FATAL & SEVERE RISKS

INTRODUCTION

Fatal and Severe Risks as the name suggests have the greatest potential to cause life altering harm to our people and others in the areas where we work. They require clear expectations for their management and must be a focus for our people in how we go to work.

The Fatal and Severe Risks Control Standard (this document) sets a baseline of expectations that must be achieved in all our operations. The Controls have been built on lessons learnt in our business and across industry.

This standard applies to all personnel, supply chain partners and visitors involved in Laing O'Rourke related activities, including where we partner with other organisations to deliver works.

No variances to these requirements are permitted unless approved through the FSR Control Dispensation process.

Each FSR identifies the mandatory controls that describe what must be in place as a minimum to manage the identified risk. The controls in the FSRs are supported by Primary Standards within our HSEMS.

FSRs apply across the entire lifecycle of all Laing O'Rourke projects. Personnel at each stage of the lifecycle must plan, complete and verify the management of high-consequence risks in accordance with this FSR Control Standard.

FSR Controls

FSR Controls must be in place for the effective management of the associated FSR. A failure of these controls has the greatest potential of leading to a significant event.

When using our FSR verification tools, there are 3 options to choose from when checking for implementation. "Go", "No Go" and "No Go Immediate Rectification".

Go

"Go" means FSR Controls are verified as fully effective, resourced, and observable.

No Go

Where FSR Controls are not fully applied or verified as effective, the activity/control is considered a "No Go". No-Go's give us an opportunity to pause, ensure safety before continuing, and shift beyond control implementation to ensuring control effectiveness.

Recording No-go outcome's and evidence of your assessment findings in **Intelex** allows the business to identify innovation, trends and opportunities for improvement. We can confirm when we have a control well understood and actioned, or when we may need to do a review to identify an improved way to manage the risk such as an engineering control.

Control Planning and Implementation / Risk Management

Through Engineered Safety and Safety in Design workshops, projects forecast and 'engineer out' risks. If this cannot be achieved and the risk remains, FSR control implementation is planned for and included in the project delivery program and estimations throughout the project lifecycle.

Workplaces must demonstrate how FSRs have been considered and planned for in:

- Work Winning/Tendering methodologies
- Engineered Safety Workshops
- Safety in Design and Constructability Reviews
- Project/Workplace Risk Assessments with reference to the program and scope of works
- Risk Assurance Planning Activities (30:60:90)
- Methodologies and/or Work Packs
- Safe Work Method Statements

Primary Standards

Primary standards, which support the FSRs, are provided to communicate to all staff, workers, clients, and supply chain partners the requirements for managing risks and mitigating fatalities, injuries, and events at Laing O'Rourke workplaces.

Latest Version

To make sure you're working from the correct information, always refer to the latest version of this document at the Laing O'Rourke Health Safety Environment Management System (LORHSEMS).

All requirements in this document apply across all Laing O'Rourke workplaces from 1 April 2026.

ENGINEERED SAFETY PRINCIPLES

At Laing O'Rourke, Engineered Safety is our commitment to designing risk out of our work, and designing health, efficiency, and control in, at every stage of the construction lifecycle. This philosophy underpins our approach to managing the most serious risks in our industry: the Fatal and Severe Risks that have the potential to cause life-altering harm.

We believe that the best risk control is one that is cognisant of human factors, doesn't rely on individual behaviour, checklists, or procedural compliance, but is instead embedded into how a job is designed, planned, procured, and delivered.

By working closely with our clients, designers, suppliers and delivery teams, and applying modern methods of construction, we can prevent exposure to, or significantly minimise potential impacts of fatal and severe risks.

1. Eliminate Risk at the Source

- Act during concept and early design stages to identify opportunities to remove hazardous work entirely.
- Choose design alternatives and construction methodologies that remove human exposure (e.g. offsite manufacture, remote-operated demolition equipment).
- Challenge default assumptions; if a task is inherently unsafe, question whether it needs to exist.

2. Embed Safety into Design

- Integrate safety objectives within the design brief and collaborate with designers to fully integrate Engineered Safety.
- Design for safe assembly, access, operation, and maintenance.
- Conduct structured design and constructability reviews that explicitly address sequencing, temporary works, and interfaces.

3. Design for Recovery and Containment

- Accept that not all failures can be prevented, but consequences can be controlled.
- Engineer systems that fail safely; default-to-safe equipment, passive fall prevention or energy isolation that reverts to a safe state.
- Build resilience into processes and physical systems so errors do not escalate to harm.

4. Use Offsite and Modular Construction Wherever Possible

- Apply Design for Manufacture and Assembly (DfMA) and other modern methods of construction to relocate high-risk activities to controlled factory environments.
- Use partial prefabrication to reduce manual handling, work at height, or exposure to live environments.
- Adopt a manufacturing mindset; standardise, simplify, and repeat proven safe assemblies.

5. Engineer Controls, Not Paperwork

- Prioritise engineered and physical controls over administrative controls.
- Design systems to separate people from hazards, such as fixed barriers, exclusion zones, automation, or interlocks.
- Integrate lock-out systems and fail-safes within electrical and mechanical systems.

6. Collaborate Across the Supply Chain

- Engage clients, designers, suppliers, and subcontractors early to identify and solve safety challenges collaboratively.
- Select materials, plant, and systems based on their capacity to eliminate or control risk, not just cost or productivity.
- Ensure procurement aligns with Engineered Safety principles.

7. Verify Risk Has Been Designed Out

- Use formal design risk reviews at key project stages to verify that fatal and severe risks are eliminated or controlled to an acceptable level.
- Treat unresolved fatal and severe risks as non-compliances requiring redesign or escalation.
- Use digital models, simulations, and visualisation tools to test safety assumptions before construction begins.
- Apply systemic learning to understand where Engineered Safety efforts enabled success, or their absence contributed to risks materialising.

PSYCHOSOCIAL HAZARDS

At Laing O'Rourke, we know that managing physical risk alone, is not enough.

Psychosocial hazards have the potential to cause life-altering harm, including acute psychological injury, cumulative stress-related disorders, and in the most serious cases, self-harm or fatality. For this reason, they are included alongside our other FSRs.

However, psychosocial hazards cannot be managed through the same control architecture used for traditional high-energy risks. The nature of harm, the mechanisms of exposure, and the pathways to injury differ fundamentally from physical fatal risks. As a result, critical controls, assurance protocols, and verification mechanisms must be designed specifically for psychosocial risk rather than replicated from conventional FSR methodologies.

Why Psychosocial Hazards Require a Distinct Management Approach

1. The risk may be cumulative, relational and context-dependent
2. Controls are predominantly behavioural and systemic based
3. Assurance is qualitative rather than binary
4. The causal pathways can be long and complex
5. Prevention requires organisational capability, and task-level control may not be relevant or sufficient

How Psychosocial Hazards Fit Within the FSR Framework and Rethinking Safety

Psychosocial hazards sit within the FSR Framework because:

- They can lead to fatal or life-altering harm.
- They require the same level of organisational attention, investment and visibility.
- They demand clear roles, responsibilities and pathways for escalation.
- Leaders must treat psychosocial hazards with the same seriousness, legitimacy and urgency as physical fatal risks.

