Construction Safety Guidebook

Introduction

Safety is a core aspect of Micron people value, and we are committed to an incident and injury free workplace.

To better help our Construction Contractors understand Micron safety requirements and identify unsafe site conditions this, “Construction Safety Guidebook” is developed with alignment of Micron’s “Global EHS – Construction Performance Standard”.

This Guidebook provides critical pictorial information with description on safety policies, requirements and specifications. The information in this Guidebook is a useful safety reference material to provide guidance on important safety practices, which helps to prevent incident at Micron construction projects.

The Contractor shall comply with all the EHS requirements contained in this specifications and supporting documentation, even where these impose a higher standard than that required by current local legislation globally. This guidebook is included as part of the EHS standards and requirements in the contract agreement.

Micron

Live Safe

Everyone deserves to go home safe.

Micron

You Are Our Greatest Asset

"Live Safe" is Micron EHS Culture program that aims to develop a world class EHS culture within the Micron network. Live Safe program is about ensuring every Team Member, Partner and contractors working at any Micron Site can go home healthy and safe everyday and be able to work in an environment where they are safe and treated with dignity and respect.

“There is not a wafer that we make that is worth the cost of an injury”

Buddy Nicoson

SVP, Global Front End Operations

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Micron Global EHS Policy

Micron is committed to environmental, health and safety (EHS) excellence as we pursue our mission to be a global leader in memory and storage solutions.

We are committed to the protection of the environment, including pollution prevention, and providing an incident and injury-free workplace (Live Safe©) for our team members, contractors and visitors. We believe all EHS injuries and incidents can be prevented and we collaborate with key stakeholders to attain this goal through risk evaluation and effective controls.

We do this by proactively setting strategic objectives that take into consideration our compliance obligations, our risks and opportunities, and the needs and expectations of our stakeholders as defined in the scope of our management system.

All Micron team members and contractors must uphold this policy. We hold our leaders, managers and supervisors responsible for conforming our operations to this policy.

Our Commitments

- We comply with the law, other compliance obligations and Micron's Code of Business Conduct and Ethics. We look to go beyond legal compliance where appropriate to demonstrate our commitment to the environment and people.
- We employ a systematic management approach (lifecycle) to minimize adverse EHS effects of our operations by reviewing our work environment, the equipment used in our workplace and materials incorporated into our products as well as considering their use, and end of life. This attention to our supply chain allows us to evaluate opportunities to eliminate health and safety hazards and reduce EHS effects at the earliest stages of planning and design.
- We encourage our team members and contractors to provide EHS enhancement suggestions, and we consider their suggestions in decision-making processes that affect EHS performance.
- We focus on continual improvement of our EHS management systems to enhance our EHS performance.
- Micron will provide the necessary investments, including resources and capital, to support and deliver our EHS commitments.

Sanjay Mehrotra
Chief Executive Officer

Micron Confidential

Construction EHS Pre-Qualification Requirements

Contractors performing work at Micron should go through an EHS pre-qualification processes administered either at the site or corporate procurement level. Each proposed Contractor shall have above average EHS performance records, specifically:

1. OHSA Recordable Incident Rate <= 1.8 for the previous 3 years (or equivalent local country incident rate).
2. Zero (0) Fatalities in last 5 years.
3. Company has not been prosecuted, served with a prohibition or improvement notice or fined by the enforcing authorities for a violation under local Health, Safety or Environmental legislation for the past 5 years.
4. Company has been certified to ISO 14001:2015 Environmental Management Systems and ISO 45001:2018 Occupational Health and Safety Management Systems.

Corrective Action Plan (CAP) will be required to address any prequal metric that is not met. The CAP must be reviewed and approved by Micron Project Manager and Micron EHS Representative before awarding of contract.

Empowerment to Stop Work

"Micron is committed to protecting the safety and heath of all team members, contractors, vendors and visitors, as well as the environment, at all facilities in which it conducts its business.

Our Stop Work Policy grants all team members, contractors and vendors working at its facilities the authority and responsibility to stop work or behavior that could create imminent danger to any person, cause damage to the environment or violate legal regulations."

Micron Confidential

Zero Tolerance

Everyone deserves to return home safely after work and has an important role to play in ensuring safe work planning and ensuring by following established safe work rules and regulations.

Micron's Zero Tolerance initiative specifies mandatory compliance requirements for safe high risk work execution, which is fundamental in preventing Life Altering Injuries or Potential Life Altering Injuries.

Therefore, the Contractor's Project Management Team is required to incorporate the "Zero Tolerance" initiatives into their EHS Management Plan for roll out and enforcement. Non-compliance to "Zero Tolerance" initiative will result in serious disciplinary action including termination.

Construction Safety Rules

Rule no.1: Assess and control all risks before work

- Know the hazards and assess the risks of your work daily.
- Conduct review of job hazard analysis (JHA) and Pre-task plan (PTP) briefing before any work.
- Ensure safety measures and controls are in place before you begin work.

Rule no.2: Ensure and work with a valid work permit

- Check if a work permit is required for your activity such as lifting, excavation, work at height and others.
- If yes, confirm the work permit is signed and it is check for safety controls before start work.

Rule no.3: Wear Personal Protective Equipment (PPE)

- Wear safety helmet, safety goggles, safety shoes, safety gloves and high visible vest always.
- Do not perform work without wearing proper task-specific PPE outlined in your job hazard analysis.

Rule no.4: Reporting of unsafe act and condition

- Report any unsafe condition onsite to your supervisor or EHS team immediately.
- Report any incident or injury to your supervisor or EHS team immediately.
- You are authorized to stop work, if it is unsafe to work.

Rule no.5: Prevent falls while working at height

- Ensure that there is fall protection measures in place before working at height. Example edge guardrail, proper working platform, lifeline with secure anchor points etc.
- Use fall protection equipment (safety harness with lifeline) when there is a potential to fall from height.

Rule no.6: Ensure good housekeeping

- All pathways must always be kept clear of obstructions.
- Waste and other debris must be promptly removed or placed in a designated storage area daily.
- No material is allowed to place/store near leading edge.

Rule no.7: Safe material handling

- Always ensure loads are secured properly before transporting or hoisting activity.
- Use proper mechanical handling or transportation means.
- Check transportation route and ensure no tripping hazard.

Rule no.8: Zero tolerance on high risk violation

- Micron are committed to promote safe behavior and make “Safety is everyone’s responsibility”.
- All safety zero tolerance violations will subject to disciplinary investigation, with possible suspension from work.

Micron Pre-task Planning

- The Pre-task Planning (PTP) provide check on the non-routine high risk activities and reinforcing the task-specific hazards and safety measures onsite just before work activity.
- The PTP also promotes craft workers participation in the hazard recognition and control process at the task level and importantly, it gathers the craft workers sign-off and buy-in immediately before a task.
- Contractors are to effectively implement and utilize PTP for all the work activities at their projects.

PRE-TASK PLANNING

Company Name:	Supervisor In-charge:	Location of Work:
Description of works:		
Start Date/Time:	End Date/Time:	Number of workers:
Material Handling Plan (Method of delivery):		
Hoisting Plan (Personnel & Permit):		

Section 1: Please review the work to be performed onsite and check 'Yes' or 'No' below. (If answer below is "Yes", please confirm physical hazards onsite and verify safety measures implemented written in approved RA/JHA):

1	Does the work expose to falling from height of more than 6 feet or 1.8 metre?	☑ Yes	☐ No	9	Does the work involve in transportation of huge, bulky and/or heavy equipment?	☐ Yes	☐ No
2	Does the work involve in using of hazardous chemicals or gases?	☐ Yes	☐ No	10	Does the work involve in using of forklift for moving of load?	☐ Yes	☐ No
3	Does the work involve in "Live" electrical system or energized equipment?	☐ Yes	☐ No	11	Does the work involve in working at ceiling, sub-fab utilities areas or roof?	☐ Yes	☐ No
5	Does the work involve in non-routine lifting, which is not approved previously?	☐ Yes	☑ No	14	Does the work involve in removing raised floor tiles or work under raise floor?	☐ Yes	☐ No
6	Does the work involve in confined space entry or excavation?	☐ Yes	☐ No	15	Does the work involve in any oxy-cutting or welding hot work?	☐ Yes	☐ No
7	Does the work involve in disable or removing equipment safety interlocks?	☐ Yes	☐ No	16	Does the work involve in dismantling of electrical or chemical system?	☐ Yes	☐ No

Are any of the following permits or forms required? (Mark if apply. Permits and RA/JHA must be attached to this Pre-task Planning)

☐ Working at Height	☐ Confined Space	☐ Electrical Works	☐ Critical Lift Plan	☐ Hot Work
☐ Traffic Control	☐ Chemical & gas	☐ Excavation	☐ Chemical MSDS	☐ SIPP

Section 2: Pre-task planning have been reviewed in the work area and the workers have been given the safety briefing.

Construction Activity (In Sequence)	Hazards Identified	Safety Measures

Crews/Workers Name and Signature:

Note: IF WORK CONDITIONS CHANGE, WORK MUST STOP AND A NEW PLAN MUST BE PREPARED.

Unless the Contractor has provided their own pre-task planning form, please use Micron pre-task planning accordingly.

Global EHS – Construction EHS Metrics

Construction EHS Metrics And Performance

S/No	EHS Metrics	Target
1	**OSHA Rate (Lagging Indicator)**	Project Duration: • < 1.2 (On Target) • ≥ 1.2 to 1.8 (At Risk) • > 1.8 (Behind)
2	**Life Altering Injuries (Lagging Indicator)**	By end of Month: • = 0 (On Target) • ≥ 1 (Behind)
3	**Notice of Violation (Lagging Indicator)**	By end of Month: • = 0 (On Target) • = 1 (At Risk) • ≥ 2 (Behind)
4	**Repeat EHS Incidents (Lagging Indicator)**	By end of Month: • Zero Repeat Incident (On Target) • 1 Repeat Incident (At Risk) • ≥ 2 Repeat Incident (Behind)
5	**Risk Management & Pre-task Planning Compliance (Leading Indicator)**	By end of Month: • = 0 Non-compliance (On Target) • ≥ 1 Non-compliance (At Risk)
6	**Safety Observation Rate (Leading Indicator)**	By end of Month: • ≥ 50% of manpower, capped at 1000 (On Target) • 35% to 50% of manpower (At Risk) • < 35% of manpower (Behind)
7	**Incident, nonconformity & corrective action (Leading Indicator)**	Project Duration (average): • < 7 Days (On Target) • 7 to 9 Days (At Risk) • > 9 Days (Behind)
8	**Site EHS Campaigns (Leading Indicator)**	By end of Month: • ≥ 3 EHS Campaigns (On Target) • 2 EHS Campaign (At Risk) • < 2 EHS Campaign (Behind)

Construction EHS Metric Dashboards

S/No	EHS Metrics	Target
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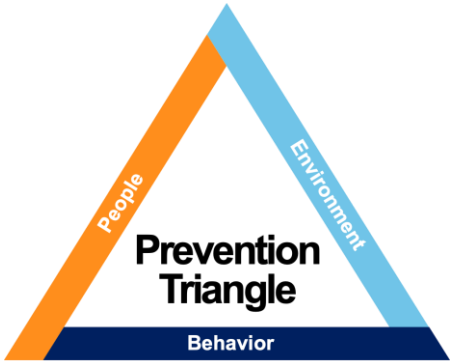

OSHA Rate

The OSHA Recordable Incident Rate is calculated by multiplying the number of recordable incident cases by 200,000, and then dividing that number by the number of man hours for the project.

OSHA Rate	>1.8	≥ 1.2 to 1.8	<1.2

Construction EHS Metric Dashboards

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Life Altering Injury

Also be described as “catastrophic” injuries, they are generally defined as injuries that are so serious that they result in some form of permanent disability, chronic health problems, and/or a reduction in the victim's life expectancy.

Life Altering Injuries:

≥1	0

Construction EHS Metric Dashboards

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Notice of Violation

Formal written notice of violation from a regulatory agency as a result of an EHS-related incident or regulatory agency direction to stop or interrupt site operations.

Notice of Violation:

≥2	1	0

Construction EHS Metric Dashboards

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Repeat EHS Incidents

Examples of an EHS-related incident include but are not limited to: work-related injury, release of material to the environment and serious near miss which may have had the potential for a severe injury.

Repeat EHS Incidents:

≥2	1	0

Construction EHS Metric Dashboards

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Risk Management & Pre-task Planning Compliance

Risk management tools (Risk Assessment, Job Hazard Analysis, Pre-task Planning etc.) which are utilized to determine the hazard identification and assessment of risks and opportunities. Site needs to ensure effective execution of risk management tools onsite.

Risk Management & Pre-task Planning Compliance:

≥1	0

Construction EHS Metric Dashboards

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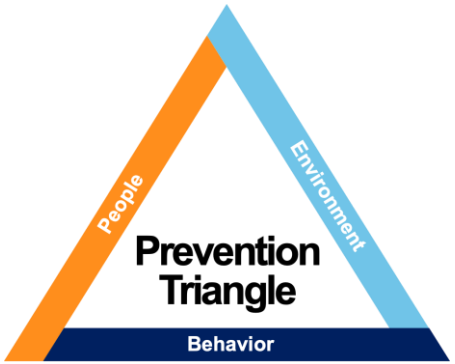

Safety Observation Rate

Safety observation rate is part of the behavior safety program, establish to enable project employees and workers to record safety observations, most importantly, stopping of work that is unsafe during the safety observation.

Safety Observation Rate:

<35%	35%-50%	≥50%

Construction EHS Metric Dashboards

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Incident, Nonconformity & Corrective Action

Establish and implement a processes, including reporting, investigating and taking action, to manage incidents, and nonconformities from inspection and audit. The timely action is to enable hazards to be eliminated and associated EHS risks to be minimized asap.

