

Mechanical Demolition Excavator Attachments and Robotics

Business Name:		ABN:
Business Address:		
Contact Person:	Phone:	Email:

THIS RISK ASSESSMENT IS APPROVED BY THE PCBU ON THIS PROJECT

Under the Work Health and Safety Regulation (WHS Regulation), a person conducting a business or undertaking (PCBU) is required to ensure that a RISK ASSESSMENT is prepared before the proposed work starts.

Full Name:		
Signature:	Title:	Date:

CLIENT OR PRINCIPAL CONTRACTOR DETAILS

Client:	SCOPE OF WORKS
Project Name:	
Project Address:	
Project Manager:	
Contact Phone:	
Date Risk Assessment supplied to Project Manager:	



RISK MATRIX									
LIKELIHOOD	INSIGNIFICANT	MINOR	MODERATE	MAJOR	CATASTROPHIC	SCORE	ACTION	HIERARCHY OF CONTROLS	
ALMOST CERTAIN	3 HIGH	3 HIGH	4 ACUTE	4 ACUTE	4 ACUTE			Elimination Remove the hazard.	
LIKELY	2 MODERATE	3 HIGH	3 HIGH	4 ACUTE	4 ACUTE	4A ACUTE	DO NOT PROCEED	Substitution Replace the hazard.	
POSSIBLE	1 LOW	2 MODERATE	3 HIGH	4 ACUTE	4 ACUTE	3H HIGH	Review before work starts.	Isolation Isolate People from the hazard	
UNLIKELY	1 LOW	1 LOW	2 MODERATE	3 HIGH	4 ACUTE	2M MODERATE	Ensure control measures in place.	Engineering Isolate the hazard	
RARE	1 LOW	1 LOW	2 MODERATE	3 HIGH	3 HIGH	1L LOW	Monitor and keep records.	Administrative Change	
								PPE	

Risk Rating & Required Action:	
4A	Stop work. The risk is intolerable. Eliminate the hazard or redesign the activity before proceeding. A Safe Work Method Statement (SWMS) or higher-level authorisation is required.
3H	Review and approve additional controls before task starts. Senior supervisor sign-off needed.
2M	Ensure all nominated controls are in place and effective. Proceed with caution; monitor conditions.
1L	Proceed, following standard operating procedures. Monitor and keep records.

Consequence Scale:			
Consequence	People (injury/illness)	Project / Assets	Compliance / Reputation
Catastrophic	Fatality or permanent total disability	project shutdown	Significant regulator intervention; criminal prosecution
Major	Serious injury/illness (hospital > 5 days)	critical delay	Improvement notice; major media coverage
Moderate	Medical-treatment injury; lost-time > 1 day	moderate delay	Minor breach; adverse client comment
Minor	First-aid only, no lost time	negligible delay	Isolated non-conformance
Insignificant	No injury	no schedule impact	Deviation caught and corrected on site

Notes on Hierarchy of Controls:
Remember to apply controls in the preferred order shown by the coloured pyramid:

1. **Eliminate**
2. **Substitute**
3. **Isolate**
4. **Engineering**
5. **Administrative**
6. **PPE**

Always document **why** a lower-order control is accepted if elimination or substitution is not reasonably practicable.

aligned with Safe Work Australia's Managing the risk of fatigue at work (2023) and ISO 45001:2018 clauses 6–8.