As a minimum, the management of psychosocial hazards at LOR requires:

- Identification, assessment and mitigation of psychosocial hazards through the completion of a Risk Assessment and Plan;
- Training our people so that they understand psychosocial hazards and minimum expectations for their management; and
- Reporting of hazards and events by our people, enabling better understanding of trends to support continuous improvement.

How We Manage Psychosocial Hazards

The detailed approach to managing psychosocial risk is provided in the Primary Standard for Psychosocial Hazards and contextualised through the psychosocial risk management plans in place at each LOR Workplace. As a minimum, our framework requires consideration and management of:

Job design and demands
- Job demands
- Low job control

Support for our people
- Poor support
- Lack of role clarity
- Inadequate reward and recognition

Organisational factors
- Poor organisational change management
- Poor organisational justice

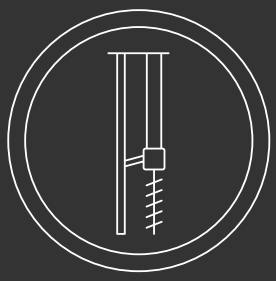
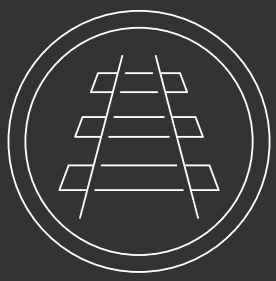
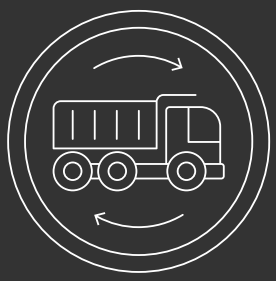
Environmental factors
- Traumatic events or material
- Remote or isolated work
- Poor physical environment

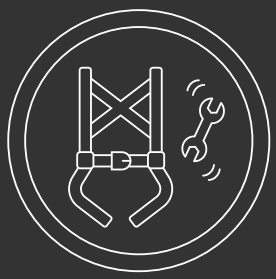
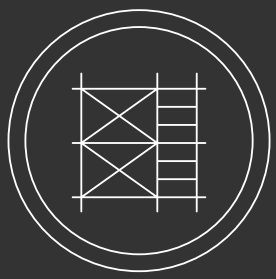
Unacceptable behaviours, and conflict
- Violence and aggression
- Bullying
- Harassment including sexual harassment
- Conflict or poor workplace relationships and interactions

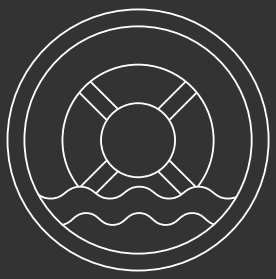
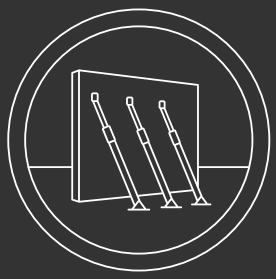
Our model ensures psychosocial hazards are identified and risks are managed in a fit for purpose model that recognises the need for a different approach to energy-based hazards.

Please refer to PS Psychosocial Hazards for details of our processes

FATAL & SEVERE RISKS

Plant & Equipment

FSR

Intent: To eliminate or minimise the risks of fatalities, injuries and events arising from the interaction of plant, equipment, vehicles and people.

Engineered Safety in Practice (examples):

- Eliminate or reduce plant and people interaction through planning and methodology
- Maintain defined exclusion zones through planning conflict detection
- Assess available technology to automate repetitive or high-risk tasks wherever possible
- Select plant with 360° visibility, cameras, and proximity detection

FSR Controls

1. All plant must be onboarded by an authorised person using the *plant mobilisation process* before first use on site.
2. Plant operators must hold the required national or industry competency and any applicable high-risk work licence for the equipment being operated.
3. Inspect all plant before use each shift using a plant-specific pre-start checklist.
4. The Temporary Works Coordinator or Temporary Works Supervisor must verify that ground bearing capacity, stability, and temporary works are suitable for vehicle and plant operation.
5. Implement a documented Vehicle Movement Plan and communicate it to all relevant personnel, including any changes.
6. Physically separate pedestrian routes from operating plant and vehicles using barriers and designated walkways.
7. Separate operating plant and people by establishing and maintaining defined exclusion zones.
8. Physically separate heavy and light vehicles using designated routes, barriers, and scheduling controls.
9. Establish a delineated exclusion zone to prevent people accessing the blind side of the truck when loading and unloading with mobile plant.
10. Where plant or equipment may encroach within the Safe Approach Distance (SAD) of overhead wiring, obtain an appropriate electrical permit from the asset owner and implement the defined controls.
11. Park plant and vehicles in a *fundamentally stable condition* to prevent unplanned movement.
12. Controls are in place to ensure personnel cannot enter *plant operating zones* or are otherwise protected by engineering controls.

Additional Rail Plant Requirements

14. All rail-mounted plant must be inspected and certified by a network-approved competent person prior to onboarding and authorisation for use on track.
15. Verify all plant on track has a certificate of registration issued by the Network Owner for its specific operating conditions.
16. Mobile plant that may encroach into the Danger Zone must have engineering controls, such as slew restrictors, or achieve physical separation as a minimum.
17. Where *track-bound equipment* is used, verify that derailment recovery plans and equipment are available, applicable to the site, and understood by all relevant personnel.

18. When working on a *skeleton track*, confirm that a network-approved track certifier has verified that the track is fit for purpose before on-tracking plant.
19. Where rolling stock is used, delineate the work area limits with visual indicators or signage to prevent any interface with other workgroups.

DEFINITIONS

Fundamentally stable conditions: A condition in which mobile plant is parked so that it cannot unintentionally move, tip, or collapse, even in the absence of operator control i.e. i.e. v-drains, flat level surface, braking, attachments grounded, chocks (where required).

Plant mobilisation process: The formal process of authorising plant for its first use on a project or workplace, completed by an appointed, or otherwise authorised, competent person who verifies that the plant meets Laing O'Rourke's minimum requirements for its type and configuration, and is free from defects or unauthorised modifications.

Track-bound equipment: Rail-only machinery that must remain on railway tracks for travel and operation. (e.g., locomotives, wagons, tampers, regulators, track grinders).

Skeleton track: the incomplete track formation where the rail is supported by sleepers placed on top of bottom ballast. This acts as a "working railway" during construction, before commissioning works are finalised.

Cranes & Lifting

FSR

Intent: To eliminate or minimise the risks of fatalities, injuries and events arising from the use of cranes and lifting equipment.