Incident, Nonconformity & Corrective Action:

>9 Days	7-9 Days	< 7 Days

Construction EHS Metric Dashboards

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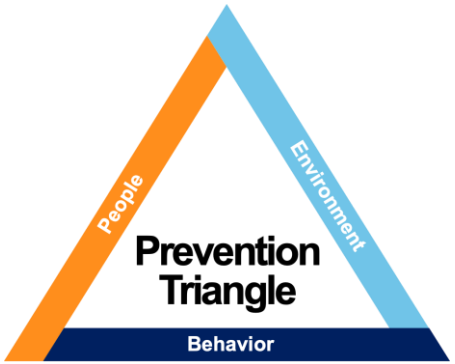


Site EHS Campaigns

Organise and conduct specific EHS campaign to promote the safety awareness and also proactively identify and manage workplace hazards. This does not include routine toolbox briefings and EHS related trainings.

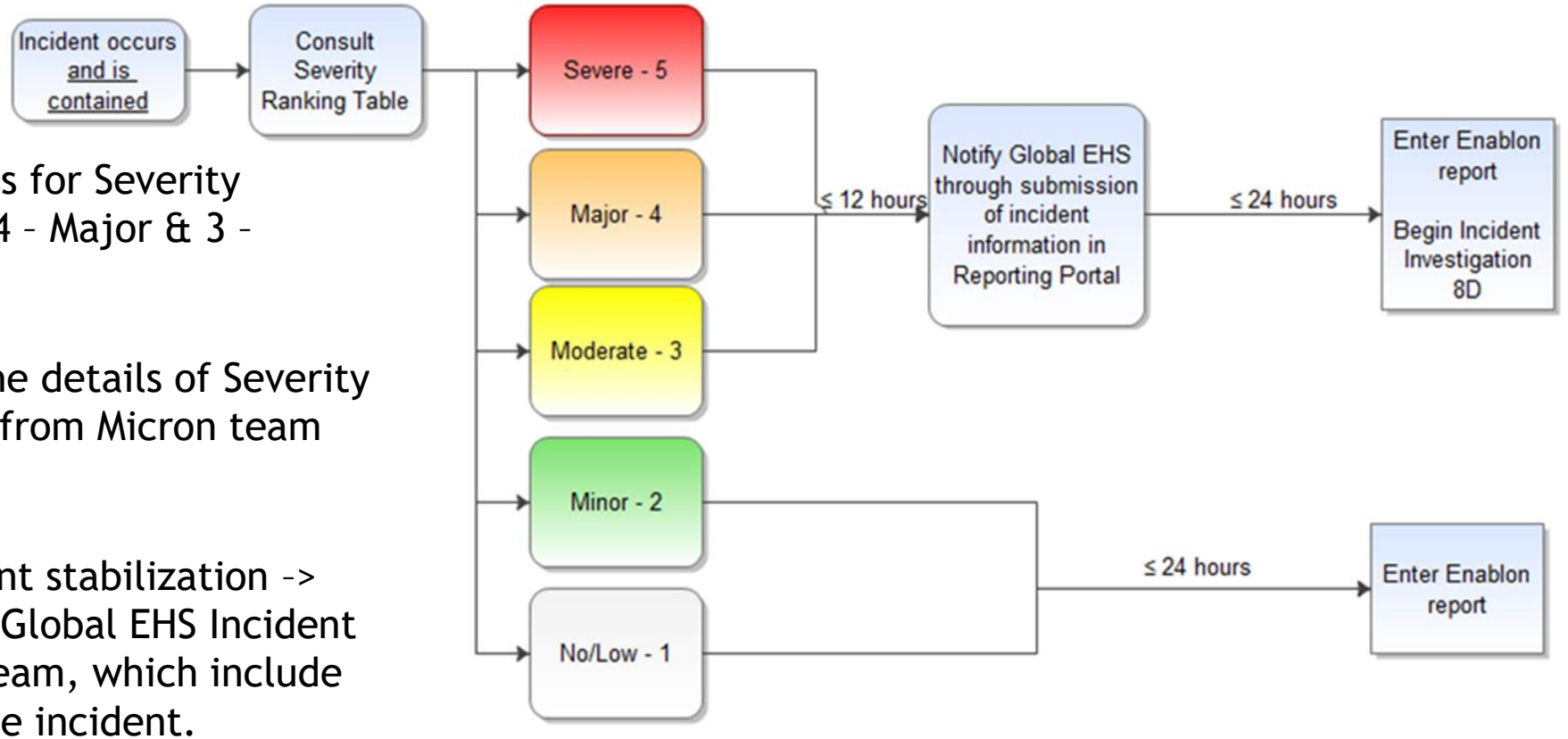
Site EHS Campaigns:

<2	2	≥3

Global EHS – Incident Reporting & Investigation

Incident Reporting Process

- Incident reporting process for Severity Category for 5 - Severe, 4 – Major & 3 – Moderate.
- Contractors can obtain the details of Severity Categories Classification from Micron team members.
- Within 12 hours of incident stabilization -> Contractor shall submit “Global EHS Incident Notification” to Micron team, which include factual information on the incident.



Incident Investigation Requirements

- Contractor need to use 8D process to investigate the incident categories shown at Table 3.
- For incidents that meet the 8D reporting threshold, a Supplier Quality Notification (SQN) in the GDMS system must be issued so that the 8D process is triggered for the Contractor to complete.
- Contractor shall select an appropriate root cause analysis tool for the investigation. Example: 5-Why (Preferred), Fishbone, Fault Tree etc.
- As part of the construction EHS metrics, Contractor need to timely manage and submit the incident investigation report by the 6th days of incident.

Table 3 Investigation Requirements

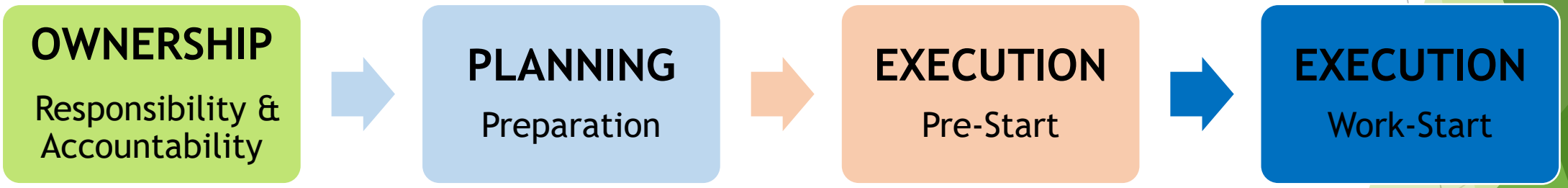
Severity Category	Actions Required	
	Submit 8D to Global EHS	Root Cause Analysis
Severe	Required	Part of the 8D process
Major	Required	Part of the 8D process
Moderate	Required	Part of the 8D process
Minor (with LAI potential)	Required	Part of the 8D process
Minor (with no LAI potential)	Not required	Required
Low	Not required	Required
Near Miss (with LAI potential)	Required	Part of the 8D process

S/No	EHS Metrics	Target	Site	Explanation Notes
7	**Incident, nonconformity & corrective action (Leading Indicator)**	Project Duration (average): • < 7 Days (On Target) • 7 to 9 Days (At Risk) • > 9 Days (Behind)	**<7 days**	Establish and implement a processes, including reporting, investigating and taking action, to manage incidents and nonconformities. The timely action is to enable hazards to be eliminated and associated EHS risks to be minimized asap.

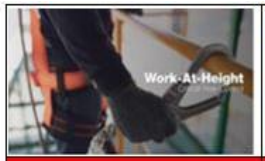
Global EHS – Critical Risk Review Checklist

Critical Risks Review Checklist Introduction

- As part of Micron “Zero Repeat” continual improvement program, Micron requires all high-risk activities (Critical Risks) performed at the workplace to be reviewed and where required, Control Measures outlined in the Critical Risks Review checklists to be adopted to ensure work can be carried in a safe manner.
- Applicable to works involving 6nos of critical risks performed by Micron projects. Contractor can obtain the 6nos of critical risks checklists from Micron Project/EHS team.
- The review processes involves the following 4 steps:



Scope of Critical Risks Checklist

									
	WAH	**Lifting**	**Elect "Live" work**	**Confined Space**	**Hot Work**	**Excavation**	**Traffic**	**Environmental Control**	**Hazardous Substance**
Scope	• >3m or meet local regulatory/ construction requirements	• All site crane lifting & rigging activities • Rigging activities associated with tool move-in/out	• Energized electrical work or inspection on live system >50Volts (AC, rms)	• Work within space with limited/restricted entry/exit, & not designed for continuous human occupancy.	• Riveting, welding, flame cutting or burning work involving use or generation of sparks	• Any digging, including driving piles or any other objects >0.3m in depth, into the ground, regardless by human or by machine.	• Non-routine Work which changes and affects traffic or external pedestrian walk-way, within Micron compound	• Construction, & Operations non-routine work with environmental impact, or can result in Health injury, covering: - Erosion, - Waste Mgt, - Sustainability - Pest, - Noise, - Dust	• Construction, & Operations non-routine work involving new chemicals into site, including:. -Hazardous substance -Flammable substance -Acidic/ Caustic chemicals, -Hydraulic fluids
Include	• Inc activities which require Fall-protection (eg. work with floor-board opening & Ceiling work)	• Inc non-routine lifting work using Lorry crane or forklift	• Inc "live" Testing/ Commissioning of elect system						
Exclude	• Exc routine Tool-install activities with existing SOP/Procedures			• Exc routine PM work with SOP/Procedure. • Exc work under raised metal floor (RMF), & above ceiling.	• Exc Orbital & IR welding, with no spark generation • Exc Hot work carried out in defined workshop with controls in place			• Exc Operational Routine work: follow current site Environment, Health, Safety & Sustainability practices which cover these areas	• Exc Operational Routine work: follow current business process for new chemicals (CEDAR, etc.)

Example – Working at Height Checklist (Part 1)

Critical Risk #1 – Working-At-Height Checklist						
Fac Owner (Non-construction):		GC Owner (Construction):				
Item	Critical Controls	PLANNING	EXECUTION DATE:		Remarks	
			Pre-start	Work-Start		
PLANNING: Documentation, Risk Assessment, etc						
1.1	Safe work method and risk assessment is available for the work scope.	TICK if YES ☐	[redacted]			
1.2	Pre-Task Plan outlining risks associated with scope of work and controls prepared by the task supervisor is in place.	☐				
1.3	Work-at-Height crew competency certificates is available and meet the relevant experience/training requirements (Supervisor > 3years, Workers > 1year)	☐				
1.4	Fall Prevention Plan is in place where the hierarchy of controls been identified and applied to the working at heights activities; e.g. eliminating the need to work at height where practicable, using fixed platforms such as scaffolding, edge protection, or MEWP's instead of fall arrest or restraint systems? MEWP's have engineering controls to prevent crush injuries to operator (secondary guarding) unless risk assessment demonstrates not reasonably practicable.	☐				
1.5	If the work activity involves usage of MEWP, please ensure the following requirements are met: • Inspection checklist indicating that the plant is fit for purpose available. • Report/record that the plant is in good condition and is inspected and maintained by a competent person in accordance with the OEM's requirements • Machinery used fitted with compliant crush protection, unless risk assessment demonstrates otherwise. • Operator is trained and certified by OEM	☐				
1.6	If the work activity has Falling Object risk, please ensure the following requirements are met: • Machinery used fitted with compliant Falling Object Protection, unless risk assessment demonstrates otherwise. • Is the area below appropriately barricaded off (hard barricades preferred) and signage indicates "Work-In-Progress Above"? • Is the area above appropriately barricaded off and sign posted "Work-In-Progress Below"? • Scaffolding, walkways, and temporary work structures are fitted with toe-boards/safety nets to minimise the risk of falling objects. • Grid mesh or covers have been installed in all areas where an object may fall through	☐				
PLANNING: Pre-run (within 72hrs of actual work)						
1.7	Has the Pre-run been done within 72hrs of the scheduled activity day (Date: _____)	TICK if YES ☐				
1.8	All equipment, including elevated work platforms and scaffolding must be: • Fit for purpose design and inspected/approved prior to use • Inspected by a competent person prior to use (Scaffold inspection tags) • Scaffold Inspected at intervals of not more than 7 days immediately following the date of the last inspection by the scaffold supervisor • Ensure a master scaffold register is in place • Used and maintained in accordance with manufacturer's instructions, standards, or design specifications • Ongoing monitoring of work at heights controls and re-inspection/approval of changes as required	☐	TICK if YES ☐			
1.9	Working at heights activities, or activities with the risk of fall are witnessed to have been safely planned, conducted, and supervised. Fall control measures installed onsite: • Safe mean of access and egress provided • Openings into or through which a person may fall are covered or guarded with effective barriers • There are handrails, top and mid rails at open sides of staircases • Guardrails and toe-boards are in place to prevent people and objects from falling over the edge • Working platforms used are certified and is able to support the worker's weight • Workers are provided with personal fall arrest systems and secure anchor points	☐	☐			

Example – Working at Height Checklist (Part 2)

	• Plan the type of fall system to be used – Fall restraint system or Fall arrest system • Plan the fall clearance – Self retracting device for work activity < 5.5 m is required				
EXECUTION: Pre-start					
1.10	Ensure final run-through/tool-box meeting is done and no deviation from Pre-run condition			☐	
1.11	Equipment/PPE Pre-check: Harnesses and lanyards; • Inspected prior to use by competent personnel, details recorded on register • Lanyards incorporate a shock absorber for fall arrest system • Minimum slack between harness and lanyard • Full body (5 point) harnesses used, attached to appropriately certified anchor points • Floor openings are identified, adequately covered and their locations communicated with the use of barricades and conspicuous warning signs			☐	
1.12	Document Check • Task specific PTP and WMS have been communicated to workers and they have signed the PTP acknowledging they have understood; 1) The hazard and controls, 2) Conditions that require them to stop work, and 3) Emergency arrangements. • Working at height permit & rescue plan (where required) raised and approved, and available at the work front			☐	
1.13	• Personnel listed for working at heights & supervision of working at heights are competent and tallies with those on-site • Workers and supervisor understand the controls required for working at heights • Condition for "Stop/Pause Work" is understood by workers if they encounter any deviation from workplan			☐	
1.14	If the work activity involves usage of MEWP, please ensure the following requirements are met: • Daily Pre-start inspections have been completed for the mobile plant, with deficiencies listed and actioned for repair/replacement. • Plant operator is aware of the safe operating requirements, holds valid competency certificate and has at least 1year operating experience/operator certification. • A spotter is assigned to assist plant operation and is aware of emergency operations			☐	
1.15	If the work activity has Falling Object risk, please ensure the following requirements are met: • Exclusion zones established where there is a risk of falling objects. The exclusion zone radius is based on the likely drop zone based on the height and type of material • Tools and materials that could cause a falling object risk are restrained to prevent dropping where practicable including: Tools being tethered, Use of rated buckets/bags to secure small items, Chin straps for helmets, Loads that are transported by cranes or mobile plant shall be secured by a competent rigger. Safety net for scaffolds, etc.			☐	
EXECUTION: Work-Start					
1.16	Ensure assigned Site Leader Validation completed before proceeding to start work (Name: _____)			Tick if YES ☐	
1.17	Supervision to monitor works / subcontract works present at work location.			☐	
1.18	If the work activity involves usage of MEWP, please ensure the following requirements are met: • Functionality of the following is tested; lights, safety warning devices, tyres, mirrors, brakes, etc. • No signs of leaks (engine/hydraulic oil) • Traffic warden/spotter present to assist plant operator • Plant operator aware of traffic movement plan			☐	
1.19	If the work activity has Falling Object risk: • Workers that could be exposed to a falling object understand the risks and controls to manage falling objects risk (demonstrated through evidence of training or consultation in JHA, WMS/PTP development and briefing) • Regular housekeeping inspections are be undertaken to identify, remove or secure falling object risks			☐	

Global EHS – PPE Requirements

PPE Requirements

Contractor shall provide, maintain, and enforce the usage of personal protective equipment (PPE) for everyone involved in the project. Contractor shall provide the required PPE free of charge to their respective workforce and visitors. The PPE shall be compulsory on site and shall conform to the international product standards.

