

HSW Risk Assessment – Structures Test Laboratory

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

Document Number: RA8

Faculty/ Service Division: Faculty of Engineering

School/Department: Department of Civil and Environmental Engineering

HSW Risk: Uncontrolled Risk is High, 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:

Welding and Hot Work

Potential Hazards - Hot work, gases

Potential Harm – Explosion, Fire, Death, Burns.

CEE RISK ASSESSMENT 8		
Establishment: Structures Test Laboratory	Assessment by: R.A. Powell	Date: 08 Jun 15
Review Date: 08 Jun 16	Approved by:	Date:

<p>WORK ACTIVITY Welding and Hot Work</p> <p>Reference/s Health and Safety in Welding – DOL Oct 2006.</p>
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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	
Untrained/unsafe personnel	<ul style="list-style-type: none"> Staff Students 	<ul style="list-style-type: none"> Welding equipment must not be used by personnel who have not passed operator or supervisor level training. Operator must be in a fit state to operate the equipment and not impaired by drugs, alcohol or fatigue. Operators are to comply with Safe Work Instructions relevant to the equipment. 	4	1	4	

Hazard / Risk	Who is at Risk?	Normal Control Measures (Brief description and/or reference to source of information).	Risk Rating			Additional Control Measures Required (To take account of local/individual circumstances).
			C	L	R	
Unsafe equipment	<ul style="list-style-type: none"> • Staff • Students 	<ul style="list-style-type: none"> • All welding equipment must be manufactured in accordance with the appropriate AS/NZ standards or better. • All equipment is to be inspected by the operator before the first use each day it is operated. • Non-conformities to be reported to supervisor and rectified before being used. 	4	1	4	
Personal Injury	<ul style="list-style-type: none"> • Staff • Students 	<ul style="list-style-type: none"> • Mandatory Personal Protective Equipment for welding includes: <ul style="list-style-type: none"> ○ Welding helmet with a suitable arc flash filter, not less than shade 10. ○ Eye protection. ○ Flameproof overalls with long sleeves and neck fastenings. ○ Welding gloves. ○ Welding apron. ○ Respiratory protection. ○ Safety capped boots. 	4	1	4	<ul style="list-style-type: none"> • Additional Personal Protective Equipment for welding may also include: <ul style="list-style-type: none"> ○ Hearing protection ○ A cap ○ Neck covering (for protection from arc flash in confined spaces) ○ Spats or leggings • Additional respiratory protection may be required (e.g. when welding galvanised metal or when cadmium is present in welding rods). This may range from simple filter masks that fit under the welding helmet to powered air purifying respirators. Specialist help may be needed to select, fit and maintain these items.

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			C	L	R	
Fire and explosion	<ul style="list-style-type: none"> • Staff • Students 	<ul style="list-style-type: none"> • All combustible materials to be removed or made safe. • No flammable liquids, vapours, gases or dusts to be present. • Extinguishers/hoses to be provided on site. • Operator must know how to use fire equipment. • Operator must know location of telephone/fire alarm. • Site to be inspected after completion of work. 	4	1	4	<ul style="list-style-type: none"> • Exposure of Oxygen and associated equipment to grease and oil is to be prevented, and personal clothing and equipment is to be free of oil and grease prior to handling Oxygen.
Burns	<ul style="list-style-type: none"> • Staff • Students 	<ul style="list-style-type: none"> • Assume everything that has been welded is hot. • Use handling equipment such as tongs where possible. • Wear heat resistant PPE when handling hot items. • Ensure collars and sleeves are secured to prevent the entry of sparks. 	3	1	3	

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	
Fumes and Dust.	<ul style="list-style-type: none"> • Staff • Students 	<ul style="list-style-type: none"> • Create less fumes at source: <ul style="list-style-type: none"> ○ Use a welding technology that creates less fumes. ○ Use electrodes that create less fumes. ○ Reduce the current to the minimum possible. • Arrange the work so that hot gases and fumes do not rise into the worker's face. • Use dilution ventilation. • Use local exhaust ventilation. • Use personal protective equipment (PPE). 	2	2	4	
Electric shock	<ul style="list-style-type: none"> • Staff • Students 	<ul style="list-style-type: none"> • Ensure the welding equipment has the correct current capacity. • Know the location of the isolating switch. • Take care to preserve electrical polarity when using two welding machines on electrically connected metals. • Use a welding machine with an automatic cut-out to ensure the duty cycle cannot be exceeded. • Ensure welding does not take place where water may be present. • Ensure hands and gloves are dry before welding. 	4	1	4	

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			C	L	R	
Compressed gases	<ul style="list-style-type: none"> • Staff • Students 	<ul style="list-style-type: none"> • Gas bottles/cylinders are to be correctly labelled, stored in a ventilated area and secured so they don't fall over. • Spare fuel gas cylinders and oxygen cylinders are to be stored separately. • Acetylene cylinders should be stored upright. • Gas bottles are to be turned off after use. • Gas welding and cutting must not be conducted in a confined area. 	4	1	4	
Hazardous substances	<ul style="list-style-type: none"> • Staff • Students 	<ul style="list-style-type: none"> • Operators must be aware of the hazardous fumes that are liberated by the heating of particular substances and take the appropriate precautions. • Operators must take all precautions detailed in the safety data sheets of hazardous substances being used. 	4	1	4	<ul style="list-style-type: none"> • Many metals may give off particularly hazardous or toxic fumes when welded or worked. • Some substances used in welding processes (such as pickling paste) are hazardous even without being heated.
Radiation	<ul style="list-style-type: none"> • Staff • Students 	<ul style="list-style-type: none"> • Ensure the appropriate PPE is correctly worn. • Erect opaque welding screens around the work to protect others. 	2	1	2	

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			C	L	R	
Noise and vibration	<ul style="list-style-type: none"> • Staff • Students 	<ul style="list-style-type: none"> • Ensure the appropriate PPE is correctly worn. • Warn others before conducting noisy work. • Use noise barriers where possible to protect others. 	2	2	4	
Manual Handling	<ul style="list-style-type: none"> • Staff • Students 	<ul style="list-style-type: none"> • Use mechanical lifting equipment where possible. • Obtain assistance when lifting or moving heavy objects. • Use dunnage when placing heavy objects on the ground to minimise crush injuries. • Avoid sustaining awkward postures when working. 	2	2	4	

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?	
Review By: (name)	
Review Date:	

HSW Risk Assessment Matrix

Likelihood level	4	Very likely Probably expect the event to occur in most circumstances	Moderate (4)	High (8)	Extreme (12)	Extreme (16)
	3	Likely Event likely to occur at least once over the coming year	Moderate (3)	High (6)	High (9)	Extreme (12)
	2	Possible Event may occur at some time	Low (2)	Moderate (4)	High (6)	High (8)
	1	Unlikely Occurrence is conceivable, but not expected to occur	Low (1)	Low (2)	Moderate (3)	Moderate (4)
			Minor	Moderate	Major	Severe
			1	2	3	4
Consequence level						
Consequence description	Harm to People 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)	
	People Affected 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)	
	Reputation and Legal 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
Operations 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
Environment 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

Extreme (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.
High (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.
Moderate (3-4)	Management to monitor risks in case changing circumstances increase the level of risk. Some action may be required, e.g. improving controls.
Low (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