ENGINEERED SAFETY IN PRACTICE (EXAMPLES):

- Reduce lifts through prefabrication and modular design
- Engineer lifting points into components with certified load ratings, incorporate balance considerations into design
- Design crane locations and lift paths early in the project
- Avoid complex or multi-crane lifts through sequencing

FSR Controls

1. Appoint a Crane Appointed Person to manage lifting operations.
2. Appoint a Crane Supervisor to oversee lifting activities on site.
3. A specific lift plan or analysis is required for every lift, except where a pre-approved analysis is listed in the Schedule of Common Lifts.
4. *Intermediate* and *Complex Lifts* must have an approved Lift Study.
5. Only set up a crane in locations that have a valid Permit to Load.
6. Where multiple crane operations interface, the Crane Supervisor must coordinate lifting sequences and interfaces.
7. Inspect lifting and rigging gear before each use for signs of damage, confirm it is certified, fit for use and clearly tagged in line with the *RGBY system*.
8. Soft Slings may only be used following approval by an *Operational General Manager* using the Soft Sling Authorisation Tool.
9. Articulating or non-slewing cranes (ANSC) may only be used following approval by an *Operational General Manager* using the ANSC Authorisation Tool.
10. All *crane crew* must be trained and hold the relevant high-risk work licences before commencing lifting activities.
11. A tower crane anti-collision system is operational where there is radius overlap.
12. Earthmoving equipment used as a crane must be assessed and approved for lifting through the plant mobilisation process.
13. When earthmoving equipment is used as a crane, do not use for *precision lifting* and only operate in accordance with load charts.
14. Prohibit work beneath suspended loads.
15. Cranes operating near powerlines must adhere to asset owner and Safe Approach Distance (SAD) requirements, have slew / height limiters and a trained electrical spotter.
16. A restricted work zone is established for all lifting activities using delineation and clear signage.
17. Before any pick-and-carry movement, confirm the load is within the machine's rated capacity and configuration, with the load tied back to a rated point, or where not possible, controlled by a tagline.
18. Verify travel paths for pick-and-carry movements are level, compact, and free of personnel, obstacles, and overhead hazards before moving the load.

DEFINITIONS

Precision Lifting: A lift requiring deliberate, incremental movements ("inching") and fine positioning of components within tight tolerances, commonly involving workers in close proximity to the load to guide or align componentry.

Intermediate Lift: Where the load to be lifted is of established weight and there are hazards, to be considered, either within the working area of the crane, or on the access route to the working area, but no multiple-crane lifting is involved.

- Pick and carry duties
- Oversailing other cranes or building
- The presence of services above or below ground
- Interface with public transport or public areas, etc.
- Blind lifts.

Intermediate lifts will require additional local controls to address any other hazards identified in the Risk Assessment which may not be related directly to the type of load itself.

Complex Lift: Complex lifts are where lifting persons, or the lifting operation requires more than one crane to lift the load, or use load enhancement attachments (e.g. Superlift), or the lift is to take place at hazardous or critical locations, demolition/dismantling, or there are complex shapes of unknown weight or an undefined centre of gravity. Some of these criteria will require a de-rating of the crane.

All complex lifts require risk assessments and method statements, and the approval of the Crane Appointed Person. It is strongly recommended that the Appointed Person is also on-site at the time of the complex lift.

Complex lifts must also be individually supervised by an experienced Crane Supervisor.

Note that while lifts referred to as 'common lifts' could be basic, intermediate or complex, the 'safe system of work' must always be commensurate with the complexity of the lift.

RGBY System: a color-coding system for equipment inspections with colours (Red, Green, Blue, Yellow) corresponding to quarterly checks.

Crane crew: all crane operators, Crane Supervisors, riggers and dogmen associated with the lifting operations.

Operational General Manager: for the purposes of this FSR, Operational General Manager should be taken to include the most senior leader of Specialist Business Units.

Delineation: refers to the process of demarcating an area to restrict access or discourage access via the use of Visual Delineation or Physical Barricades in line with the Primary Standard for Barricading.

Excavation

FSR

Intent: To eliminate or minimise the risks of fatalities, injuries and events arising from excavations, and other activities involving breaking ground.

Engineered Safety in Practice (examples):

- Eliminate or minimise deep excavations through engineering alternatives
- Assess preliminary temporary works schemes, advising of complex or unusual methodologies
- Eliminate or reduce overhead and/or underground services interfaces
- Plan service routes to avoid high-risk excavation areas

FSR Controls

1. Obtain a Ground Penetration Permit before commencing any ground penetration activity.
2. Identify the location, depth, and safe approach distances of all underground services with physical marking before ground penetration activities.
3. Clearly mark exposed services with visual indicators and protect them with physical barriers to prevent accidental contact.
4. When the operational envelope of an excavator can encroach on the Safe Approach Distance (SAD) of powerlines, it must have slew / height limiters and a trained electrical spotter.
5. Protect excavations deeper than 1.5m from collapse using approved temporary works designs (e.g. battering, benching, or shoring) or confirm via a geotechnical engineer that ground support is not required.
6. Use only proprietary shoring systems approved by the Temporary Works Coordinator.
7. Construct shoring in accordance with the approved design and have it verified by the Temporary Works Coordinator or their delegate.
8. Only enter excavations where safe access and egress are provided and specified ground support is installed as per the approved design.
9. Place all spoil, plant, and equipment at least 1m beyond the zone of influence unless otherwise approved by the Temporary Works Coordinator.
10. Controls for prevention of falls around excavations must adhere to FSR Prevention of Falls and Dropped Objects.
11. Deep excavations left unattended must be secured with fencing or barriers at least 1.8m high, or covers to prevent unauthorised access, along with Deep Excavation signage.
12. The Temporary Works Supervisor must inspect all excavations open for more than 24 hours daily and after any weather event for signs of fretting or deterioration.
13. An emergency plan is in place, equipment available, and the team are trained in the response process.
14. Excavator operators must be trained and hold the relevant nationally recognised unit of competency.

DEFINITIONS

Zone of Influence: The area around an excavation that could collapse or be destabilised by loads, vibration, or poor ground; it is dependent upon soil / strata type

Piling

FSR

Intent: To eliminate or minimise the risks of fatalities, injuries and events arising from piling operations.

Engineered Safety in Practice (examples):

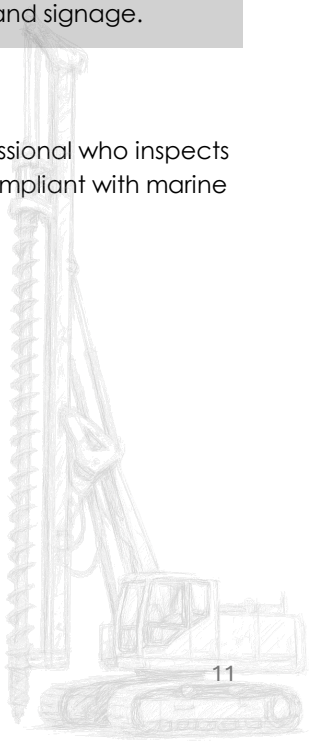
- Eliminate or reduce overhead and/or underground services interfaces and consider headroom for piling operations
- Avoid water-based piling operations.
- Use GIS to establish crane / piling platform locations and capacities and any underground services
- Prioritise use of foundation designs that reduce or eliminate the need for piling
- Consider use of displacement piling to minimise spoil and open hole risks
- Eliminate manual pile break back activities (e.g. use zero trim piling or mechanical methods like pile milling machines or mechanical pile croppers.)

