: none"> <li>○ Ensure boxing and pouring methods do not endanger personnel.</li> </ul> </li> </ul>	2	2	4	<ul style="list-style-type: none"> <li>• Under certain conditions freshly mixed concrete or mortar can cause ulceration of the skin (cement burn), but this is rare.</li> <li>• Any special health precautions which are recommended by the manufacturer of the cement or related materials should be followed.</li> <li>• Employees' skin and eyes both need to be protected from contact with cement.</li> <li>• Contact should be avoided as much as possible. The use of a barrier cream may give some protection if contact is kept to a minimum.</li> <li>• Protective clothing should be worn where appropriate. This should include long sleeves, full length trousers, gloves, and suitable footwear.</li> <li>• There should be facilities for washing the body and changing clothes, in accordance with part 1 of these guidelines.</li> <li>• If cement dust or mixture gets into the eyes, they should be washed out immediately with cold water. If the irritation persists, medical attention should be sought.</li> <li>• Respiratory protective equipment should be worn during treatment of hardened concrete where dust is created.</li> </ul>

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<b>Construction</b> Crane use and people being struck by falling objects	<ul style="list-style-type: none"> <li>• Staff</li> <li>• Students</li> <li>• Visitors</li> </ul>	<ul style="list-style-type: none"> <li>• A Safe Exclusion Zone must be established around any construction activity where cranes are being used or heavy objects are being lifted.</li> <li>• Cranes must be used in accordance with the Crane Risk Management Plan.</li> </ul>	4	1	4	
<b>Construction</b> Collision with mobile plant and equipment;	<ul style="list-style-type: none"> <li>• Staff</li> <li>• Students</li> <li>• Visitors</li> </ul>	<ul style="list-style-type: none"> <li>• A pre-work brief to establish roles and responsibilities is to be conducted before the operation of mobile plant takes place.</li> <li>• A Safe Exclusion Zone must be established around any construction activity involving mobile plant.</li> <li>• Spotters to be used when mobile plant is being repositioned.</li> </ul>	4	1	4	
<b>Construction</b> Working at Height	<ul style="list-style-type: none"> <li>• Staff</li> <li>• Students</li> </ul>	<ul style="list-style-type: none"> <li>• Working at height must be conducted in accordance with the WAH Risk Management Plan.</li> </ul>	4	1	4	

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<b>Construction</b> People harmed by cutting equipment.	<ul style="list-style-type: none"> <li>• Staff</li> <li>• Students</li> </ul>	<ul style="list-style-type: none"> <li>• Hot cutting methods must be conducted in accordance with the Welding risk management plan.</li> <li>• Mechanical cutters must be used in accordance with manufacturers' recommendations. These include, but are not limited to:                             <ul style="list-style-type: none"> <li>○ Operators trained and authorised.</li> <li>○ Appropriate PPE to be worn.</li> <li>○ Work shall not be cut in such a way that it will fall on the operator or others.</li> </ul> </li> </ul>	4	1	4	
<b>Construction</b> Manual Handling	<ul style="list-style-type: none"> <li>• Staff</li> <li>• Students</li> </ul>	<ul style="list-style-type: none"> <li>• Use mechanical lifting equipment where possible.</li> <li>• Obtain assistance when lifting or moving heavy objects.</li> <li>• Use dunnage when placing heavy objects on the ground to minimise crush injuries.</li> <li>• Avoid sustaining awkward postures when working.</li> </ul>	2	2	4	

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<b>Construction</b> Post tensioning	<ul style="list-style-type: none"> <li>• Staff</li> <li>• Students</li> </ul>	<ul style="list-style-type: none"> <li>• Leather working gloves to be worn</li> <li>• Fingers and hands to be kept clear of pinch points</li> <li>• Personnel must never stand behind the stressing jack or post tensioning anchorage</li> <li>• Personnel must never overstress the post tensioning tendon</li> <li>• Personnel must use the correct nuts / wedges</li> </ul>	4	1	4	Post-tensioning loads and bar sizes to be determined during test planning.
<b>Testing</b> Collapse of structures	<ul style="list-style-type: none"> <li>• Staff</li> <li>• Students</li> <li>• Visitors</li> </ul>	<ul style="list-style-type: none"> <li>• Prior to test activation:                             <ul style="list-style-type: none"> <li>○ All personnel to be briefed on expected duration, effects, and emergency management.</li> <li>○ Barriers to be erected around the test.</li> <li>○ All personnel are to be accounted for and relocated to a safe location.</li> <li>○ Entrances to be secured.</li> </ul> </li> <li>• Persons are not to approach unsound structures.</li> </ul>	4	1	4	<ul style="list-style-type: none"> <li>• Students may be required to approach unsound structures as part of the experiment. Prior to this occurring, a suitably experienced staff member must assess whether it is safe to do so.</li> <li>• A clear point of escape must be available, and the structure should only be touched if it is deemed safe to do so by an experienced staff member. Remote methods of observation (such as using a drone/crane mounted camera) should be considered in the first instance.</li> </ul>

## Action Plan

Management agreed additional control measures to be implemented	Resources Required	Action By			Action Complete	
		Responsible Person	Target Date	Completion Date	Responsible Line Manager Signature	Date

## Review

Review Details	Comments
Scheduled Review Date	
Are all control measures in place?	
Are controls eliminating or minimising the risk?	
Are there any new problems with the risk?	
<b>Review By: (name)</b>	
<b>Review Date:</b>	