JOB STEP	POTENTIAL HAZARDS	IR	CONTROL MEASURES	RR
SPECIFIC WORK STEPS	HAZARDS THAT MAY ARISE	INITIAL RISK	SPECIFIC MEASURES TO BE PUT IN PLACE TO ELIMINATE OR CONTROL THE RISKS	RESIDUAL RISK
1. Governance, WHS Duties and Contract Management	<ul style="list-style-type: none"> Unclear allocation of WHS duties between PCBU, principal contractor, subcontractors and equipment suppliers Inadequate demonstration of due diligence by officers under WHS Act 2011 Contracts that prioritise program and cost over safety, encouraging shortcuts in planning and supervision Lack of documented WHS objectives, performance indicators and review processes for demolition robotics and excavator attachments Failure to verify contractor competency and WHS systems before engagement Inadequate arrangements for consultation, co-operation and co-ordination between multiple PCBUs on site 	4A	<ul style="list-style-type: none"> Establish a documented WHS governance framework that clearly identifies PCBU and officer duties specific to mechanical demolition and robotic in accordance with WHS Act 2011 Include explicit WHS performance requirements and right-to-audit clauses in contracts for demolition plant, robotic systems and labour hire personnel Implement a formal pre-qualification process for demolition and robotics subcontractors covering licences, insurances, WHS history, SWMS quality and maintenance systems Define and document limits of authority, decision-making and escalation for plant isolation, emergency stopping of works and change management Schedule regular WHS performance reviews at management level (e.g. quarterly) including incident trends, maintenance non-conformances, near miss data and audit findings Develop and enforce a consultation protocol between PCBUs on multi-contractor sites, with documented coordination meetings and actions Ensure officers receive periodic due diligence training focusing on high-risk construction work and plant-related obligations 	3H
2. Procurement and Design of Excavator Attachments and Robotic Systems	<ul style="list-style-type: none"> Selection of plant and attachments that are not fit for purpose for low risk groundworks or structural demolition tasks Imported or modified plant without evidence of compliance with Australian Standards and WHS Regulation plant requirements Hydraulic hammers, shears, pulverisers and coppers without adequate guarding, slew limits or overload protection Robotic demolition units lacking appropriate emergency stop, fail-safe and proximity detection features Inadequate consideration of noise, vibration, dust and silica emissions in equipment selection Lack of standardisation across plant fleet causing confusion about controls, safety features and interfaces 	4A	<ul style="list-style-type: none"> Implement a formal procurement policy requiring verification that all demolition excavator attachments and robotic systems comply with relevant Australian Standards and WHS Regulation plant provisions Require original equipment manufacturer (OEM) documentation, conformity statements and design calculations for shear cutters, hammers, hydraulic coppers and pulverisers Specify mandatory safety features in purchase specifications including emergency stops, slew and height limiting systems, load indicators, guarding and lock-out facilities Undertake a documented plant risk assessment during procurement covering mechanical, electrical, hydraulic, noise, dust and vibration hazards Standardise controls, interfaces and safety systems across the fleet as far as reasonably practicable to reduce operator error Include requirements for integrated dust suppression, noise attenuation and vibration control in specification of demolition plant and robotics Ensure modifications to plant and attachments follow a formal engineering change process with competent design sign-off and updated documentation 	2M

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3. Plant Registration, Documentation and Compliance Management	<ul style="list-style-type: none"> Failure to register registrable plant with the regulator where required Missing or outdated plant risk assessments for excavators, attachments and robotic units Absence of up-to-date operating manuals, load charts, limitation data and emergency procedures on site Non-compliance with demolition-related codes of practice and high risk construction work requirements Inadequate tracking of inspections, statutory tests and third-party certifications Inconsistent document control leading to operators referencing obsolete procedures 	3H	<ul style="list-style-type: none"> Establish a centralised plant register identifying all excavators, robotic units and major attachments, including registration status, serial numbers and configuration history Ensure registrable plant is registered with the relevant WHS regulator and evidence is readily accessible Maintain a controlled document system for plant risk assessments, OEM manuals, load charts and emergency procedures, with version control and review dates Implement a compliance calendar that schedules statutory inspections, non-destructive testing, pressure system checks and any OEM-mandated certifications Ensure high risk construction work requirements, including SWMS for demolition activities, are referenced within the overarching plant risk management system Audits are performed to verify that current plant documentation is available at point of use and that operators are aware of limitations and emergency actions 	2M
4. Systems for Plant Selection, Configuration and Attachment Management	<ul style="list-style-type: none"> Incorrect matching of attachments (shears, hammers, croppers, pulverisers) to base machine capacity and hydraulic capability Uncontrolled use of quick-hitches leading to attachment detachment and ejection of plant components Use of damaged, incompatible hoses, couplings and fittings creating hydraulic failures or mechanical breakages Lack of documented process for configuring robotic demolition tooling for specific structures or materials Inadequate verification that safety devices remain functional when different attachments are installed Uncontrolled addition or removal of counterweights and protective structures affecting machine stability 	4A	<p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p>	2M
5. Competency, Licensing and Training Systems	<ul style="list-style-type: none"> Operators of excavators, hydraulic hammers, shears, croppers and robotic units lacking formal competency and experience in demolition environments 	4A	<p>[REDACTED]</p>	2M