FSR Controls

1. Identify falls and dropped object risks associated with piling during Safety in Design, constructability assessments, and work planning, and implement controls to eliminate or engineer out these risks.
2. Piling operators and crew members hold the required national or industry competency and applicable high risk work licences for the equipment and tasks being undertaken.
3. Verify that all piling rigs meet Laing O'Rourke's minimum plant and equipment standards, are approved for site use, and display a valid PileSafe sticker prior to operation.
4. Obtain a Permit to Load before setting up and commencing piling operations.
5. Before loading any vessel for piling or marine works, obtain a Permit to Load from the Temporary Works Coordinator, supported by a verified stability assessment from an accredited marine surveyor.
6. Before using a piling rig to conduct lifting activities, it must have a lift plan and be approved to lift/suspend loads.
7. Protect pile holes not in use with temporary works approved covers and physical barriers, or secure fencing to prevent risk of falling.
8. An exclusion zone is established for the auger and slew zone using physical barriers and signage.

DEFINITIONS

Accredited marine surveyor: An accredited marine surveyor is an AMSA-recognised professional who inspects and certifies barges used for construction, ensuring they are stable, fit for purpose, and compliant with marine safety regulations.



Work in Rail Environments

FSR

Intent: To eliminate or minimise the risks of fatalities, injuries and events arising from work in rail environments.

Engineered Safety in Practice (examples):

- Eliminate or reduce the need for works within the rail corridor through design alternatives, such as pre-assembled structures or modular installations.
- Design rail assets, foundations, and access systems to allow for off-track construction and cranage where possible.
- Integrate Digital Engineering models (BIM + GIS) to identify and design out potential conflicts with live rail infrastructure, traction power, signalling, and communications systems.
- Select construction methodologies and materials that minimise the number and duration of rail possessions/occupations required

FSR Controls

1. Obtain authority from the Network Operator to enter or work in the rail corridor, confirming that the authority defines the limits, scope of work, and agreed controls.
2. Verify that Safeworking controls have been communicated to all workers, and in place, before commencing work.
3. Work must be performed from a *position of safety* outside the Danger Zone unless the track is protected or lookout working is applied.
4. Lookout working must only be implemented when higher-order Safeworking protections are not practicable, and only in accordance with the relevant Network Rules.
5. When lookout working, the Safeworking person must have clear line of sight and at least two effective methods of warning workers of an approaching train (e.g. whistle, air horn, physical contact).
6. Where works are adjacent to a live track, provide delineation at 3m from the outside rail to prevent workers entering the danger zone. If 3m cannot be achieved, use a rail-operator-approved barrier system (e.g. Vortok Safety Barrier).
7. Identify and protect rail infrastructure at risk of damage before commencing work, prioritising physical controls, or where not practicable, clearly identifiable markers.
8. Where plant or equipment may encroach on the Safe Approach Distance (SAD) of overhead wiring, obtain an appropriate electrical permit from the asset owner and implement the defined controls.
9. Where an electrical permit is in place, the isolation status, limits, and conditions must be confirmed and communicated to the work group before work commences.
10. Control interfaces with other railway operations, roads, and public using physical barriers, approved traffic management measures, level crossing controls, or dedicated access routes
11. Where there is a risk of work crews going beyond authority limits and into an energised zone, the limits must be clearly communicated by the Safeworking person and reinforced in the field with reliable warnings such as barriers, signage, delineation boards, or lights.

DEFINITIONS

Position of Safety: A safe location where workers are clear of being struck by moving trains or plant, either outside the danger zone or behind a protective structure, as nominated by safe work arrangements.

Heavy Vehicles

FSR

Intent: To eliminate or minimise the risks of fatalities, injuries and events arising from transport tasks (Logistics) at Laing O'Rourke worksites.

Engineered Safety in Practice (examples):

- Engineer level loading bays, integrated restraint systems, and clear separation from pedestrians
- Select packaging, unit sizes, and component designs that eliminate / minimise hazardous manual handling
- Specify transport methods and delivery schedules that eliminate fatigue or time pressures
- Consider loading, securing and unloading methods without climbing on trucks or relying on personal judgement by providing appropriate tools and equipment in the work planning stage

FSR Controls

1. A Chain of Responsibility Management Plan is in place for the safe operation of heavy vehicles.
2. Loading Manager roles and responsibilities are assigned at each worksite to manage and coordinate loading and unloading activities.
3. Drivers of heavy vehicles must hold the appropriate licence for the class of vehicle being operated.
4. All personnel involved in applying or removing load restraint equipment, or supervising these activities, must be trained in load restraint.
5. Heavy vehicle operators must implement and monitor In-Vehicle Monitoring Systems (IVMS).
6. Verify vehicle height, width, length, and mass are within legal limits and relevant permit conditions before departing site.
7. Confirm an engineered load restraint design is in place for all *non-standard loads*.
8. Inspect load restraint gear for signs of damage or wear before use.
9. Verify that all required transport permits are in place before transporting over-mass or over-dimension loads.
10. Restrict unnecessary personnel from entering truck loading and unloading areas with signage and delineation.
11. Establish a delineated exclusion zone to prevent people accessing the blind side of the truck when loading and unloading with mobile plant.
12. Drivers must remain in a designated safe zone, such as the cab or a marked position, during all loading and unloading activities.
13. Tipper trucks/trailers must only discharge materials in designated tipping zones with exclusion zones in place to prevent access to the rollover zone.
14. Clearly identify overhead powerlines at site entry/exit points and along internal travel routes using signage, visual markers, and height indicators.
15. Address and report any visible signs of impairment, including fatigue, with the driver and notify the transport operator.
16. Report any defects affecting the roadworthiness of a vehicle to the transport operator.

DEFINITIONS

Non-standard loads: Non-standard loads are freight items that are oversize, over mass, indivisible, or irregular, and can't be restrained using normal methods, meaning they require permits, engineered solutions, or special load restraint arrangements.

Delineation: refers to the process of demarcating an area to restrict access or discourage access via the use of Visual Delineation or Physical Barricades in line with the Primary Standard for Barricading.

Traffic Management

FSR

Intent: To eliminate or minimise the risks of fatalities, injuries and events arising from traffic interfaces.

Engineered Safety in Practice (examples):

- Eliminate the interface with live traffic flows (including construction traffic)
- Consider the use of side-tracks, safety barriers, road closures and/or detours
- Eliminate the requirement for traffic control personnel interface with public vehicles
- Consider traffic signalling and control features for entry and exit points
- Physically separate vehicles and people through design layout planning

FSR Controls

1. Eliminate or engineer out the interface between people and live traffic by implementing road closures, detours, physical barriers, or traffic control technologies.
2. Consult the delivery team during both the design and implementation of traffic control arrangements to ensure they are practical and aligned with site conditions.
3. Assign a *competent person* to oversee the design and ongoing effectiveness of traffic management controls.
4. Obtain all required approvals, permits, and licences from the relevant authority or asset owner, and document them in the Traffic Management Plan(s) or Traffic Guidance Scheme(s).
5. Implement approved Traffic Management Plans or Traffic Guidance Schemes and monitor their effectiveness through a documented inspection regime with accessible records.
6. Barriers and anti-gawk screens must be of the correct rating and installed in accordance with the approved design and Traffic Management Plan.
7. Install barrier end treatments that are tested and approved in accordance with Australian Standards, appropriate for the posted speed environment, site geometry, and road authority requirements.
8. Establish deflection zones behind barriers to restrict people from entering and storage of materials.
9. Designate and manage construction site access points to control risk to workers, road users, pedestrians, and vulnerable road users.
10. Provide physical protection and safe escape routes for traffic control personnel working near live traffic.
11. Traffic management personnel must be trained, competent, and hold current accreditation appropriate to the tasks they perform.