## HSW Risk Assessment Matrix

Likelihood level	4	<b>Very likely</b> Probably expect the event to occur in most circumstances	Moderate (4)	High (8)	Extreme (12)	Extreme (16)
	3	<b>Likely</b> Event likely to occur at least once over the coming year	Moderate (3)	High (6)	High (9)	Extreme (12)
	2	<b>Possible</b> Event may occur at some time	Low (2)	Moderate (4)	High (6)	High (8)
	1	<b>Unlikely</b> Occurrence is conceivable, but not expected to occur	Low (1)	Low (2)	Moderate (3)	Moderate (4)
			<b>Minor</b>	<b>Moderate</b>	<b>Major</b>	<b>Severe</b>
			<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Consequence level						
Consequence description	<b>Harm to People</b> Potential for injury or death	None or trivial / negligible injury (no or slight injury which requires localised first aid)	Minor injury (illness or injury is not serious, medical treatment required)	Serious injury (serious injury or illness, hospitalisation required)	Fatality, major injury (death, permanent disablement, or significant long-term illness)	
	<b>People Affected</b> Extent of people potentially affected	None or few (e.g. 0 to 2)	Small numbers (e.g. 3 to 10)	Moderate numbers (e.g. 10 to 50)	Wide scale (e.g. more than 50)	
	<b>Reputation and Legal</b> Potential for publicity with a negative impact on reputation / potential for legal prosecution	None or issue raised by staff or students and resolved promptly by management  None or legal dispute – found not guilty – fines up to \$x	Internal scrutiny to prevent escalation and short-term stakeholder concern  Minor non-compliance, limited notification to regulators / affected stakeholders	Medium-term stakeholder concern, national media scrutiny and ‘brand’ impact  Medium non-compliance, moderate notification to regulators / affected stakeholder, potential for legal	Persistent stakeholder concerns, international media scrutiny and long term ‘brand’ impact  Significant non-compliance, extensive notification to regulators / affected stakeholders, potential for legal proceedings / imprisonment /	

			proceedings / fines	fines
<b>Operations</b> Extent of ability to maintain core business	None or business interruption < 4 hours	Business interruption between 4 hours to 5 days	Business interruption > 5 days	Business interruption of many weeks
	None or effectiveness and efficiency of a service, programme or project impacted in the short term	Operational disruption manageable by workarounds	Medium operational impact resulting in delay of key deliverables	Breakdown of key activities and significant long-term impact
<b>Environment</b> Extent of negative impacts on the environment	None or slight damage to property or equipment	Moderate damage to property or equipment	Major damage to property or equipment	Massive damage to property or equipment
	None or minimal impact	Minor short-term or intermittent impact, able to be contained with specialist assistance	Serious, medium-term detrimental impact	Very serious, long-term or permanent damage
	None or clean up expenses up to \$25,000	Clean up expenses up between \$25,000 to \$1m	Clean up expenses up between \$1m - \$5m	Clean up expenses > \$5m

### Consider the Likelihood

**Consider:** How often is the task done? Has an accident happened before (here or at another workplace)? How long are people exposed? How effective are the control measures? Does the environment affect it (e.g. light, temperature, space)? What are people’s behaviours (e.g. stress, panic, deadlines)? What people are exposed (e.g. disabled, young students, etc)?

### Consider the Consequences

**Consider:** What type of harm could occur (minor, serious, death)? Is there anything that will influence the severity (e.g. proximity to hazard, person involved in task, etc)? How many people are exposed to the hazard? Could one failure lead to other failures? Could a small event escalate?

### Calculate the Risk

The final score for each risk is calculated by multiplying the likelihood and consequences response scores. This will give a risk score of between 1 and 16.

All risks rates as “High” or “Extreme” require detailed analysis of mitigating practices / controls to determine the residual risk rating.

“Low” and “Moderate” risks may be excluded from further analysis (other than when the consequence may be severe), however the rationale for excluding these risks should be documented to demonstrate the completeness of analysis undertaken.

Other than in the most unlikely circumstance, risks that can cause major or severe harm to people have been determined as “high” or “extreme”.

Management review is considered appropriate for risks of these nature due to the potential magnitude of the impact, even though the likelihood may be assessed as relatively low.

### Risk Priority - Legend

<b>Extreme</b> (12-16)	Intolerable risk. Immediate action(s) is to be taken by Faculty/Service HSW risk owners - including DVCs, Deans of Faculties, Directors of Services, Academic Heads/PIs, Services Managers. Work should not be started or continued until the risk has been reduced to as low as reasonably practicable using the hierarchy of risk controls. The Associate Director Health, Safety and Wellbeing, and Manager Risk and Performance must be advised of the risk for their review. The risk should be included in the UoA wide risk register.
<b>High</b> (6-9)	Should not be tolerated. Urgent action is to be taken by the immediate manager. Work should not be started or continued until the risk has been reduced to as low as reasonably practicable using the hierarchy of risk controls. The HSW Manager working with the Faculty/Service, and Manager Risk and Performance must be advised of the risk for their review. To be included in the UoA wide risk register.
<b>Moderate</b> (3-4)	Management to monitor risks in case changing circumstances increase the level of risk. Some action may be required, e.g. improving controls.
<b>Low</b> (1-2)	Requires no attention above routine practices and procedures, apart from monitoring.

**Note:** This proposed Health and Safety Risk Assessment Matrix aligns with WorkSafe NZ guidance, UoA Resilience Management Plan, UoA Risk Determination Matrix, UoA TVRA and UoA Incident Levels