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	<ul style="list-style-type: none"> Inadequate understanding of structural behaviour during mechanical demolition, increasing risk of unplanned collapse Supervisors not trained in plant-specific hazards, exclusion zone design or emergency response for robotic systems No verification of licences, VOC (Verification of Competency) or high risk work licences where applicable Insufficient training on new or upgraded technology (e.g. remote controls, proximity sensors, machine guidance) Failure to refresh training leading to skills fade and normalisation of deviance 		[REDACTED]	
6. Supervision, Planning and Demolition Methodology Control	<ul style="list-style-type: none"> Insufficient supervision of mechanical demolition and robotic operations, particularly during critical structural stages Lack of engineering input into demolition sequence, leading to unexpected collapse or progressive failure Inadequate planning for use of hammers, shears, rippers and pulverisers near live services, public access or adjacent structures Failure to integrate robotic demolition methods within the overall demolition management plan Uncontrolled changes to demolition methodology driven by time pressure or equipment availability Poor communication of exclusion zones and no-go areas to workers and subcontractors 	4A	[REDACTED]	2M
7. Maintenance, Inspection and Pre-Use Safety Systems	<ul style="list-style-type: none"> Inadequate preventative maintenance leading to failure of hydraulic systems, structural components or control systems 	4A	[REDACTED]	2M

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	<ul style="list-style-type: none"> Lack of systematic inspection of high-wear components such as chisels, shear blades, cropper jaws and quick hitches Failure of robotic control systems due to neglected firmware updates or damaged communication equipment Non-functional safety devices (e.g. emergency stops, alarms, interlocks, limiters) going undetected Poor record keeping of defects, temporary repairs and out-of-service tags Use of non-genuine or incompatible replacement parts compromising plant integrity 		[REDACTED]	
8. Structural Stability, Ground Conditions and Collapse Risk Management	<ul style="list-style-type: none"> Unassessed ground conditions during low risk groundworks leading to machine instability, overturning or collapse of temporary works Mechanical demolition inducing unplanned structural collapse due to inadequate assessment of load paths and residual strength Hydraulic hammering or shearing undermining support elements or bracing systems Robotic demolition units operating on compromised slabs, suspended decks or partially demolished sections without verification Inadequate monitoring for ground movement, vibration impacts or cracking during works Failure to manage changes in ground conditions due to weather, underground services or previous excavations 	4A	[REDACTED]	2M
9. Exclusion Zones, Traffic Management and Public Interface	<ul style="list-style-type: none"> Uncontrolled access of workers or public into mechanical demolition or robotic operating envelopes 	4A	[REDACTED]	2M