DEFINITIONS

Competent Person: The competent person needs current accreditation or qualification as a Traffic Management Designer/Planner under state/territory requirements (e.g., TfNSW, VicRoads, QLD TMR) in addition to proven experience in applying Austroads Guides, designing traffic management plans, understanding risk, applying standards, and monitoring their ongoing effectiveness in real site conditions.

Hazardous Energy

FSR

Intent: To eliminate or minimise the risks of fatalities, injuries and events arising from energised plant, equipment, and sources like underground and overhead services, at installation, testing, commissioning, and decommissioning phases of operation.

Engineered Safety in Practice (examples):

- Eliminate work on or around energised plant
- Select equipment with built-in safety controls such as auto-shutdown and fail-safe modes
- Consider isolations and lockout systems for any augmented live services
- Integrate interlock systems that prevent access until energy is safely isolated
- Sequence work to avoid interactions with live services
- Physically separate vehicles and people through design layout planning

FSR Controls

1. Apply hazardous energy isolation methods in line with the hierarchy of control.
2. *Authorised Isolator* and other relevant roles are appointed for each isolation.
3. Obtain an Isolation Permit for all *group* and *multi-point isolations*.
4. Isolation locks, tags, and equipment must be readily available before work commences.
5. Clearly identify, tag, lock, and verify all isolation points to prevent inadvertent energisation.
6. Identify, de-energise, and physically isolate all hazardous energy sources before starting work on plant, equipment, or installations.
7. Treat all equipment and wiring as live until a *competent person* has verified the system is in a zero-energy state (e.g. bled or test-for-dead).
8. Release all stored energy before opening any hoses or vessels under pressure.
9. Persons working under an isolation must be trained and competent for the role that they hold.
10. Never remove another person's danger tag or isolation lock without following the approved isolation lock removal process.
11. Communicate isolation permit and all isolation changes to potentially impacted personnel.
12. Develop a commissioning plan for Mechanical, Electrical, and Plumbing (MEP) systems and communicate it to relevant personnel.

DEFINITIONS

Authorised Isolator: A trained and authorised person responsible for safely locking out, tagging, and verifying the isolation of energy sources before work begins, ensuring no uncontrolled energy can be released.

Group isolation: Process to manage more than one trade or more than six people from a single trade working under an isolation.

Multi-point isolation: Isolation of hazardous energy that requires more than one isolation point to fully de-energise or secure a plant, system, or process. May include single or multiple energy sources.

Competent Person: Competent persons for verifying a system is in a zero-energy state are defined in the Primary Standard – Hazardous Energy, Utilities and Services.

General Electrical Safety

FSR

Intent: To eliminate or minimise the risks of fatalities, injuries and events arising from onsite electrical installations and the use of electrical equipment.

Engineered Safety in Practice (examples):

- Consider the protection/layout of temporary and permanent power to reduce the risk of interface with people and plant
- Pre-fit wiring into panels and modules in controlled environments, integrate residual current devices (RCDs) and auto disconnects
- Eliminate working live through sequencing
- Consider use of modular electrical systems to minimise exposure during installation

FSR Controls

1. Live electrical work on or near (within 500mm of) exposed energised conductors is not permitted on voltages above 120vDC or 50vAC unless the work is classed as fault finding or testing.
2. Electrical work must be only carried out by *competent persons* holding the required training and licences.
3. Only *competent* and authorised electrical personnel may perform isolation, testing, switching, and other duties on high-voltage apparatus, in line with the network operator's rules and authority system.
4. Only enable access to *HV* facilities where a formalised isolation and access permit system is in place, including during commissioning or after energisation.
5. A High Voltage Safety Management Plan (or equivalent) is in place and adhered to when entering an energised *HV* facility (i.e. substation or switchyard etc.) or undertaking any works on in-service *HV* apparatus.
6. Before accessing *HV* Switchboards or Gear, the Arc Flash Study and associated controls must be in place and understood by people completing the works.
7. Verify that all temporary and permanent electrical installations, including construction wiring and switchboards, comply with Australian Standards through inspection and certification by a licensed electrician or authorised inspector before energisation.
8. Treat all equipment and wiring as live until a *competent person* has verified the system is in a zero-energy state (e.g. test-for-dead).
9. Identify and verify all circuits before starting work, including cable cutting or termination, using approved testing equipment, circuit tracing, and clear labelling.
10. Where electrical services are exposed or at risk of mechanical damage, install appropriate protection (e.g. cable tray, ducting, conduit, concrete encasement).
11. Only connect electrical tools and equipment to circuits protected by *RCDs* or *RCBOs*.
12. RCDs must be tested and tagged, and function-checked using the push-button test.
13. Visually inspect portable electrical tools and construction equipment before each use for damage or defects, and confirm they are tested and tagged in line with the RGBY system.
14. An emergency plan is in place, equipment available, and the team are trained in the response process before undertaking electrical work.

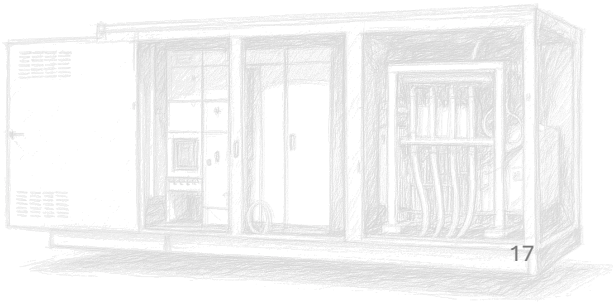
DEFINITIONS

Competent Person: Licensed electrician or authorised electrical worker competent in testing and isolation verification.

HV: High Voltage

RCDs: A mechanical switching device or association of devices designed to automatically disconnect the supply when it detects an imbalance of current between active and neutral conductors, indicating current leakage to earth. RCDs protect against electric shock and some types of electrical fire.

RCBOs: A mechanical switching device that combines the functions of a Residual Current Device (RCD) and a Miniature Circuit Breaker (MCB). It automatically disconnects the supply when it detects either a residual (earth leakage) current or an overcurrent (overload or short-circuit), providing both personal and equipment protection.



Hazardous Dust & Fibres

FSR

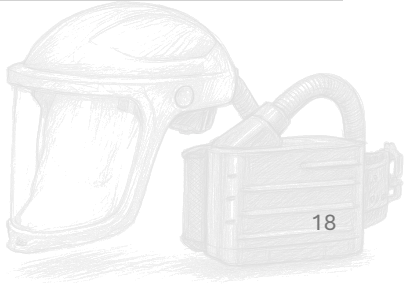
Intent: To eliminate or minimise the risks of fatalities, injuries and events arising from the management, removal and disposal of hazardous dust and fibres such as asbestos and respirable crystalline silica.