Work Gloves Requirements

Mandatory Construction Site PPE:

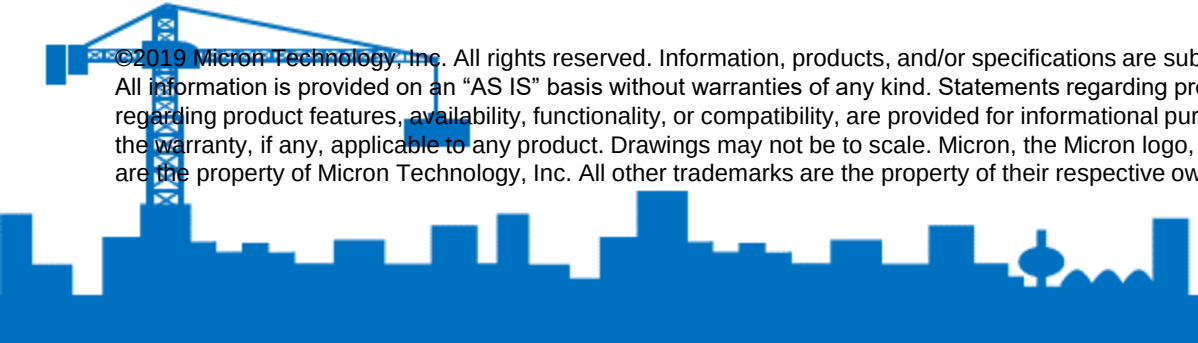
Project personnel working in Micron's Construction Sites to adopt and comply to Micron PPE Standard. This covers; Micron team members, Contractor team members, Authority representatives and visitors. The personnel protective equipment and work gloves are required to be worn as soon as personnel access PPE Zone within the construction site.

Safety Gloves Requirements:

All personnel working at Micron construction projects are required to wear EN388:2016 or ANSI105:2016 (TDM test standard) rated cut resistant gloves as a minimum requirement.

This requirement is established in reference to internationally recognized standards e.g. EN, ANSI and applicable local standards or regulatory requirement, whichever that offers superior hand protection. The standards provide a consistent, numeric-scale method, e.g. cut, puncture and abrasion resistance, chemical permeation and degradation, detection of holes, and heat and flame resistance, with which the hand gloves are tested against.

Global EHS – Construction EHS and Training Facilities Requirements



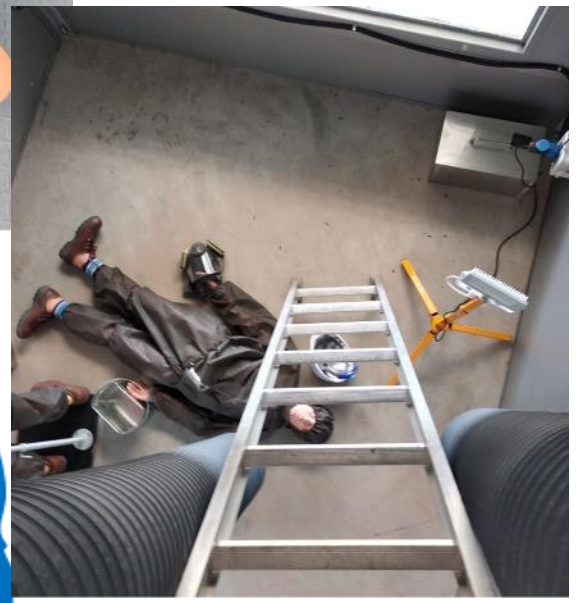
EHS and Training Facilities Requirements

- General Contractors are required to setup a safety training centre with different mock-up areas in order to enhance the training given to workers. The establishment of interactive, hands-on, and innovative safety training will allow workers to have a clearer understanding of the work activities, potential hazards and the safe working procedures; this will ultimately lead to a safer workplace. The training facilities itself shall be safe, periodically maintained and must not expose the trainee's to harm
- The setup of the training facilities are illustrated in this requirements and include the following mockup:
    1. Working at height training mockup
    2. Confined Space training mockup
    3. Lifting and rigging training mockup
    4. Electrical Lockout Tagout training mockup
    5. Flooring opening training mockup
    6. Chemical handling training mockup
    7. Drainage and walk path mockup
- General Contractors are also required to provide adequate, clean and conducive welfare facilities not limited to but some of which is outlined below:
    1. Workers Rest and Canteen Facilities
    2. Site First Aid and ERT Facilities
    3. Workers toilet Facilities
    4. Mass toolbox briefing space with mass communication setup
    5. Integrated Security Facilities

Training Facilities – Working at height

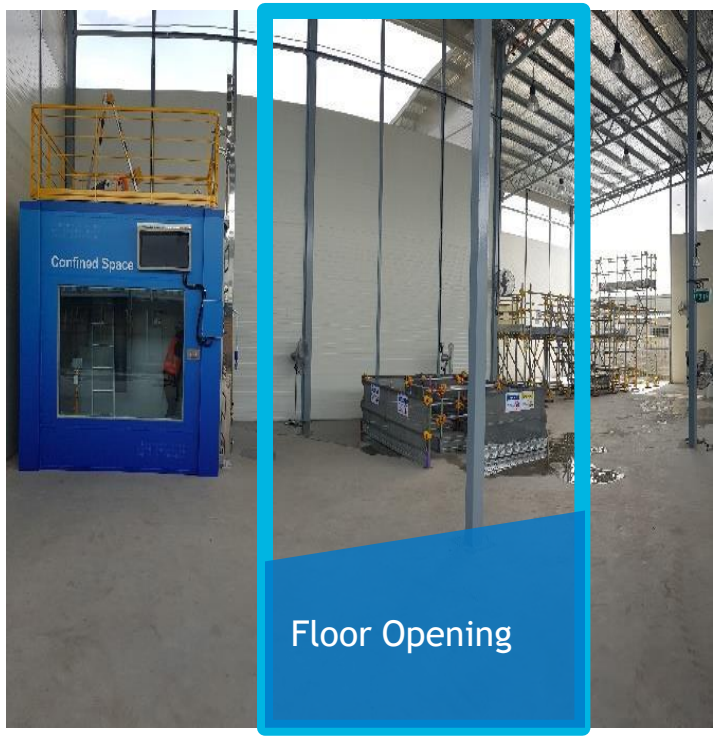
Training scaffolding module with access and working platform for Working at Height and Rescue training and exercise

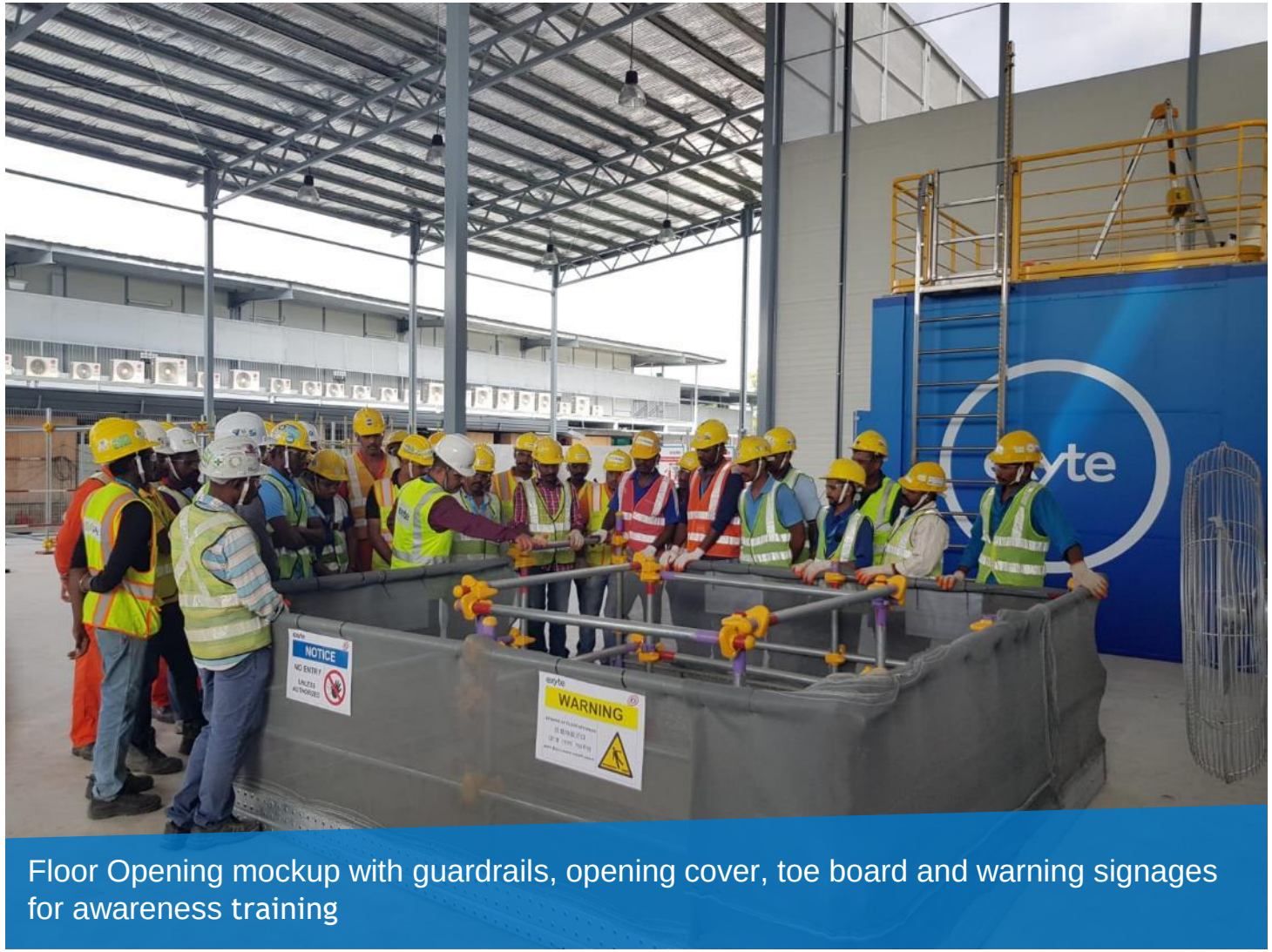
Training Facilities – Confined Space



Confined Space Awareness Training Module box with ventilation blowers, access, air monitoring devices and rescue equipment.

Training Facilities – Floor opening



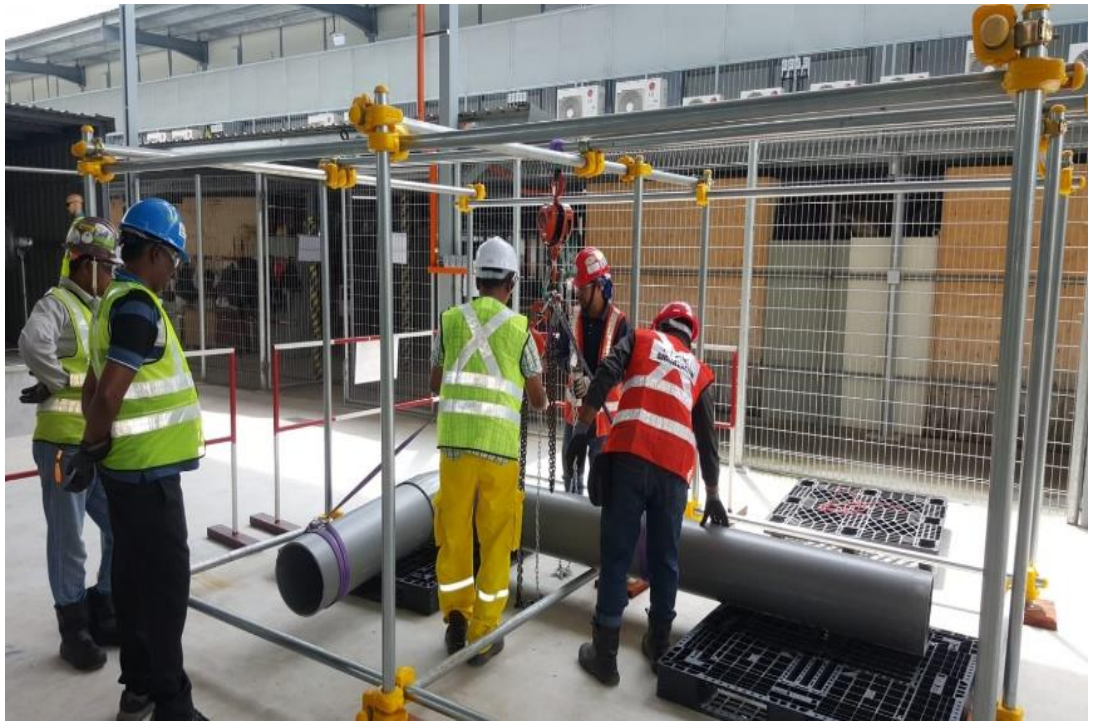


Floor Opening mockup with guardrails, opening cover, toe board and warning signages for awareness training