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	<ul style="list-style-type: none"> Interaction between mobile plant, delivery vehicles and pedestrians in constrained demolition sites Inadequate traffic management around low risk groundworks resulting in collision or run-over incidents Flying debris from hammers, shears, croppers or pulverisers impacting workers, public or adjacent property Robotic units operating near unsegregated walkways, emergency egress routes or occupied buildings Poor visibility, dust and noise masking alarms, reversing signals or spotter instructions 		[REDACTED]	
10. Energy Isolation, Lock-Out/Tag-Out and Unintended Movement Control	<ul style="list-style-type: none"> Uncontrolled release of hydraulic, electrical or stored mechanical energy during maintenance or configuration of attachments Unintended start-up or movement of excavators or robotic units due to fault controls, interference or unauthorised activation Failure to isolate power supplies to robotic demolition units before intervention in work Bypassing or defeating interlocks and emergency stops for convenience Inadequate procedures for isolating and verifying isolation of attachments such as hammers or shears before inspection Lack of clear authority and training for personnel performing isolation tasks 	4A	[REDACTED]	2M
11. Remote Operation, Robotics Control and Cyber/Signal Reliability	<ul style="list-style-type: none"> Loss of communication between robotic units and remote controllers leading to uncontrolled or unresponsive plant Interference or overlap of control signals when multiple remote units or devices are operating in proximity 	4A	[REDACTED]	2M

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	<ul style="list-style-type: none"> • Cybersecurity vulnerabilities in networked or software-controlled plant leading to unauthorised access or malfunction • Inadequate failsafe behaviour programming on signal loss or critical fault conditions • Operator disorientation or poor situational awareness when controlling robotics from remote vantage points • Insufficient management of battery charging, power supply and cable routing for robotic demolition equipment 		[REDACTED]	
12. Hazardous Substances, Dust, Noise and Vibration Management	<ul style="list-style-type: none"> • Generation of respirable crystalline silica dust during mechanical demolition, pulverising and cropping of concrete • Exposure to excessive noise levels from hydraulic hammers, shears, croppers and excavators • Whole body and hand-arm vibration exposure from long-duration plant operation • Uncontrolled release of hazardous substances (e.g. asbestos, lead, PCBs) disturbed by mechanical demolition or robotics • Inadequate management of diesel emissions from plant operating in partially enclosed spaces • Lack of air monitoring, health surveillance and exposure tracking for high-risk substances 		[REDACTED]	2M
13. Fatigue, Work Scheduling and Human Factors	<ul style="list-style-type: none"> • Extended shifts, night work or rotating rosters leading to operator fatigue and impaired decision making • Cognitive overload when operating complex robotic systems with multiple feedback streams • Time pressure from aggressive demolition programs increasing risk-taking and non-compliance with procedures 	3H	[REDACTED]	2M

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	<ul style="list-style-type: none"> Inadequate rest breaks for operators of high-vibration or high-noise plant Poor design of control layouts and displays leading to operator error or inadvertent activation Insufficient consideration of language, literacy and cultural factors in training and communication 		[REDACTED]	
14. Emergency Preparedness, Incident Response and Recovery	<ul style="list-style-type: none"> Delayed or ineffective response to plant rollovers, structural collapse or entrapment incidents Lack of coordinated emergency procedures for robotic systems and remote-controlled plant Insufficient rescue capability for incidents occurring in partially demolished structures or excavations Failure to isolate plant or stabilise structures before attempting rescue Poor communication with emergency services about site hazards, access and structural condition Inadequate post-incident investigation and learning processes 	4A	[REDACTED]	2M
15. Change Management, Commissioning and Decommissioning of Plant	<ul style="list-style-type: none"> Uncontrolled introduction of new demolition plant, attachments or robotic technologies without adequate risk assessment Commissioning activities performed without verifying safety systems and integration with existing operations Decommissioned or out-of-service plant being inadvertently returned to use Inadequate communication of changes to operators, supervisors and adjacent trades Failure to reassess risks when work scope, structure condition or workforce composition changes 	3H	[REDACTED]	2M

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	<ul style="list-style-type: none"> Lack of systematic review after trial or pilot use of new robotic demolition equipment 			

SAMPLE

EMERGENCY RESPONSE – CALL 000 FOR EMERGENCIES

Ensure to have an Emergency Management Plan in place as well as adequate numbers of trained first aid staff with easy access to fully stocked first aid kits, rescue equipment, material safety data sheets, adequate access to emergency communication equipment and fire-fighting equipment suitable for all classes of fire and ignition sources.

