

Mechanical Engineering

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. WHS Governance, Leadership & Legal Compliance	<ul style="list-style-type: none"> Lack of clear WHS policy specific to mechanical engineering activities (assembly, installation, field work) Inadequate allocation of WHS responsibilities and accountabilities across projects and workshops Poor consultation mechanisms with health and safety representatives (HSRs) and workers Failure to integrate WHS Act 2011 and WHS Regulations into mechanical engineering procedures Inadequate due diligence by officers in overseeing high-risk mechanical work (heavy assembly, torquing, field balancing) Insufficient resourcing for WHS (budget, time, competent people, tools) for complex mechanical projects 	4A	<ul style="list-style-type: none"> Develop, implement and regularly review a documented WHS Management System aligned with WHS Act 2011, WHS Regulations, and relevant Australian Standards (e.g. AS/NZS 4801 / ISO 45001 principles) Define and document WHS roles, responsibilities and authorities for officers, managers, supervisors, engineers and workers involved in mechanical design, assembly, installation and maintenance Establish formal WHS consultation processes with HSRs, safety committees and field crews, including regular toolbox talks for mechanical works Ensure officers exercise due diligence by receiving WHS training specific to high-risk mechanical hazards and reviewing WHS performance reports at set intervals Integrate WHS legal requirements into engineering project plans, tender documents, design reviews and commissioning processes Set WHS objectives and key performance indicators (KPIs) for mechanical engineering operations (e.g. audit completion rates, corrective action closure times, incident trends) and review them at management meetings 	3H
2. Mechanical Design, Engineering Controls & Change Management	<ul style="list-style-type: none"> Designs not considering safe assembly and disassembly of large mechanical parts and heavy components Insufficient engineering controls for uncontrolled release of spring loaded or stored energy equipment Designs that require excessive manual handling or awkward access for bolt torquing, pipework or gear installation Lack of built-in lifting points and rigging interfaces on large mechanical assemblies and drive units Inadequate consideration of vibration, field balancing requirements and dynamic loads on rotating equipment Poor management of design changes and variations leading to undocumented risks on site 	4A	<ul style="list-style-type: none"> Apply formal Safety in Design processes for all mechanical systems (drive units, rotating equipment, dust collection systems, heavy gear motors, pipework and fixtures), including documented risk assessments and design reviews Specify engineered controls such as guarding, interlocks, rated lifting lugs, jacking points, torque access points, isolation points and lockable valves in all mechanical designs Incorporate safe access, working space, and maintenance clearances into equipment layouts, including for bolt torquing, field balancing, and mechanical service installation Design spring-loaded and stored energy systems with failsafe mechanisms, mechanical stops, bleed valves or locking pins to prevent uncontrolled release Require vibration and balancing criteria, alignment tolerances and acceptance testing to be included in design documentation and commissioning plans Implement a controlled Management of Change (MOC) process for any design or configuration change, including WHS risk review, approvals and updated drawings / procedures 	2M

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3. Planning, Scheduling & Coordination of Mechanical Works	<ul style="list-style-type: none"> Poor planning of complex assemblies leading to congestion, simultaneous operations and conflicting work fronts Inadequate coordination between mechanical, electrical, civil and other contractors, increasing interaction risks Insufficient time allowed for safe assembly of large parts, heavy component bolting and pipework installation Unclear work scopes and interfaces between workshop assembly and field installation teams Lack of structured pre-start planning for activities such as installing heavy gear motors and dust collection equipment Inadequate planning for access equipment, lifting devices and temporary supports for large mechanical parts 	3H	<ul style="list-style-type: none"> Use formal job planning and scheduling processes (e.g. look-ahead planning, permit to work integration) for all major mechanical projects and shutdowns Develop and communicate interface documents and coordination plans between mechanical teams and other disciplines, including clear ownership of work areas and mechanical systems Include WHS and constructability reviews in planning phases to identify required access platforms, cranes, jacks, rigging, temporary supports and torqueing tools Implement pre-start planning meetings and job hazard analyses (JHAs) for high-risk mechanical works, ensuring scope, sequence and controls are checked before work starts Control simultaneous operations (SIMOPS) via a permit to work or coordination system, avoiding overlapping heavy lift activities and confined space activities near mechanical installs Establish planning rules requiring realistic timeframes and crew sizes to prevent rushing, overtime fatigue and unsafe shortcuts during assembly and installation 	2M
4. Procurement, Verification & Suitability of Mechanical Equipment	<ul style="list-style-type: none"> Procurement of non-compliant mechanical plant, drive units, gear motors and dust collection equipment without adequate safety checks Use of uncertified lifting accessories, fixtures and supports for heavy components and large assemblies Incompatible flanges, bolts, gasket and pipework causing assembly difficulties and leak risks Inadequate specification of torque requirements, lubrication systems and fastener grades for critical joints Failure to verify certification, design calculations and test reports for spring-loaded and pressure equipment Purchasing of low-quality or inappropriate tools for bolt torquing, field balancing and alignment 	3H	<p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p>	1L
5. Competency, Training & Supervision for Mechanical Tasks	<ul style="list-style-type: none"> Inadequate training in mechanical assembly and disassembly of large and complex components 	4A		2M