Training Facilities – LOTO

Electrical Mockup Panel for “Live” electrical works and portable electrical tool testing training

Training Facilities – Lifting and Rigging



Lifting and Rigging training mockup

Training Facilities – Chemical handling

Chemical Handling mockup unit with spill kits for training

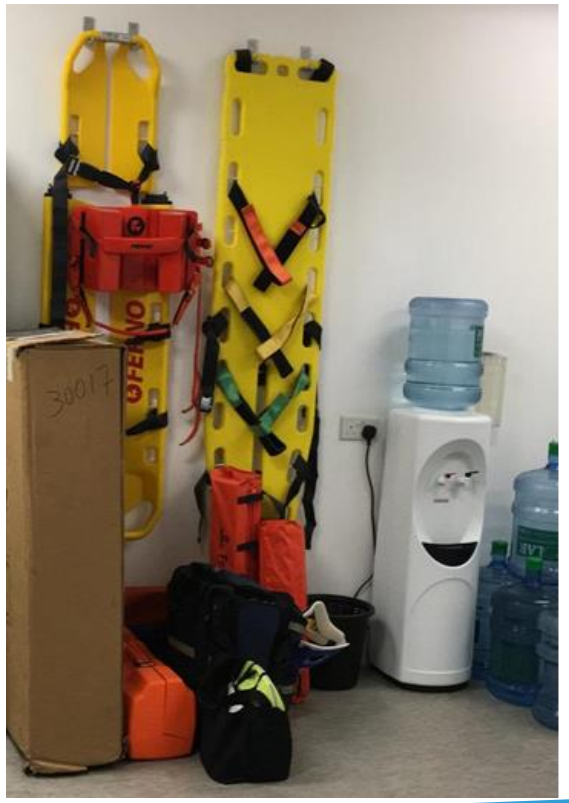
Safe Walkway and Drainage System Mockup

Drainage system mockup to prevent environmental pollution into public drainage system and designated safe walkway

Workers Rest and Canteen Facilities

World class workers rest areas and canteen with proper tables and chairs provided adequately. Adequate drinking water points and washing basin provided.

First Aid and ERT Facilities

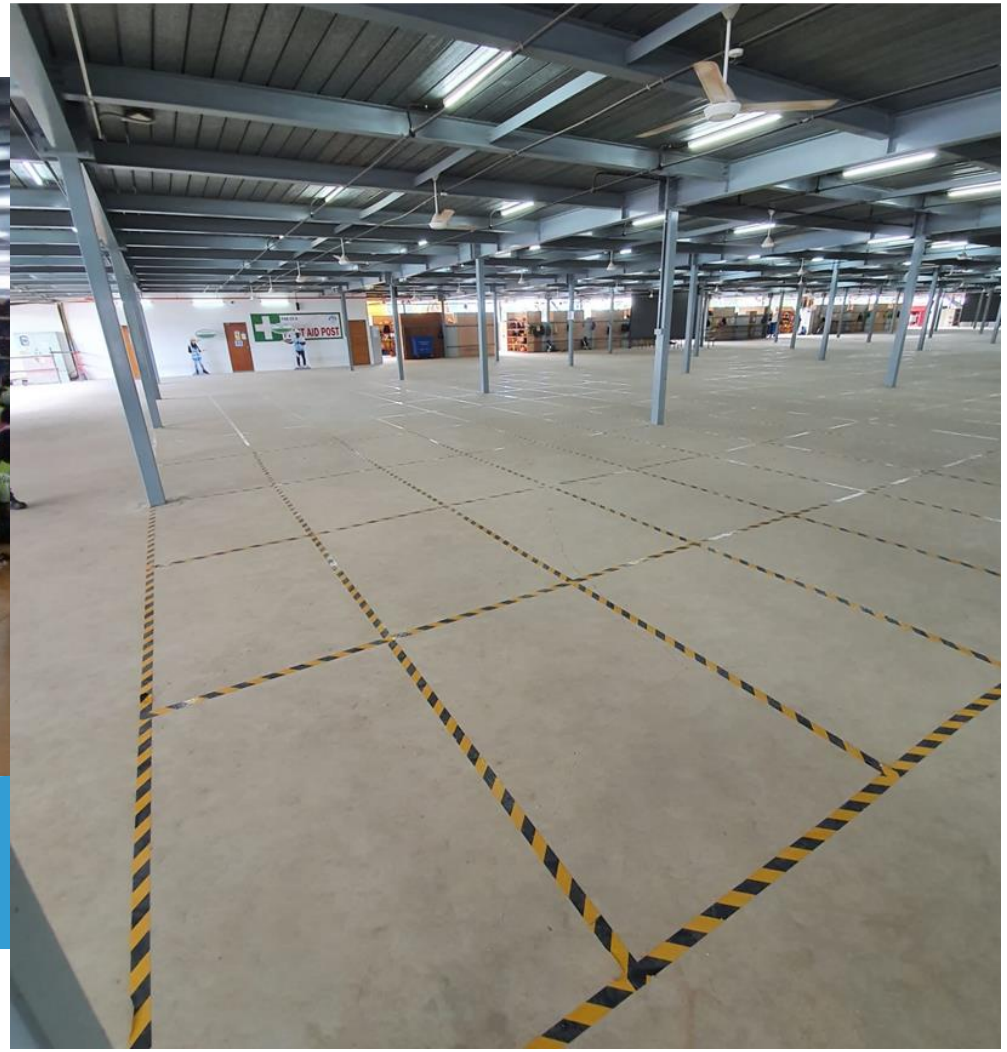


First Aid and ERT room with Full time Certified Nurse standby during construction activities and equip with medical beds, stretchers, necessary first aid items and emergency response items.

Workers Toilet Facilities

Worker toilet and washing facilities with proper temporary sanitary system including hardcore base, foundation & concrete slab finishes, toilet partition, WC, urinal & basin, prefab containerized toilet housing with fully fitted sanitary fixtures.

Toolbox Briefing Facilities



Toolbox meeting space with well ventilated fans, big TV screens and mass communication system for effective safety briefing

Security Facilities

Access control system complete with anti-tailgate turnstile/mantrap system with integrated facial recognition/biometrics & access card control, CCTV monitoring, site hoarding, controlled vehicle access, temperature scanners and electronic permit to work integration.

Global EHS – Construction Working at Height Safety Requirements

Fall Protection Plan

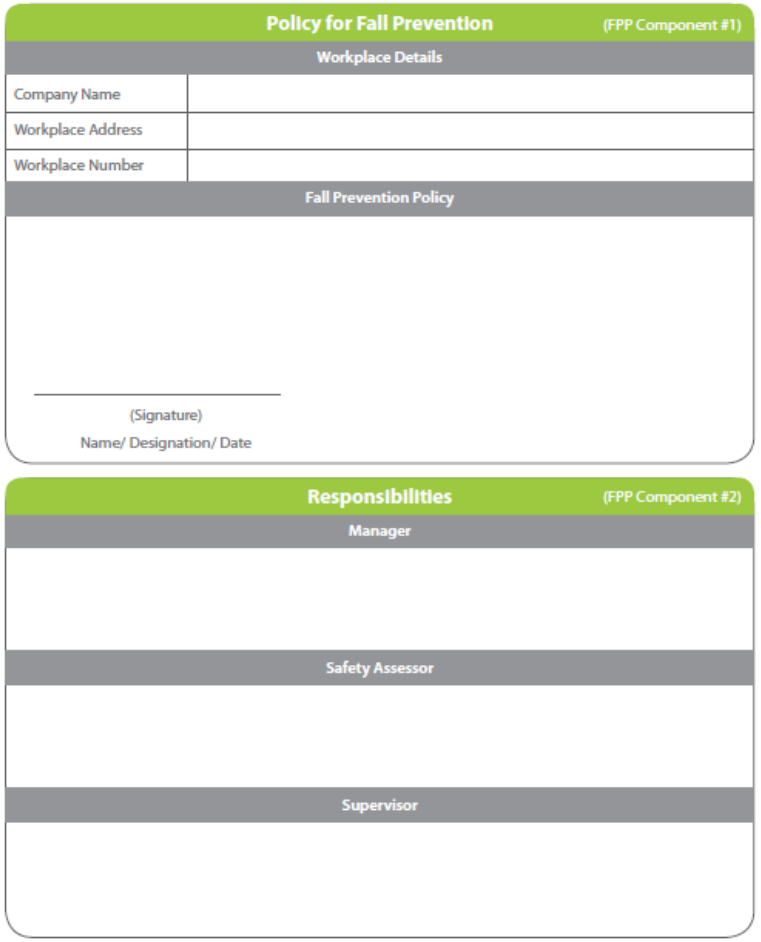
Contractor shall establish and implement a site-specific fall prevention plan, which is prepared for the purpose of reducing or eliminating risk of falls. The fall prevention plan may consist in parts of existing project EHS documentation.

The fall prevention plan shall fulfil the following requirements:

1) Address fall from heights hazards comprehensively;
2) Meet or exceed Micron's Global EHS – Work at Heights Standard;
3) Relevant to the specific project site covered in the fall prevention plan;
4) Readily available at the project site covered in the fall prevention plan;

The fall prevention plan must:

1) Establish clear individual responsibilities for fall prevention;
2) Integrate fall prevention into the project sites EHS Management System for enhancement and sustenance of work at heights safety;
3) Provide a systematic approach for eliminating or reducing risk of falling from heights;
4) Ensure that all reasonable fall prevention and protection measures and methods have been taken prior to commencement of working at heights; and
5) Ensure the adoption of an integrated approach to fall prevention and work at heights safety.



Policy for Fall Prevention (FPP Component #1)

Workplace Details	
Company Name	
Workplace Address	
Workplace Number	

Fall Prevention Policy

(Signature)

Name/ Designation/ Date

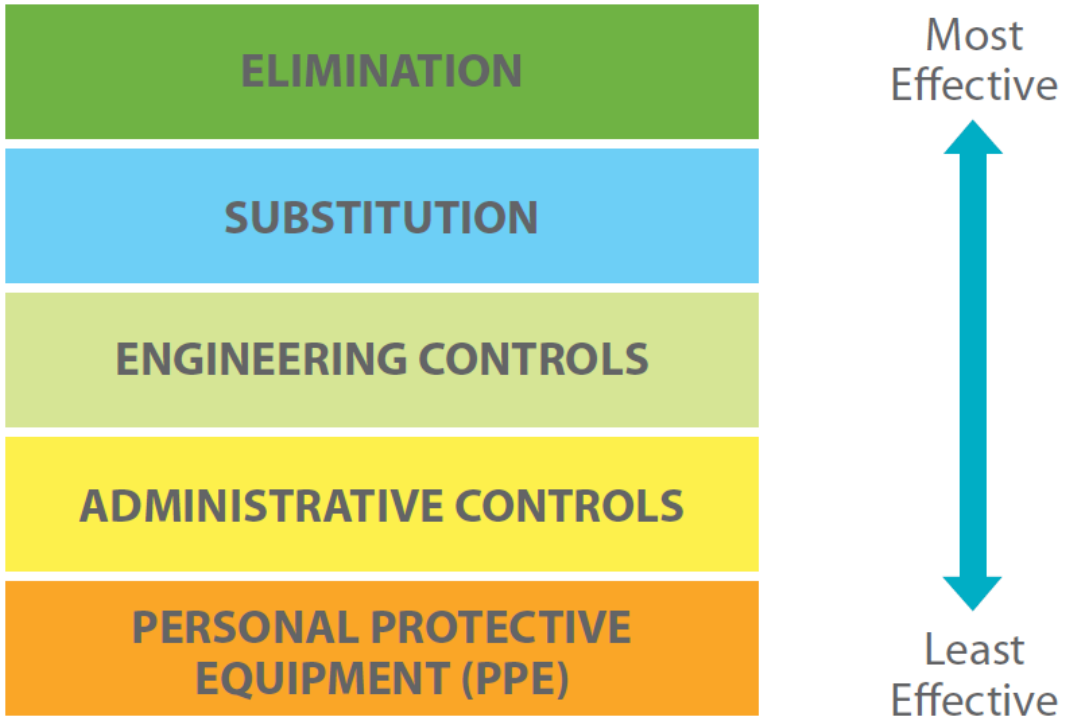
Responsibilities (FPP Component #2)

Manager

Safety Assessor

Supervisor

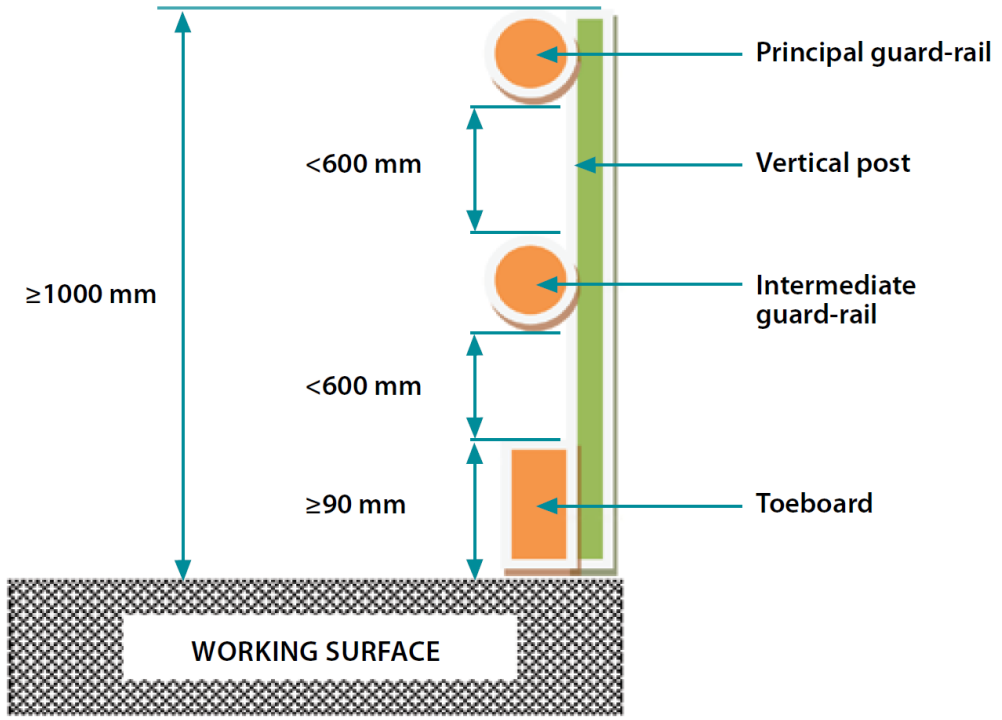
Elimination of Working at Height Hazards