LEGISLATIVE REFERENCES

RELEVANT LEGISLATION AND CODES OF PRACTICE. DELETE THE LEGISLATIVE REFERENCES FOR ANY STATE THAT ARE NOT APPLICABLE

Queensland & Australian Capital Territory

Work Health and Safety Act 2011
 Work Health and Safety Regulations 2011
 Legislation QLD: <https://www.worksafe.qld.gov.au/laws-and-compliance/work-health-and-safety-laws>
 Codes of Practice QLD: <https://www.worksafe.qld.gov.au/laws-and-compliance/codes-of-practice>
 Legislation ACT: <https://www.worksafe.act.gov.au/laws-and-compliance/acts-and-regulations>
 Codes of Practice ACT: <https://www.worksafe.act.gov.au/laws-and-compliance/codes-of-practice>

Victoria

Occupational Health and Safety Act 2004
 Occupational Health and Safety Regulations 2017
 Legislation VIC: <https://www.worksafe.vic.gov.au/occupational-health-and-safety-act-and-regulations>
 Codes of Practice VIC: <https://www.worksafe.vic.gov.au/compliance-codes-and-codes-practice>

New South Wales

Work Health and Safety Act 2011
 Work Health and Safety Regulations 2025
 Legislation NSW: <https://www.safework.nsw.gov.au/legal-obligations/legislation>
 Codes of Practice NSW: <https://www.safework.nsw.gov.au/resource-library/list-codes-of-practice>

Western Australia

Work Health and Safety Act 2020
 Work Health and Safety Regulations 2022
 Legislation Western Australia: <https://www.commerce.wa.gov.au/worksafe/legislation>
 Codes of Practice WA: <https://www.commerce.wa.gov.au/worksafe/codes-practice>

Northern Territory

Work Health and Safety (National Uniform Legislation) Act 2011
 Work Health and Safety (National Uniform Legislation) Regulation 2011
 Legislation NT: <https://worksafe.nt.gov.au/laws-and-compliance/workplace-safety-laws>
 Codes of Practice NT: <https://worksafe.nt.gov.au/laws-and-compliance/codes-of-practice>

Safe Work Australia Links

Law and Regulation (All States): <https://www.safeworkaustralia.gov.au/law-and-regulation>
 Model Codes of Practice: <https://www.safeworkaustralia.gov.au/resources-publications/model-codes-of-practice>

South Australia

Work Health and Safety Act 2012 (SA)
 Work Health and Safety Regulations 2012 (SA)
 Legislation for SA: <https://www.safework.sa.gov.au/resources/legislation>
 Codes of Practice for SA: <https://www.safework.sa.gov.au/workplaces/codes-of-practice#COPs>

Model Codes of Practice

- Managing noise and preventing hearing loss at work
- Confined spaces
- Labelling of workplace hazardous chemicals
- Managing risks of hazardous chemicals in the workplace
- Welding processes
- First aid in the workplace
- Managing the risk of falls at workplaces
- Hazardous manual tasks
- Managing the risk of falls in housing construction
- Managing electrical risks in the workplace
- Demolition work
- Excavation work
- Work health and safety consultation, cooperation and coordination
- Managing the work environment and facilities
- How to manage work health and safety risks
- Managing risks of plant in the workplace
- Construction work

Tasmania

Work Health and Safety Act 2012
 Work Health and Safety (Transitional and Consequential Provisions) Act 2012
 Work Health and Safety Regulations 2012
 Work Health and Safety (Transitional) Regulations 2012
 Legislation for TAS: <https://worksafe.tas.gov.au/topics/laws-and-compliance/acts-and-regulations>
 Codes of Practice for TAS: <https://worksafe.tas.gov.au/topics/laws-and-compliance/codes-of-practice>

Details of permits, licenses or access required by regulatory bodies (add or delete as required):

- Permits from local council
- Authorisation to commence work
- Any required documents.