Engineered Safety in Practice (examples):

- Identify and specify materials that have lower exposure risks where practicable (e.g. Low Silica Stone products).
- Explore and agree on methodologies to minimise exposure to hazardous dusts and fibres through engineering means (e.g. dust suppression, extraction, negative pressure tents, ventilation and containment)
- Explore available technology to conduct works remotely or at a distance (e.g. robots, mobile plant attachments)
- Avoid disturbing materials containing hazardous materials/fibres in design scope if safely contained

FSR Controls

1. Identify *hazardous dust and fibre* risks during Safety in Design, constructability assessments, and work planning, and implement controls to eliminate or engineer out those risks.
2. An Occupational Health and Hygiene Management Plan must be in place and endorsed by a qualified occupational hygienist.
3. Before commencing Demolition Work or alterations / modifications to existing structures, a third-party hazardous materials survey must be undertaken.
4. All personnel undertaking asbestos removal must be trained, competent, and work under a valid licence.
5. Obtain an inspection and clearance certificate upon completion of licensed asbestos removal.
6. Compressed air, blowers or dry sweeping must not to be used for cleaning surfaces where hazardous dust may be present.
7. Use HEPA-filtered vacuums rated for the dust being collected (e.g. M-class minimum for respirable crystalline silica).
8. Implement engineering controls where hazardous dust may be generated, such as on-tool extraction, water suppression, or local exhaust ventilation.
9. Respiratory Protective Equipment (RPE) used to prevent inhalation of *hazardous dust and fibres* must be fit-tested, except for loose-fitting Powered Air Purifying Respirator (PAPR) units.
10. Respiratory Protective Equipment (RPE) to prevent inhalation of *hazardous dust and fibres* must be suitable for the task, maintained and inspected before each use for signs of damage or deterioration.
11. Conduct exposure monitoring and Health Surveillance in accordance with the Health Risk Assessment (HRA) to confirm the effectiveness of implemented controls.
12. Decontaminate tools, equipment, and clothing exposed to *hazardous dust or fibres in line* with the applicable Exposure Control Plan or Safe Work Method Statement.
13. Dispose of hazardous waste, including asbestos, at licensed facilities authorised to receive that waste.



DEFINITIONS

Hazardous dust and fibres: As per the definition in this link

Confined Spaces

FSR

Intent: To eliminate or minimise the risks of fatalities, injuries and events arising from work in confined spaces.

Engineered Safety in Practice (examples):

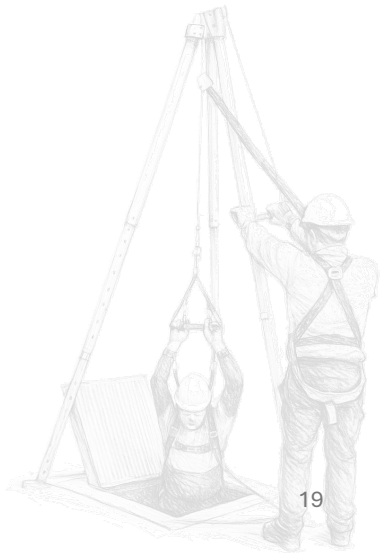
- Eliminate temporary and/or permanent confined spaces through sequencing or access modifications
- Consider ergonomics, worker environment, remote tools or robotic inspection and maintenance equipment
- Ensure access to temporary confined spaces can be restricted and controlled.
- Reduce time in confined space by prefabricating systems or components externally.

FSR Controls

1. Identify potential *confined spaces* during Safety in Design, constructability assessments and work planning, eliminating or engineering out the risk where possible.
2. Conduct a *confined space* risk assessment for each area that may meet the definition of a confined space before starting work.
3. Atmospheric testing equipment must be within calibration and tested before use.
4. Inspect breathing apparatus before each use and maintain it at defined intervals.
5. *Confined space* work must only be carried out by personnel trained and competent for their specific roles.
6. Obtain a Confined Space Entry Permit for all *confined space* entry work and verify all required controls are in place before work commences.
7. *Confined spaces* must be secured against entry and clearly signed.
8. Conduct initial and ongoing atmospheric testing and record results on the *Confined Space* Entry Permit.
9. A dedicated standby person must be present at all times while workers are inside the *confined space*.
10. An emergency plan is in place, equipment available, and entry team trained in the response process.

DEFINITIONS

Confined Space: refer to flowchart from Determining a Confined Space guide on the HSEMS



Prevention of Falls & Dropped Objects

FSR

Intent: To eliminate or minimise the risks of fatalities, injuries and events arising from working at height and using elevated work platforms. Working at Heights is defined as works where the requirement exists to wear a fall arrest/restraint harness as a primary control.

Engineered Safety in Practice (examples):

- Eliminate or reduce working at height via construction techniques and prefabrication on ground
- Integrate engineered edge, fall arrest anchors and falling object protection (e.g. dropped objects barriers) into structures
- Eliminate or reduce work in harness under fall protection or restraint
- Consider location of any required fall arrest anchor points and engineer required solution
- Eliminate or reduce exposed penetrations
- Consider accessibility of equipment and emergency retrieval (EWP etc).
- Incorporate exclusion zone requirements, work area encapsulation and tool tethering solutions for overhead work
- Consider full encapsulation of the work area to capture dropped objects and mitigate impact risks

FSR Controls

1. Identify potential for falls and dropped objects during Safety in Design, constructability assessments and work planning, eliminating or engineering out the risk where possible.
2. EWP operators must assess ground conditions before operating to confirm stability and suitability for load-bearing.
3. A Permit to Load must be in place before an EWP is set up for operation.
4. Edge protection and handrail system designs must be approved by the Temporary Works Coordinator.
5. Edge protection and handrail systems are installed as per the design by competent persons and inspected at required intervals by the Temporary Works Supervisor.
6. Personnel using fall arrest or restraint systems must be trained, competent, and hold industry-recognised qualifications.
7. A work at height permit must be in place where fall arrest or restraint systems are the primary fall prevention control.
8. Physically prevent objects from falling or people from being exposed to a fall by:
    - Use of fully encapsulated work areas (e.g. scaffold sheeting, mesh barriers).
    - Installing toe boards, netting, tool lanyards, and debris containment systems.
    - Designing catch platforms or hard barriers below elevated work zones.
    - Securing stored materials with restraining systems.
9. Where full encapsulation is not in place, establish exclusion zones beneath and adjacent to work at height, using linked physical barriers, clear signage, access approval procedures, and contact details for the responsible person.
10. Delineation controls (e.g. flagging), in combination with spotters, may only be used to manage exclusion zones for continuously moving *OHLE* operations in the rail environment.
11. EWP operators (including scissor lifts) must hold the nationally recognised competency for the equipment being used.