Where possible, work at heights should be eliminated. Examples include:

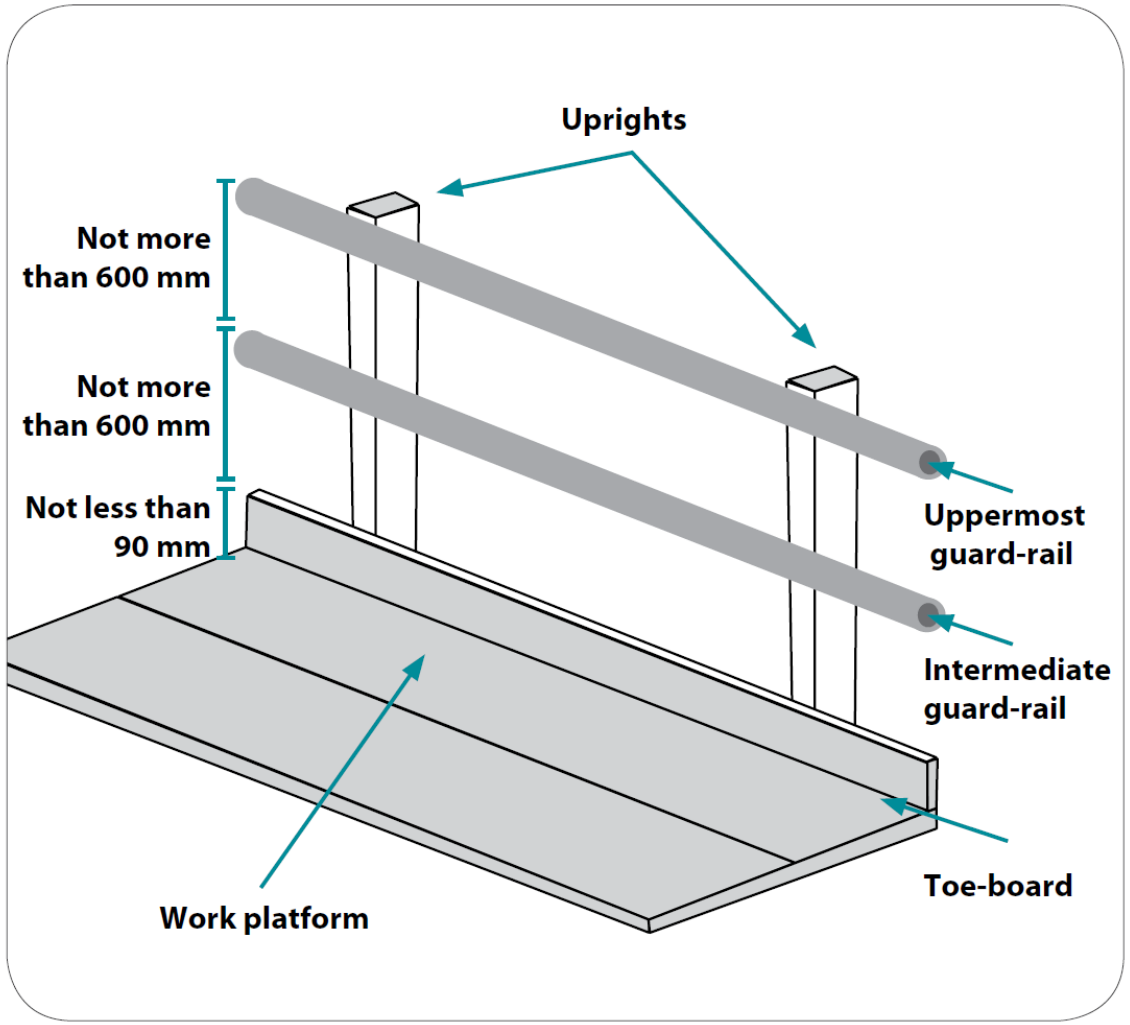
1) Pre-fabricate a roof truss then hoist it up, instead of installing pieces of smaller parts onsite.
2) Using pre-cast or tilt-up concrete construction pre-install with guardrail, instead of concrete walls constructed onsite.
3) Utilizing of Mobile Elevating Working Platform (MEWP), instead of workers working on steel structure.

Rigid Guardrails / Barriers / Barricades Requirements



1. Edge protection must be provided to the edge of a scaffold, walkway, ramp, and landing or wherever a person is at risk of falling from open sides.
2. The protection must also be able to withstand the impact of a person falling against it.
3. The guard-rail system must be of good construction, in good condition and be able to withstand the weight of a person (at least 100kg) applied in any direction at any point.
4. For steel structures installation, there should be a plan for the guard-rails to be attached to the panels prior to the structures being raised.

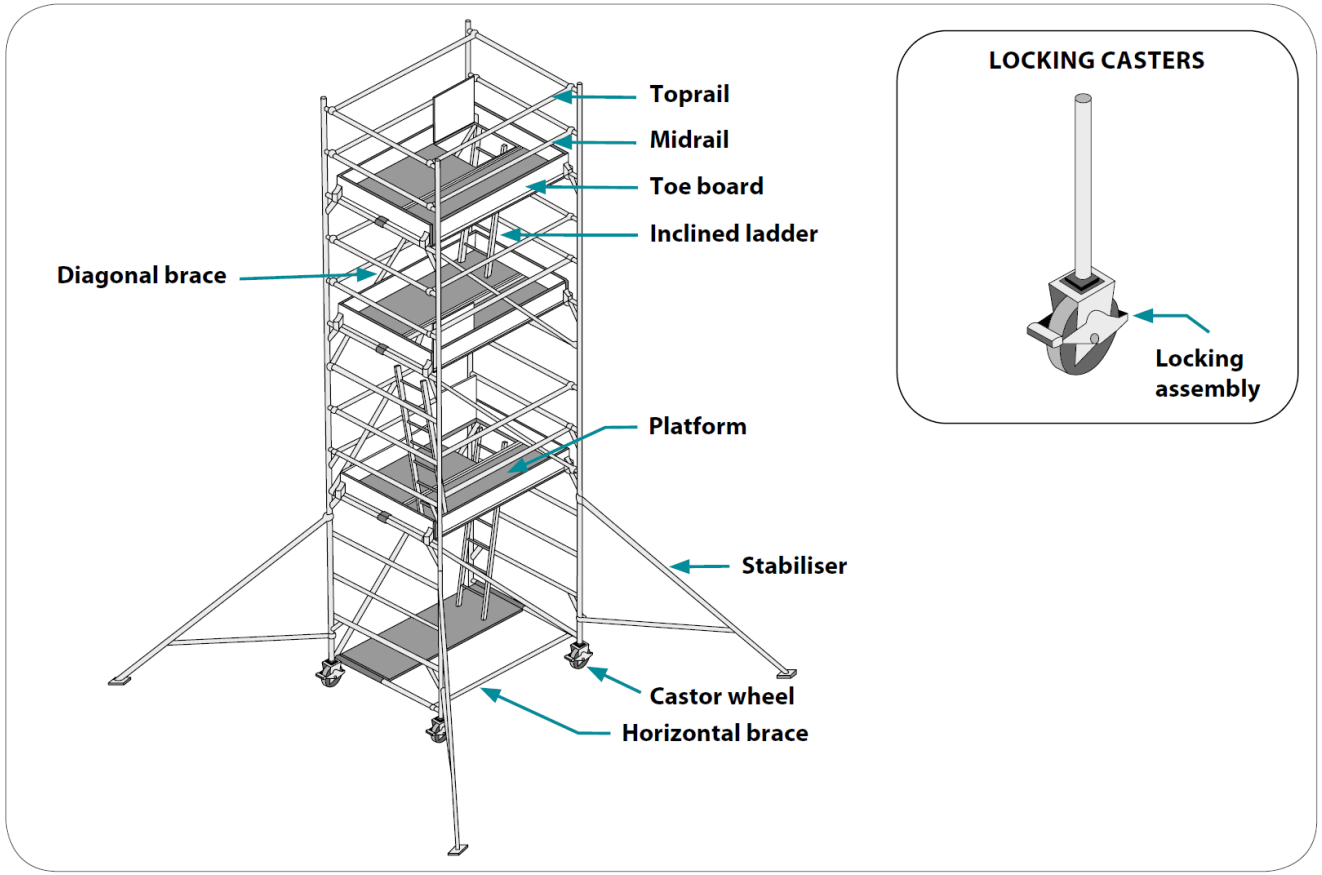
Scaffolding Requirements



1. A standard guardrail shall be used on scaffolds platform greater than 1.8 meters (6 feet) in height.
2. Netting are required on all work levels of a scaffold to prevent falling objects.
3. Scaffolds shall be fully planked to prevent any holes which personnel or materials could fall through to a lower level.
4. Scaffolds and its components must be capable of supporting, without failure, their own weight and at least four (4) times its maximum intended load.
5. Scaffolds shall be inspected and tagged by a competent person before use:
   - Red Tag: Do not use
   - Yellow Tag: Can be used but has additional protective measures as listed on the tag that must be followed
   - Green Tag: Can be used without any other requirements/stipulations
6. Scaffold components are not to be removed by anyone other than a competent person.
7. Competent scaffold erection team are to be engaged to erect and dismantle the scaffold.

Tower Scaffold Requirements

1. A tower scaffold that is fitted with castor wheels equipped with effective locking devices is deemed to be a mobile tower scaffold.
2. Edge protection such as guard-rails must be provided at the highest landing.
3. Never access the scaffold until all its castors are locked to prevent movement
4. Always alight from scaffold during repositioning.



Floor Opening Requirements

Contractor shall barricade all excavation, bored holes, voids, and open edges of structure under construction where a worker is liable to fall with secured and effective guardrails, barricades, and covers.

1) Rigid cover with weight rating.
2) Rigid barricade with netting and toe-board.
3) Signage warning of the hazard.
4) Clearly marked in all applicable languages.

Note: Mesh cast with slab for opening provides immediate protection against fall and cannot be accidentally removed.

1) During the formwork erection, a A13 mesh (or similar strength), fix to the top steel and cast into the slab.
2) Design load on A13 mesh must be taken as 1.5KN. This is a commonly used load in ‘Dead and Live Load Tables’ for human traffic.


A13 Mesh Cast into Slab

Wall, Partition & Stairway Gap or Void Requirements

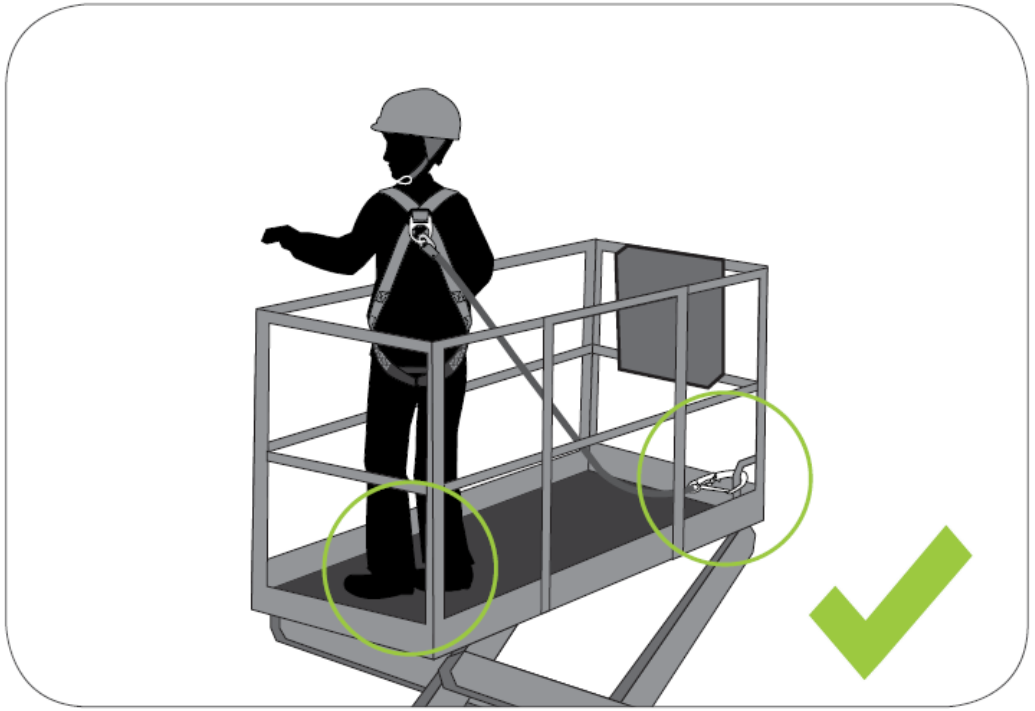
1. A gap or void 76 cm (30 inches) or more high and 48 cm (18 inches) or more wide, in a stairway, wall or partition, through which employees can fall to a lower level.
2. Edge protection and guardrails must be provided to the gap or void in the constructing stairway, the wall or partition wherever a person is at risk of falling from open sides.
3. If possible, install additional safety netting at the gap or void identified.