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	<ul style="list-style-type: none"> Lack of competency in controlled bolt torquing and tensioning of heavy components Insufficient skills for safe installation and alignment of drive units, heavy gear motors and rotating equipment Poor understanding of hazards related to spring-loaded and stored energy systems Inexperienced personnel planning or executing field balancing of rotating equipment Inadequate supervision of apprentices, new starters and contractors on mechanical worksites 		[REDACTED]	
6. Mechanical Isolation, Lockout-Tagout & Stored Energy Control	<ul style="list-style-type: none"> Failure to fully isolate mechanical, hydraulic, pneumatic and electrical energy sources before assembly or disassembly Uncontrolled release of spring-loaded equipment, counterweights or compressed components during maintenance Inadequate procedures for de-tensioning belts, springs, chains and rotating assemblies Shared or ambiguous isolation points between multiple work groups and contractors Bypassing or removal of guards and interlocks without proper isolation and authorisation Poor management of residual energy (gravity, pressure, rotation, thermal) in mechanical systems 	4A	[REDACTED]	2M
7. Lifting, Rigging & Handling of Large Mechanical Components	<ul style="list-style-type: none"> Improper lifting and handling of large mechanical parts, drive units and heavy gear motors Failure of temporary supports, jacks or fixtures during assembly of large parts 	4A	[REDACTED]	2M

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	<ul style="list-style-type: none"> • Overloading of lifting equipment or using non-rated attachment points on mechanical assemblies • Poor load stability and control during installation of dust collection equipment and large pipework sections • Inadequate planning for transport, crange and positioning of heavy components in restricted spaces • Lack of standardised methods for bolting heavy components while under load or suspended 		[REDACTED]	
8. Mechanical Assembly, Fastening & Integrity Management	<ul style="list-style-type: none"> • Incorrect torqueing or sequence of bolts on critical joints and heavy components • Use of wrong fastener grade, length or lubrication compromising mechanical integrity • Inadequate procedures for assembling large mechanical parts and fixtures • Failure of gaskets, seals or flanged joints in pipework and mechanical services • Uncontrolled deformation or misalignment during assembly of structures and supports • Lack of verification and inspection of completed assemblies prior to energisation or commissioning 	3	[REDACTED]	1L
9. Rotating Equipment, Field Balancing & Vibration Control	<ul style="list-style-type: none"> • Uncontrolled rotation or unexpected start-up of rotating equipment during field balancing or adjustment • Excessive vibration leading to fatigue failures, loosened fasteners and structural damage • Inadequate guarding and exclusion around rotating components during commissioning and balancing • Incorrect balancing procedures causing shaft, bearing or coupling damage 	4A	[REDACTED]	2M

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	<ul style="list-style-type: none"> Noise and vibration exposure for workers conducting field balancing and alignment tasks Insufficient monitoring of vibration trends and condition of rotating mechanical assets 		[REDACTED]	
10. Mechanical Services, Pipework & Dust Collection Systems	<ul style="list-style-type: none"> Leaks or failures in mechanical pipework carrying compressed air, fluids or gases Poorly supported or inadequately anchored pipework and mechanical services Ineffective dust collection system design or installation leading to airborne dust exposure and housekeeping issues Blockages, pressure build-up or explosion risks in dust collection and ducting systems Insufficient isolation, drain points and venting provisions in mechanical service installations Inadequate coordination of mechanical services routing with structure and electrical systems leading to damage or clashes 	3H	[REDACTED]	1L
11. Workshop, Site Layout & Housekeeping for Mechanical Operations	<ul style="list-style-type: none"> Congested work areas during assembly of large mechanical parts and equipment Trip, slip and impact hazards from tools, components and offcuts around assembly and installation zones Inadequate segregation between mechanical assembly, hot work, testing and storage areas Poor management of dust, offcuts, oils and lubricants leading to contamination and slip risks Inadequate provision of mechanical handling aids, benches and fixtures for safe assembly work 	3H	[REDACTED]	2M

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	<ul style="list-style-type: none"> Uncontrolled storage of spring-loaded or pre-assembled components with stored energy 			
12. Contractor Management & Interface Control for Mechanical Projects	<ul style="list-style-type: none"> Contractors conducting mechanical assembly, installation and field work without understanding site-specific WHS requirements Inconsistent standards between principal contractor and subcontractors for isolation, torquing, lifting and dust management Communication failures between contractor and client regarding changes in scope, design or sequencing of mechanical works Inadequate verification of contractor competency for specialised mechanical tasks such as field balancing and spring-loaded equipment work Overlap of contractor and in-house crews in confined mechanical work areas leading to confusion and unsafe practices 	3H	<p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p>	2M
13. Inspection, Maintenance & Asset Management of Mechanical Systems	<ul style="list-style-type: none"> Deferred or reactive maintenance of critical mechanical assets and safety systems Inadequate inspection regimes for drive units, rotating machinery, dust collection equipment and pipework Failure to identify wear, fatigue, cracks or loosening of fasteners in heavy mechanical assemblies Poor recording and tracking of maintenance history, defect reports and corrective actions Use of non-approved parts or modifications during repair of mechanical equipment Maintenance conducted without adequate planning, isolation or access controls 	3H	<p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p>	1L

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14. Emergency Preparedness, Incident Response & Recovery for Mechanical Failures	<ul style="list-style-type: none"> Inadequate preparedness for mechanical failures such as component drop, structural collapse or uncontrolled release of energy Delayed response to entanglement, crush or impact incidents involving mechanical assemblies and rotating equipment Lack of specific emergency procedures for spring-loaded equipment failures and pressure releases Insufficient first aid capability for injuries arising from mechanical work (crush, laceration, eye injury) Poor capture and investigation of mechanical near misses, leading to repeat events 	3H	<p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p>	2M

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.