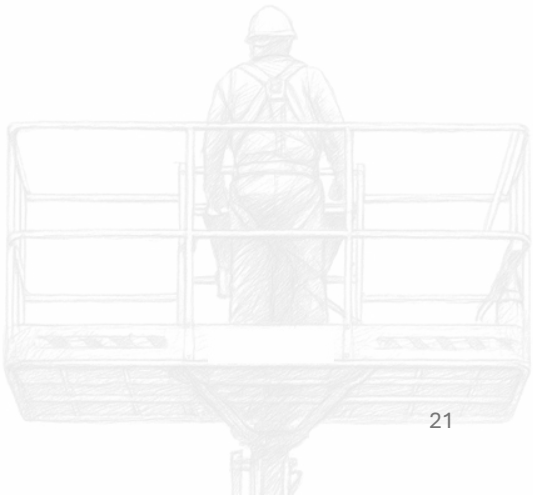
12. An emergency plan is in place, equipment available, and the team are trained in the response process.
13. Inspect and verify that fall protection anchor points are certified, fit for use, and rated to 15kN for single-person and 21kN for two-person use.
14. Cover all penetrations or gaps greater than 50 mm × 50 mm before work begins, where there is a risk of objects falling onto people below.
15. For any penetration that may need to support the weight of personnel or plant, install engineered covers or rated fall-protection measures approved by Temporary Works Coordinator.
16. Non-proprietary penetration covers must have a temporary works design and be inspected by the Temporary Works Coordinator.
17. Secure all penetration covers, clearly mark them with "DANGER Hole Below" or "WARNING Penetration Below," and display the Safe Working Load (SWL).
18. Designs for voids and penetrations in concrete slabs must consider cast-in mesh/reinforcement to prevent fall.
19. Safe access and egress to working at height areas are in place, considering emergency response requirements.
20. Obtain a Crane Workbox Permit before commencing any workbox operations.
21. Verify that secondary anti-crush guarding and/or systems are installed and functional on telescopic EWPs and scissor lifts.
22. When operating boom-type *EWPs*, wear a full body harness with a suitable lanyard securely attached to the approved anchorage point.
23. Verify that all fall protection equipment is certified, tagged, and fit for use before work begins.
24. If access is required to areas beneath elevated work zones (e.g. under viaducts), stop overhead work or manage dropped object risks using encapsulation systems or exclusion zone.

DEFINITIONS

EWP: Elevated Work Platform

OHLE: Overhead Line Equipment

Delineation: refers to the process of demarcating an area to restrict access or discourage access via the use of Visual Delineation or Physical Barricades in line with the Primary Standard for Barricading.



Scaffolding

FSR

Intent: To eliminate or minimise the risks of fatalities, injuries and events arising from erecting, altering, dismantling and using scaffolding.

Engineered Safety in Practice (examples):

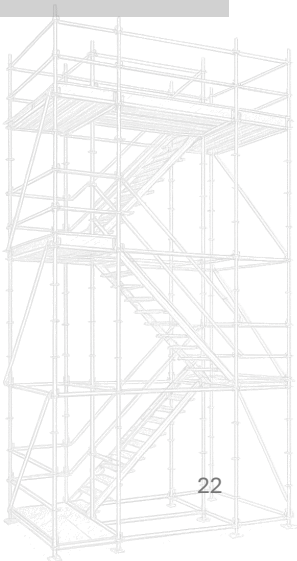
- Eliminate the need for scaffolding by incorporating permanent or temporary access systems (e.g. stairs, walkways, platforms) from the ground or allow access of elevated work platforms (EWPs)
- Agree preliminary scaffolding arrangement and make spatial allowances
- Use modular engineered scaffold systems with built-in safety features
- Incorporate scaffold layout into the planning and sequencing to prevent clashes and unsafe modifications

FSR Controls

1. Obtain an approved temporary works design before erecting any scaffold (unless the scaffold is a proprietary modular scaffold less than 4m high).
2. Scaffold design must be approved by the Temporary Works Coordinator and specify type, ground bearing capacity, wind loading, tie-in requirements and access/egress.
3. Persons erecting, altering or dismantling scaffolding must have the applicable high-risk work licence.
4. Use scaffold erection, alteration and dismantling methods that minimise fall risk, such as 1m lifts, only resorting to fall restraint or fall arrest systems where the fall risk cannot be engineered out.
5. A work at height permit must be in place where fall arrest or restraint systems are the primary fall prevention control.
6. Install physical barriers or separation controls to protect scaffolds from mobile plant and equipment impact.
7. Tag incomplete scaffolds with signage and block access using physical barricades.
8. Obtain a scaffold handover certificate upon completion, detailing scaffold type, load rating, tie-in points, access/egress, and compliance with the approved design.
9. A certified scaffolder must conduct formal inspections before first use and at least every 30 days.
10. Re-inspect scaffolds after any event that may affect stability, such as a severe weather or physical impact.
11. Obtain approval from the Temporary Works Coordinator before making any modifications to scaffold design.

DEFINITIONS

Complex scaffolds: scaffolding that is hanging, suspended, swinging and/or cantilevered



Formwork & Falsework

FSR

Intent: To eliminate or minimise the risks of fatalities, injuries and events arising from erection and dismantling of formwork and falsework.

Engineered Safety in Practice (examples):

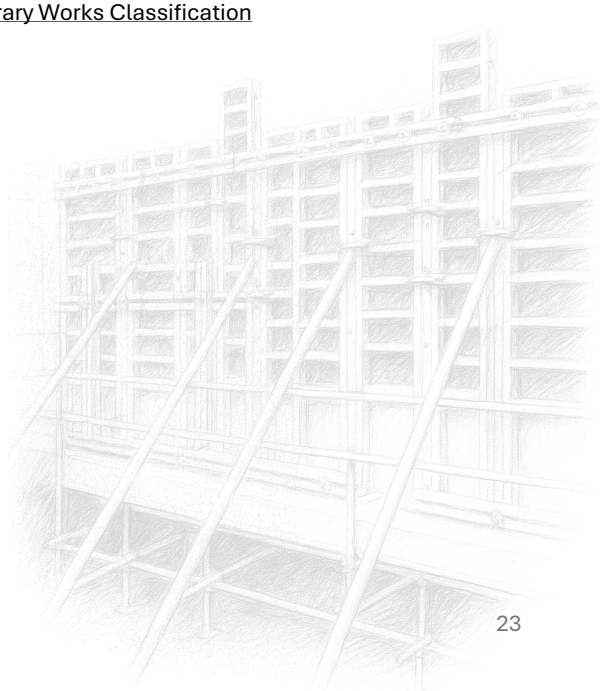
- Procure modular formwork to integrate with screens and form systems to provide encapsulation
- Eliminate or reduce working at height via construction techniques on ground
- Eliminate the need for falsework or formwork with offsite manufactured elements
- Incorporate fall protection and access into formwork system

FSR Controls

1. Only construct falsework and *medium / high-risk formwork* from designs that are Issued for Construction and authorised by the Temporary Works Coordinator.
2. A documented method and sequence for assembling and dismantling formwork and falsework must address fall and penetration protection, access, egress, and emergency response needs.
3. Inspect all formwork and falsework materials, equipment, and components before use, and remove any defective items from service.
4. Only set up concrete boom pumps in locations with a valid Permit to Load.
5. Obtain a Permit to Load before applying any load to falsework or *medium / high-risk formwork*.
6. Design changes must be approved by the Temporary Works Designer, reinspected, and the Permit to Load renewed.
7. Prevent persons and objects from falling from elevated formwork and falsework by incorporating edge protection, containment sheeting, gap covers, or deflector shields.
8. Establish exclusion zones beneath formwork during concrete placement using physical barricades, signage, access approval procedures, and contact details for the responsible person.