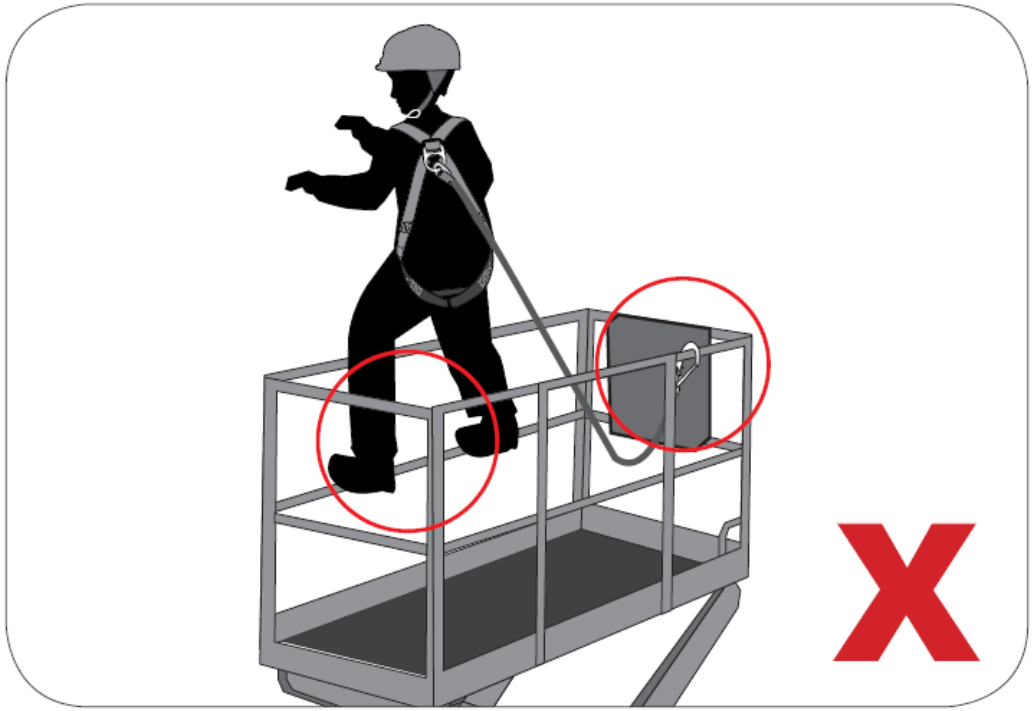
Mobile Elevated Work Platform (MEWP)

Elevated Work Platforms or other alternative lift devices are preferred for work at height activities.

1. Lifts must be inspected daily per manufacture recommendations.
2. All operators must be certified to operate the lifts; certification records must be available to audit.
3. Lifts require a spotter for all moves (horizontal or vertical).
4. 2 meters exclusion zone around base of machine.

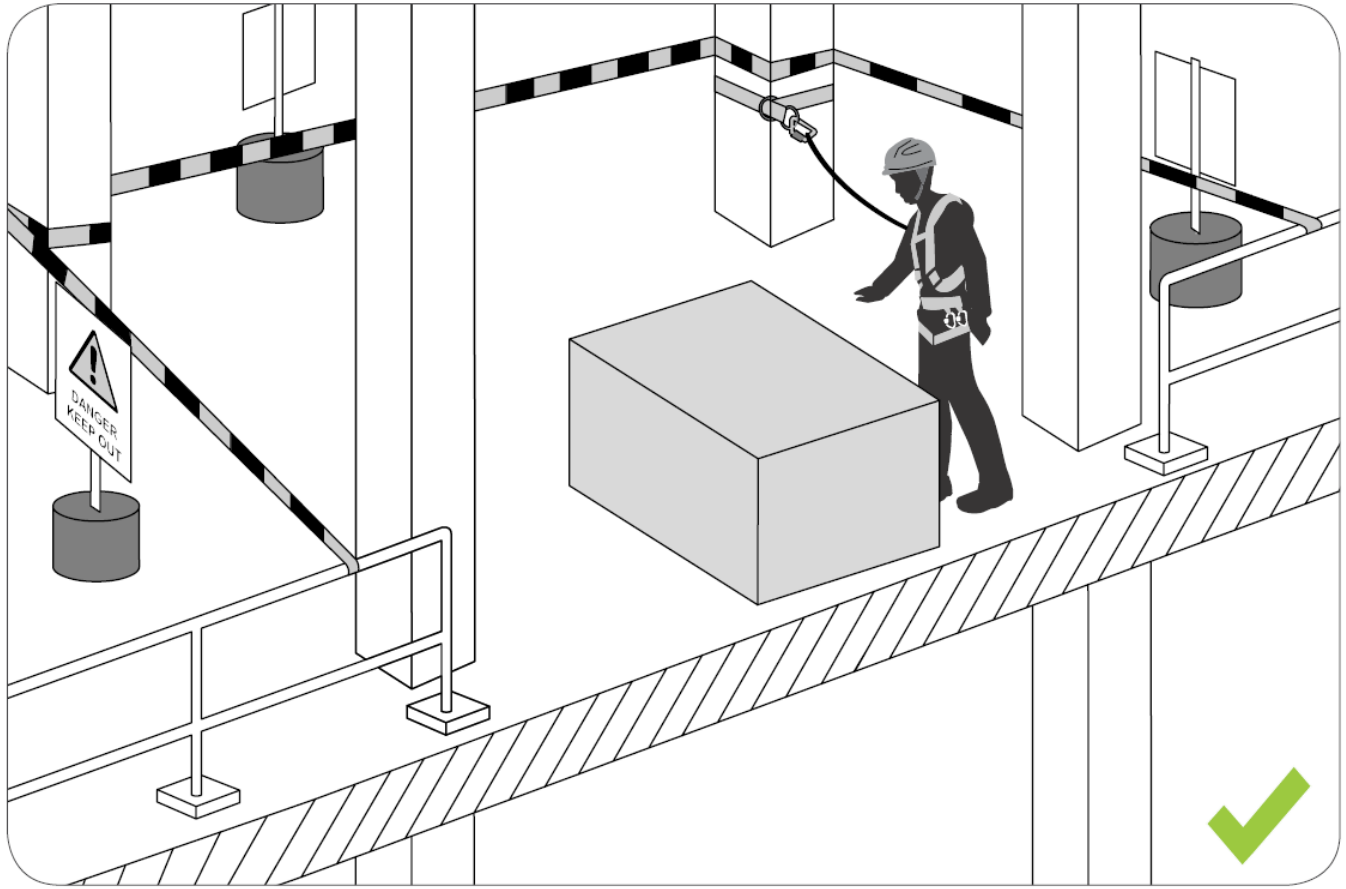
Mobile Elevated Work Platform (MEWP)





1. Fall protection harness or lanyard is required for all lifts
2. Never stand on the mid-rail or top-rail
3. Manufacturer rated anchor points must be used in lifts
4. MEWP to be fitted with certified safety devices that will prevent crush hazard

Leading Edge Safety Requirements



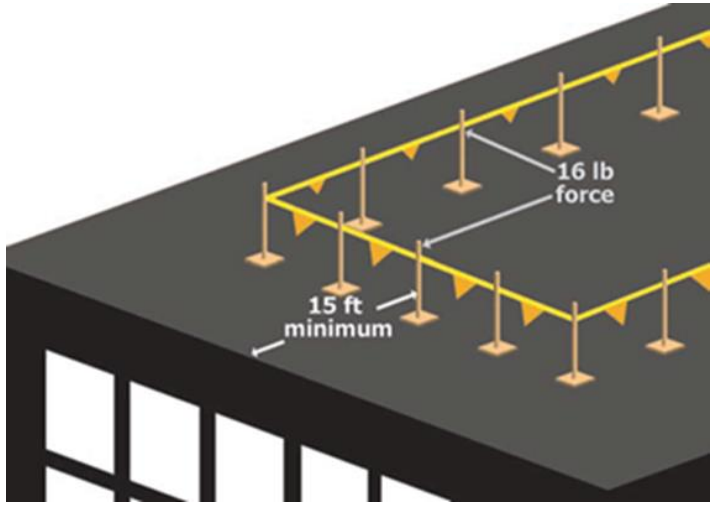
1. A leading edge is any unprotected side and/or edge of a floor, roof, or formwork for a floor or other walking/working surface (such as deck) with a fall distance of 1.8 meters (6 feet) or greater to the next lowest level.
2. All Leading Edges shall be protected or barricaded.
3. The hierarchy of controls for protecting against falls from a Leading Edge are as follows:
   - Standard guardrail and toe board
   - Fall Restraint System
   - Fall Arrest System
   - Warning Line System

Leading Edge Protection Requirements

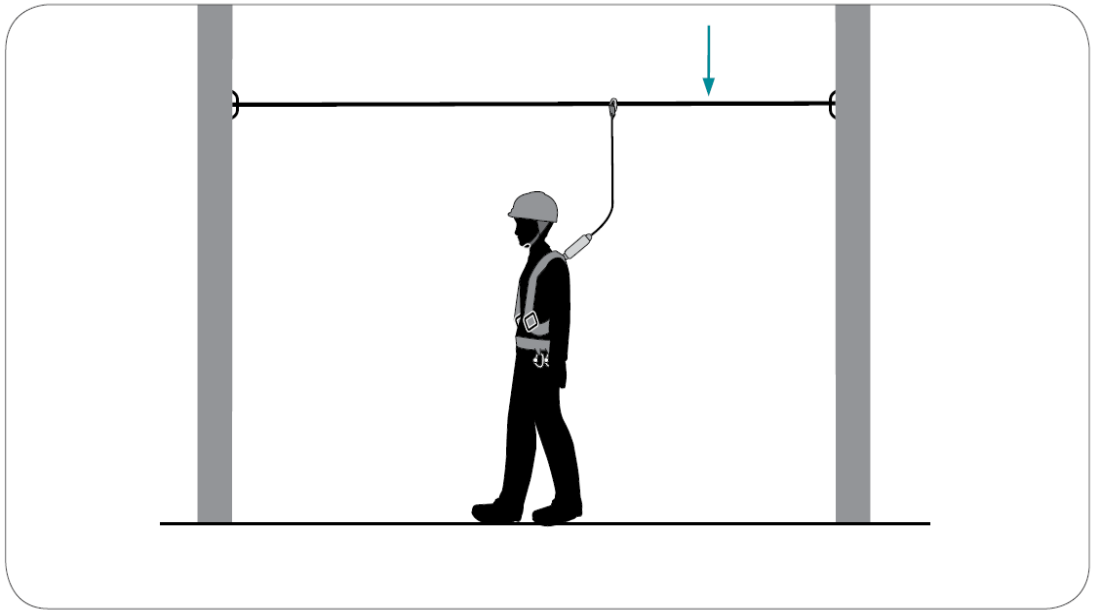
Work within 15 meters (50 feet) of a leading edge is not allowed without adequate protection that would prevent a worker from falling. The hierarchy of controls should be followed when determining the appropriate controls.

At a minimum:

- A standard guard rail or other equivalent engineering control should be established.
- If a standard guard rail is not feasible, at least 4.5 meters (15 feet) from the leading edge a non-standard rail must be constructed with ropes, wires or chains with 500-lb (2.2 kN) tensile strength. The non-standard rail must be capable of supporting 16 lbs. (71N) of horizontal force 0.75 meters (30 inches) above the base.
- Work within this zone requires either a fall restraint or personal fall systems to be utilized by all workers.
- Lanyards used in personal fall arrest systems must be rated for leading edge work.



Leading Edge Protection (Fall Arrest System)



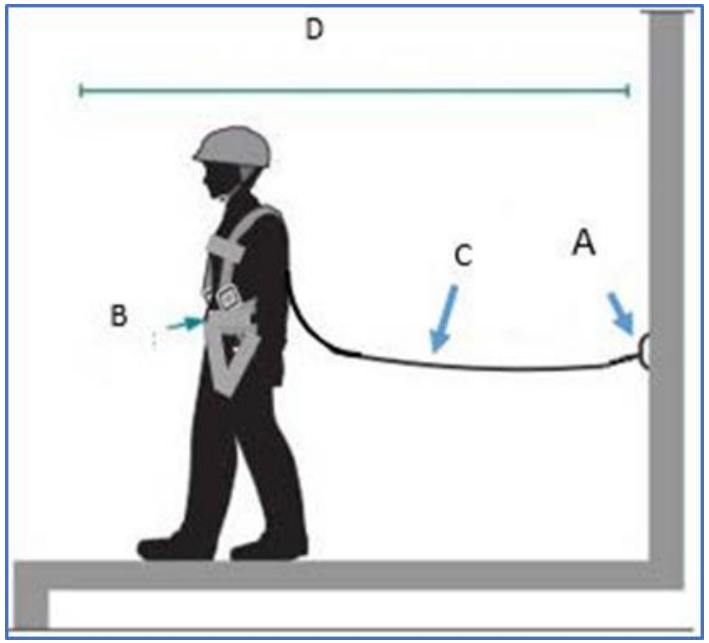
Leading Edge Protection with a fall arrest system utilizing a static line as the anchorage point, a retractable lanyard attached to the static line, and a full body harness.

The personal fall arrest system has four components:

- Anchor point capable of supporting 5,000 pounds (22.2 kN) per person attached
- Body support, an approved full body harness
- Connector a lanyard or Self-Retractable Device (SRD) that connects the body support to the anchor point
- Rated snap-hook
- Shock Absorbing section

Fall Protection (Fall Restraint System)

Fall Prevention (Restraint): A fall restraint system is designed to prevent a worker from falling. A fall restraint system shall be used for protection in situations when working near an otherwise unprotected edge; on a roof with a parapet less than 1.07 meters (42 inches) high, near a gate opening in a standard guardrail, or near an open material doorway in a wall opening.



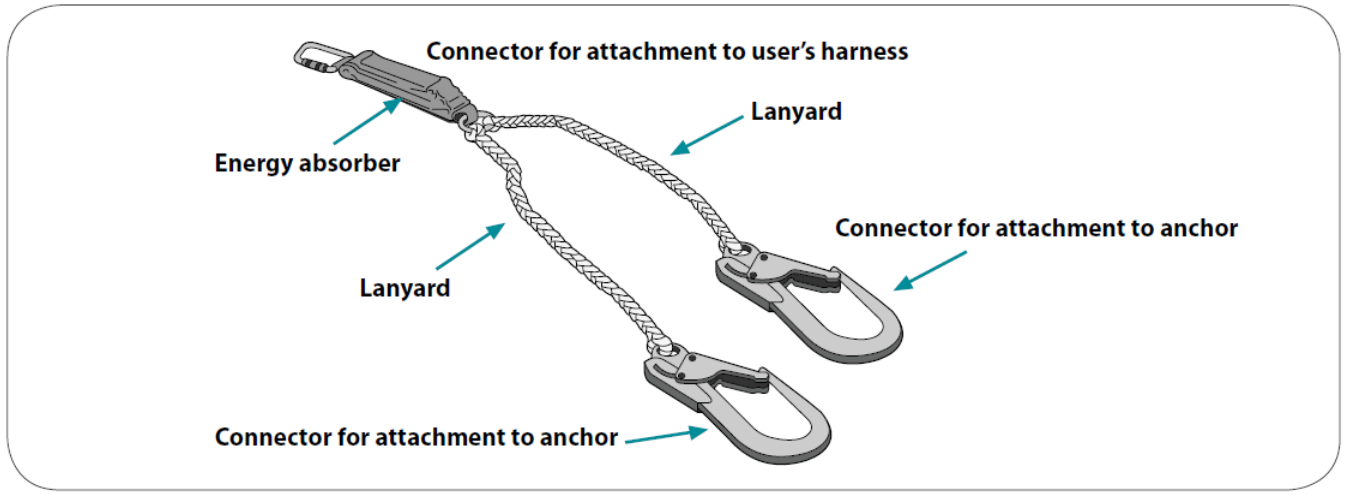
Common components of a fall restraint system are:

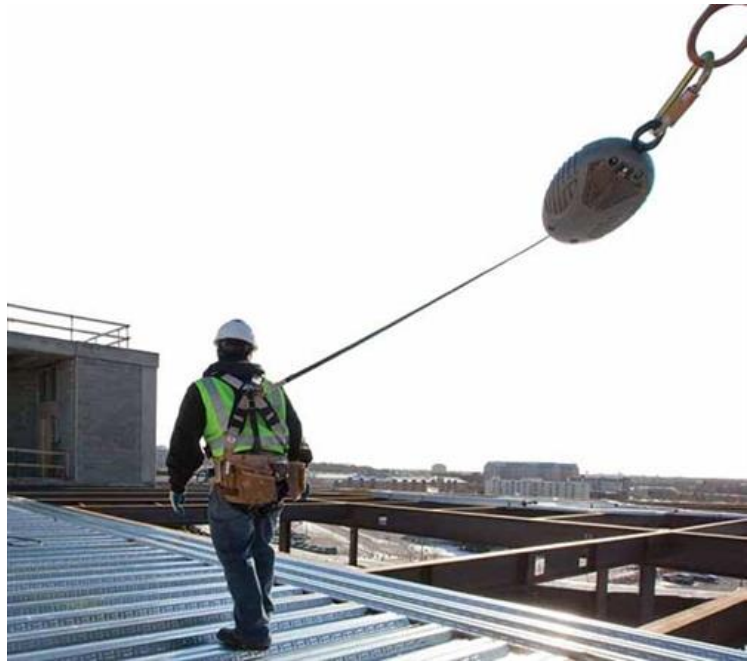
- A – Anchor point capable of supporting 4.4 kN
- B – Body Support, an approved full body harness
- C – Connector typically a lanyard
- D – The overall length of the restraint line shall keep the worker from going over the edge

Leading Edge Protection (Fall Restraint System)

When working at leading edge without a rigid barricade (roof work etc.), a full body harness and a fall restraint system utilizing a static line as the anchorage point, a fixed length lanyard, that does not allow a worker to be exposed to the fall hazard.

Lanyard and Self-Retractable Device





Lanyards - used to connect the anchorage to the body support of a fall protection system.

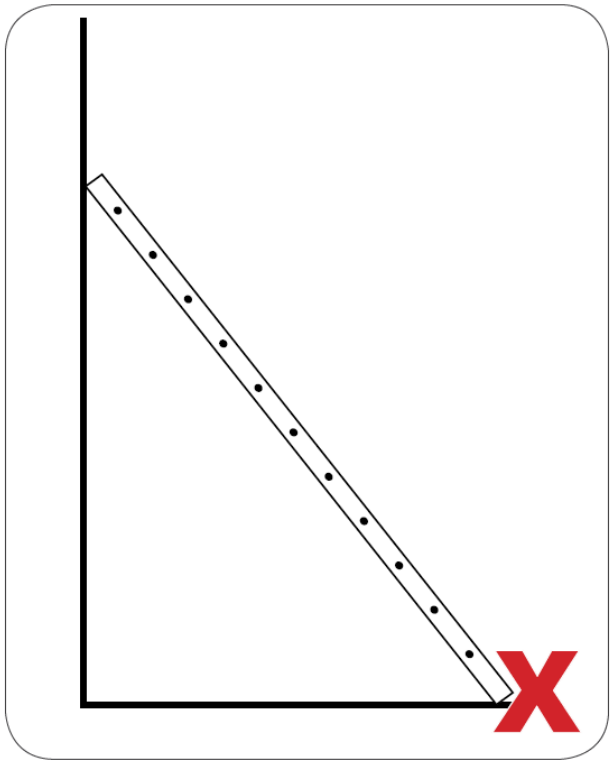
1. Attach the lanyard directly overhead to minimize swing fall
2. For work under 5.5 meters (18 feet), a Self-Retracting Device (SRD) is required
3. A safety harness can provide protection from falls only if the harness is attached to a lanyard that is anchored. This is done to allow for fall protection even when transferring between two separate anchorage points. 100 percent tie off requires twin tailed lanyards that allow the user to remain anchored to one point of anchorage with one lanyard, while transferring to another point of anchorage with the second one

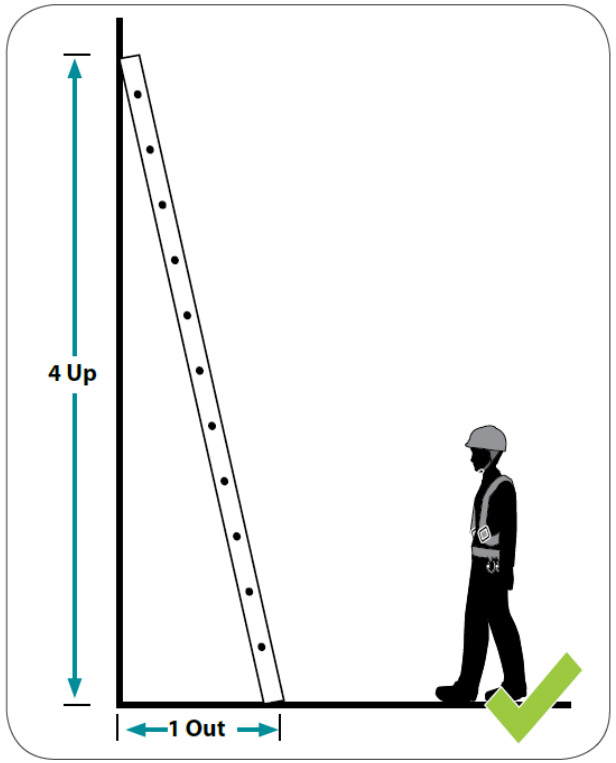
Platform Ladder

The Contractor shall use step platforms instead of portable ladders for works at height and establish a Permit-To-Work system for such works.

In addition, for works more than three (3) meters high, the Contractor shall demonstrate the stability of these step platforms to prevent toppling.

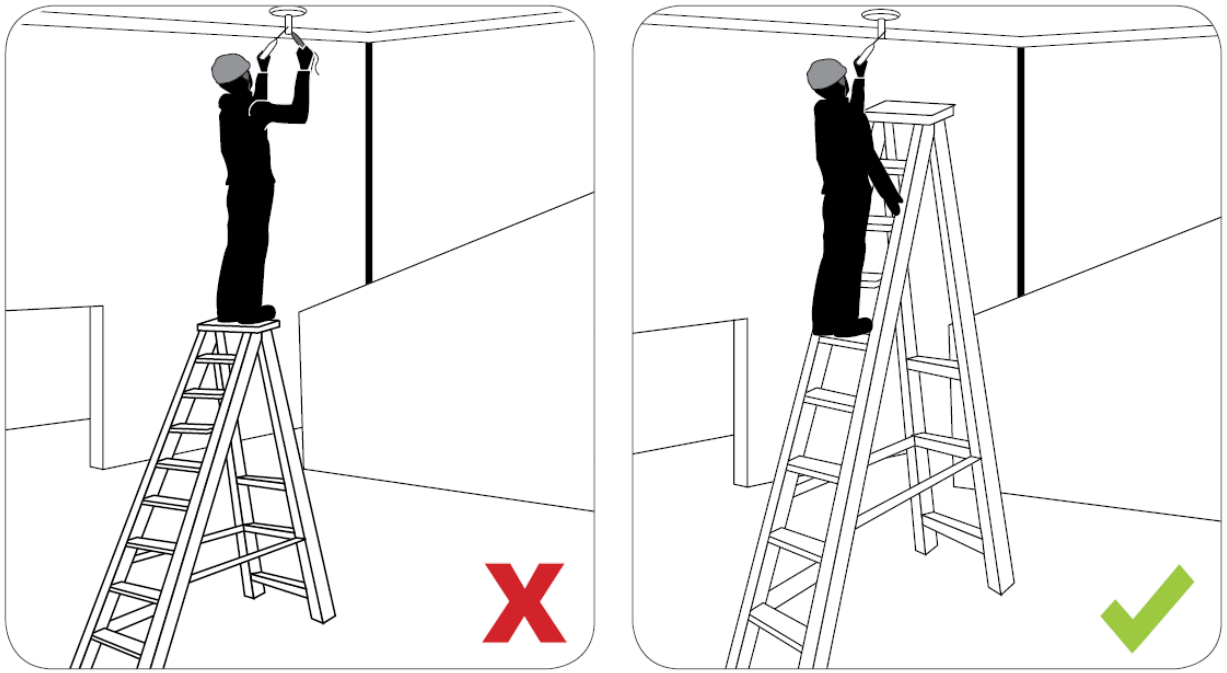
Extension Ladder & Single Stage Ladder





1. Must be set at a 4: 1 height to base ration
2. Ladder to extend 1 meter (3 feet) beyond any landing platform
3. Ladder must be secured to prevent it from slipping/moving
4. Maintain 3 point contact all times whilst climbing

A-Ladder Safety Requirements



1. A-Ladder shall be used for access only and shall not exceed three (3) meters in height. (A-Ladders may be used to access heights and as a work platform without additional fall protection if the ladder is being used per the manufacturer's recommendations).
2. Buddy system to hold the ladder.
3. Always face toward the ladder.
4. Do not sit on/straddle the top of the ladder.
5. Do not work from the top 2 steps of the ladder.
6. Do not overload the ladder capacity weight rating.
7. Maintain 3 points of contact when ascending or descending.
8. All feet set on firm ground/material.

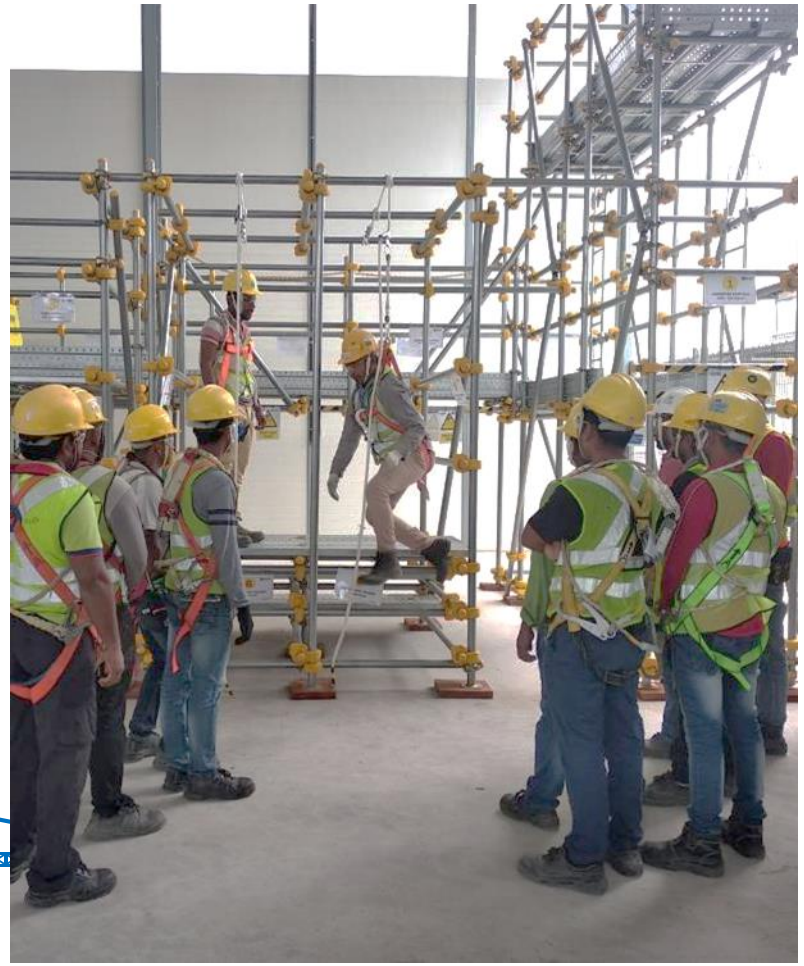
Raised Floor Tile Opening Barricade Requirement

Single Tile Barricade

Rigid Barricade

1. All raised floor openings present for any duration shall be protected with a barricade.
2. A barricade is a barrier put in place to block the area, preventing access, trips, or falls. Multiple noncontiguous floor openings shall all be protected via one or more barricades.
3. There are two types of acceptable barricades as shown:
   - Single Tile Barricade
   - Rigid Barricade

Emergency Rescue Plan for Working at Height



1. A rescue plan for working at height must be developed for all work at heights activities involving a Personal Fall Arrest System.
2. Rescue Plan must identify the following:
   - How notification will occur and to whom will notification occur to
   - Response time (shall be less than 6 minutes)
   - How to assist the worker(s) with self-rescue
   - How to responds to an unconscious patient(s)
   - How to assist with aerial lift rescue
   - The rescue equipment needed for the job
3. The rescue plan must be understood by the personnel performing work at heights.
4. Site shall conduct emergency response drill on the rescue plan and review it after drill.