DEFINITIONS

Medium or high-risk formwork: as per definitions outlined in Temporary Works Classification and Control Measures Guidelines



Work in, over & Adjacent to Water

FSR

Intent: To eliminate or minimise the risks of fatalities, injuries and events arising from work over or adjacent to water and diving work.

Engineered Safety in Practice (examples):

- Eliminate work in, over or adjacent water where possible
- Design access platforms or complete work from land, and use drones or remote tools for inspection and minor works
- Incorporate fall protection, rescue systems and life-saving infrastructure in design and work planning stages

FSR Controls

1. Identify risks associated with work in, over, or adjacent to water during Safety in Design, constructability assessments, and work planning, and implement controls to eliminate or engineer out those risks.
2. Obtain an approved temporary works design for all temporary works located over or adjacent to water.
3. Before loading any vessel for piling or marine works, obtain a Permit to Load from the Temporary Works Coordinator, supported by a verified stability assessment from an accredited marine surveyor.
4. A Vessel Management Plan must be in place for all vessels in use.
5. Inspect and maintain vessels in accordance with the Vessel Management Plan.
6. All personnel involved in diving or vessel operations must be trained, competent, and hold the required licences.
7. Implement a dive plan that includes inspection of gear, communication requirements, monitoring of changing conditions, and emergency response procedures.
8. Maintain a dive safety log for each dive, recording all safety checks, equipment used, and any unplanned events or deviations.
9. Apply the Hierarchy of Falls Protection to any work on, over or adjacent to water.
10. Always wear a personal flotation device (PFD) when working over or within 2m adjacent to water and inspect it before each use for damage or defects.
11. Position and secure approved life buoys and lifelines at designated locations, with sufficient line to reach the water level and allow easy emergency access.
12. Establish recoil and drop zones for winches, anchors and cranes before work begins to restrict access.
13. Verify all winches and wires on barges are fully guarded before starting work to prevent entanglement or contact.
14. An emergency plan is in place, equipment available, and the team are trained in the response process.

Precast Concrete

FSR

Intent: To eliminate or minimise the risks of fatalities, injuries and events arising from precast and tilt up concrete work.

Engineered Safety in Practice (examples):

- Pre-fit services and penetrations to reduce onsite remediation works and exposure to hazardous dust and fibres
- Reduce need to in-situ construction and associated working at height risks by designing with precast components in the first instance
- Incorporate and embed engineered and certified lifting anchors, bracing and lifting points into components

FSR Controls

1. Fabricate and install precast concrete elements only in accordance with an approved and certified engineering design.
2. Store precast elements on level, stable ground with appropriate supports, in accordance with the certified temporary works design.
3. Develop and implement a documented safe system of erection for all precast and propping elements, reviewed and approved by a *competent engineer* before lifting or installation begins.
4. Temporary supports must not be removed until approved by the Temporary Works Coordinator and authorised via a Permit to Unload.
5. Obtain documented approval from the design engineer before making any changes to precast element or support system designs.
6. The Crane Appointed Person, Crane Supervisor or delegate must verify that the lifting clutch is compatible with the cast-in lifting point before each lift.
7. Access to precast erection zones is restricted to authorised personnel using physical barriers and signage.
8. Verify and record concrete test results and the Certificate of Compliance (Birth Certificate) to confirm conformance with design requirements before lifting.
9. Install physical barriers to protect propping systems from impact by mobile plant.
10. Inspect props in accordance with the inspection frequency and method specified in the approved design.
11. The Temporary Works Coordinator or Supervisor must inspect brace supports before use and throughout construction to confirm compliance with design documents.

DEFINITIONS

Competent Engineer: A qualified and authorised professional engineer experienced in precast lifting and temporary works, responsible for reviewing and approving the erection method and stability plan before work begins.

Demolition

FSR

Intent: To eliminate or minimise the risks of fatalities, injuries and events arising from demolition work.

Engineered Safety in Practice (examples):

- Engineer containment systems to control dust and debris
- Minimise personnel required for demolition work through technology, planning and proposed methodology.
- Reduce exposure to demolition risks by using robotic or remote-controlled demolition equipment

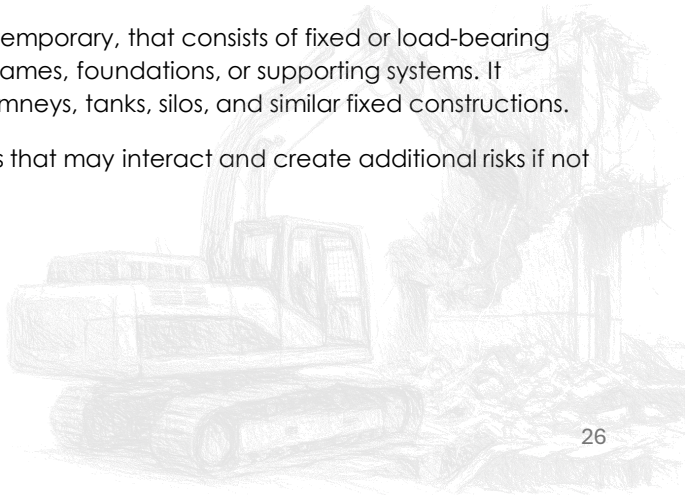
FSR Controls

1. Develop and communicate a Demolition Management Plan in accordance with AS 2601, detailing the sequence of works, risk controls, engaged contractors, and how works and associated *SIMOPs* will be managed.
2. Engage licensed demolition contractors holding a current licence appropriate for the type and scale of work.
3. Conduct a hazardous materials survey before demolition of any *building or structure*.
4. Hazardous materials are removed by competent persons and where required, licensed contractors.
5. Notify the regulator of any demolition works in accordance with relevant legislative requirements before work commences.
6. Where temporary support is required, determine the temporary works requirements for the demolition sequence, obtain a documented design, and obtain approval by the Temporary Works Coordinator.
7. Confirm all services identified for removal are physically disconnected and tested for dead by a competent person before demolition.
8. Clearly label and physically protect all services, including temporary services, that are to remain operational during demolition to prevent mechanical damage.
9. Conduct a pre-start briefing with all demolition workgroups to communicate the approved work sequence and temporary works requirements.
10. Establish exclusion zones around demolition areas before work begins using physical barricades and signage stating "Demolition Works in Progress" to restrict access to authorised personnel.
11. Install and maintain monitoring devices to verify the ongoing stability of surrounding structures, where specified in the demolition plan.

DEFINITIONS

Building or structure: any constructed item, permanent or temporary, that consists of fixed or load-bearing components such as walls, floors, roofs, beams, columns, frames, foundations, or supporting systems. It includes, but is not limited to: Buildings, bridges, towers, chimneys, tanks, silos, and similar fixed constructions.

SIMOPs: The concurrent execution of two or more activities that may interact and create additional risks if not coordinated.



Rethinking safety through

INCLUSION

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WELLBEING