Global EHS – Construction
Hot Work Safety Requirements

Before Hot Work (Welding and Gas Cutting) Activity

- Contractor shall implement a permit to work for all hot works to ensure that the equipment is safe from defects and no incompatible works are carried near the hot work area.
- Pre-task safety briefing, Job Safety Analysis and Pre-start checks (equipment safety inspection) conducted at the immediate work areas with the supervisor and workers involved in hot work.
- The equipment safety inspection must be conducted prior to the start of hot work activity and must be repeated if the hot work equipment is relocated for another job.
- Use a hot work checklist to render the hot work safe.

Hot Work PPE Requirements

- Face shield with safety glasses or welding goggles.
- Long sleeves shirt made of fire-retardant materials.
- Welding flame resistance gloves
- Heavy durable long pants.
- Approved safety helmet and safety shoes shall be made of material which is an insulator for heat and electricity.

Oxy-fuel Equipment and Hazards

Oxy-fuel equipment consists of the following:

- Cylinders of oxygen and fuel gas
- Pressure regulator fitted to the outlet of each gas cylinder
- Flashback arrestor fitted to each pressure regulator
- Gas torch
- Non-return check valve fitted between each gas torch inlet and gas hose
- Fire extinguisher (Dry Chemical type, rated for class A, B & C fire)
- Proper cylinders trolley with securing chain/hook

The main hazards are fire and explosion. May result in serious burns injury.

When cylinders are used from a pallet, then a safe distance of 6 meters shall be maintained between oxygen and acetylene cylinder pallets.

Oxy-fuel Equipment – Storage Spaces

Cylinders shall be stored in a well-protected and well-ventilated location.

Assigned storage spaces shall be located where cylinders will not be knocked over or damaged by passing or falling objects, or subject to tampering by unauthorized persons.

Oxygen or acetylene cylinders taken underground shall be transported back above ground at the end of each working shift and stored in the designated storage areas.

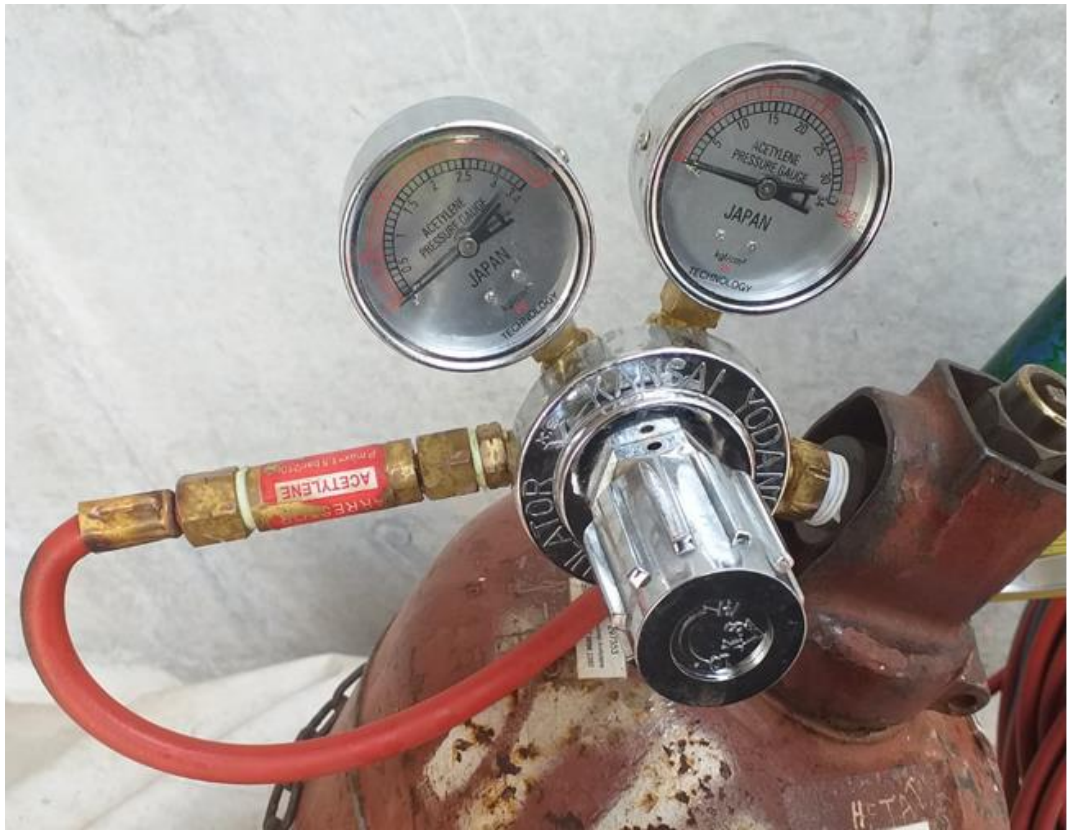
Authorized users and daily checklist should be displayed at the cylinders.

Oxy-fuel Equipment – Hose Connection

No worm drive hose clip shall be used as hose clamping device at oxy-fuel equipment. It could cause gas leaks due to over-tightening or loosened connections.

Hose connections shall be clamped or securely fastened that will withstand, without leakage, twice the pressure normally, but in no case less that a pressure of 2.1MN/m2 (300psi).

Oxy-fuel Equipment – Flashback Arrestors



Flashback could occur when there is a backflow of oxygen/fuel, resulting an explosive mix in hose. The fire could then burn back through the hose and reach cylinders. This may result in explosion of the cylinder.

Flashback arrestor must be fitted at the pressure regulator outlet of every gas cylinder.

Oxy-fuel Equipment – Non-return Check Valves

To prevent backflow of gases, a suitable non-return check valve must be fitted between each gas torch inlet and gas hose from the oxy-fuel equipment.

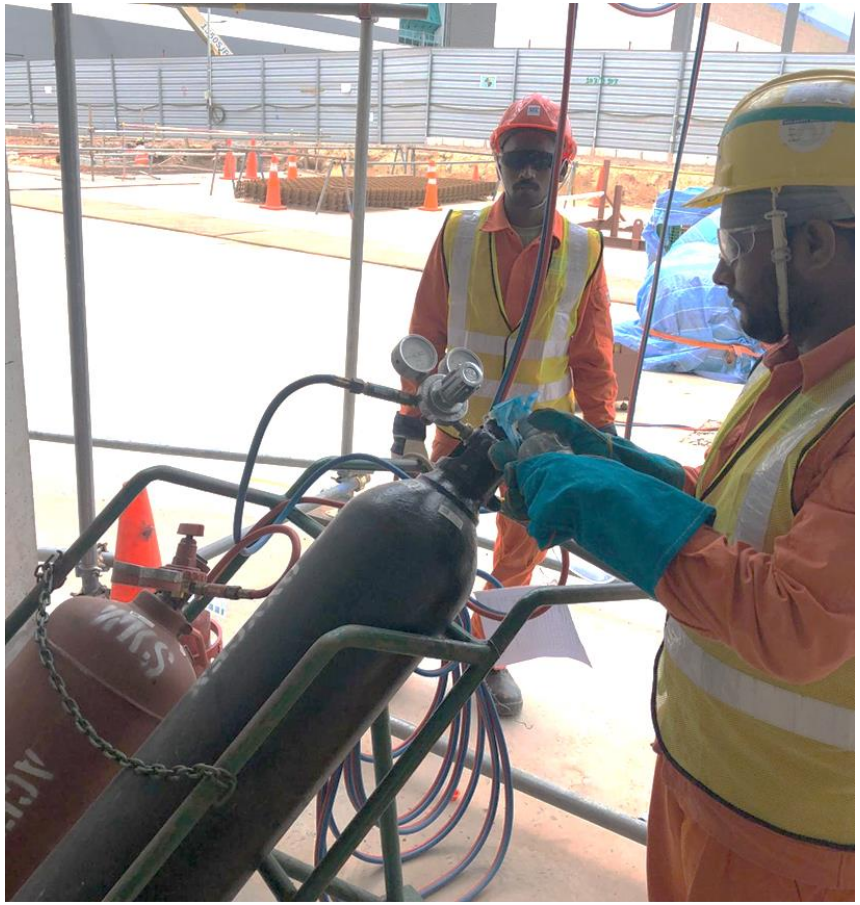
Safety devices (Flashback arrestor, non-return valves etc.) should be inspected by a competent person at least once every 12 months to ensure they are effective.

Oxy-fuel Equipment – Inspection of equipment

Always inspect and leak test the connections and hoses daily for any leakage, burns and damage.

Check to make sure all joints are in tight positions. Tighten all connections with smooth jaw wrench.

Leak detection is best carried out applying a weak (typically 0.5%) solution of a detergent in water or a leak detecting solution from one of the gas supply companies. It is applied to the joints using a brush/bottle and the escaping gas will form bubbles.



Oxy-fuel Equipment – Spark Igniter

Always use a proper torch spark igniter to start the fire.

Samples of spark igniter as below:

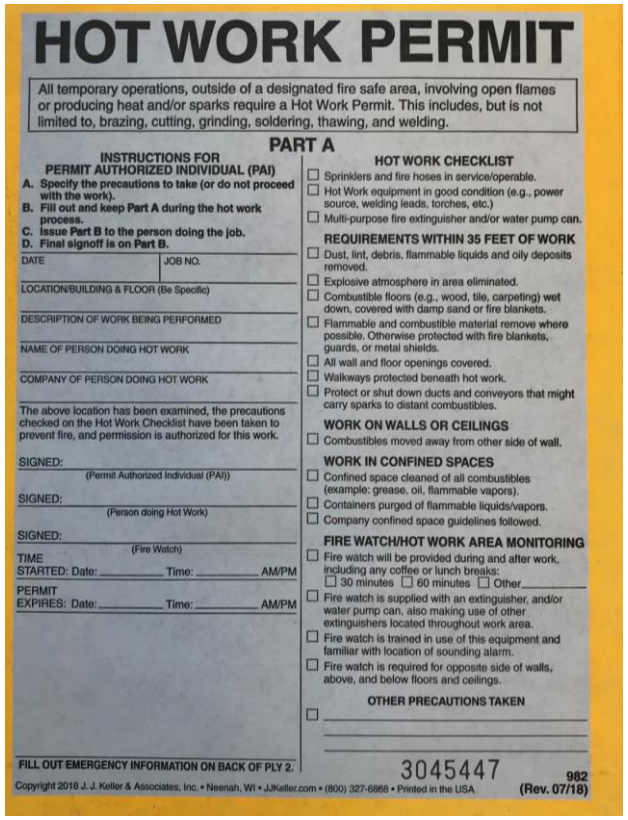
Fire Watcher

Ensure Fire Watcher and fire fighting equipment on standby for oxy-fuel cutting and welding activities and shall be located within 20 feet or 5m of the hot work area.

Fire watcher must be trained to operate the fire extinguisher and escalation process in the event of fire incident. He shall standby throughout the hot work activities and for at least 30 minutes of watch after completion to make sure no smoldering materials exist.

Use Fire Extinguisher (Dry Chemical) type; Suitable for Class A, B, C and electrical fire.

Hot Work Permit



HOT WORK PERMIT

All temporary operations, outside of a designated fire safe area, involving open flames or producing heat and/or sparks require a Hot Work Permit. This includes, but is not limited to, brazing, cutting, grinding, soldering, thawing, and welding.

PART A

INSTRUCTIONS FOR PERMIT AUTHORIZED INDIVIDUAL (PAI)

A. Specify the precautions to take (or do not proceed with the work).
B. Fill out and keep Part A during the hot work process.
C. Issue Part B to the person doing the job.
D. Final signoff is on Part B.

DATE | JOB NO.

LOCATION/BUILDING & FLOOR (Be Specific)

DESCRIPTION OF WORK BEING PERFORMED

NAME OF PERSON DOING HOT WORK

COMPANY OF PERSON DOING HOT WORK

The above location has been examined, the precautions checked on the Hot Work Checklist have been taken to prevent fire, and permission is authorized for this work.

SIGNED: (Permit Authorized Individual (PAI))

SIGNED: (Person doing Hot Work)

SIGNED: (Fire Watch)

TIME STARTED: Date: _____ Time: _____ AM/PM

PERMIT EXPIRES: Date: _____ Time: _____ AM/PM

FILL OUT EMERGENCY INFORMATION ON BACK OF PLY 2.

HOT WORK CHECKLIST

- Sprinklers and fire hoses in service/operable.
- Hot Work equipment in good condition (e.g., power source, welding leads, torches, etc.)
- Multi-purpose fire extinguisher and/or water pump can.

REQUIREMENTS WITHIN 35 FEET OF WORK

- Dust, lint, debris, flammable liquids and oily deposits removed.
- Explosive atmosphere in area eliminated.
- Combustible floors (e.g., wood, tile, carpeting) wet down, covered with damp sand or fire blankets.
- Flammable and combustible material remove where possible. Otherwise protected with fire blankets, guards, or metal shields.
- All wall and floor openings covered.
- Walkways protected beneath hot work.
- Protect or shut down ducts and conveyors that might carry sparks to distant combustibles.

WORK ON WALLS OR CEILINGS

- Combustibles moved away from other side of wall.

WORK IN CONFINED SPACES

- Confined space cleaned of all combustibles (example: grease, oil, flammable vapors).
- Containers purged of flammable liquids/vapors.
- Company confined space guidelines followed.

FIRE WATCH/HOT WORK AREA MONITORING

- Fire watch will be provided during and after work, including any coffee or lunch breaks: ☐ 30 minutes ☐ 60 minutes ☐ Other_____
- Fire watch is supplied with an extinguisher, and/or water pump can, also making use of other extinguishers located throughout work area.
- Fire watch is trained in use of this equipment and familiar with location of sounding alarm.
- Fire watch is required for opposite side of walls, above, and below floors and ceilings.

OTHER PRECAUTIONS TAKEN

- _____

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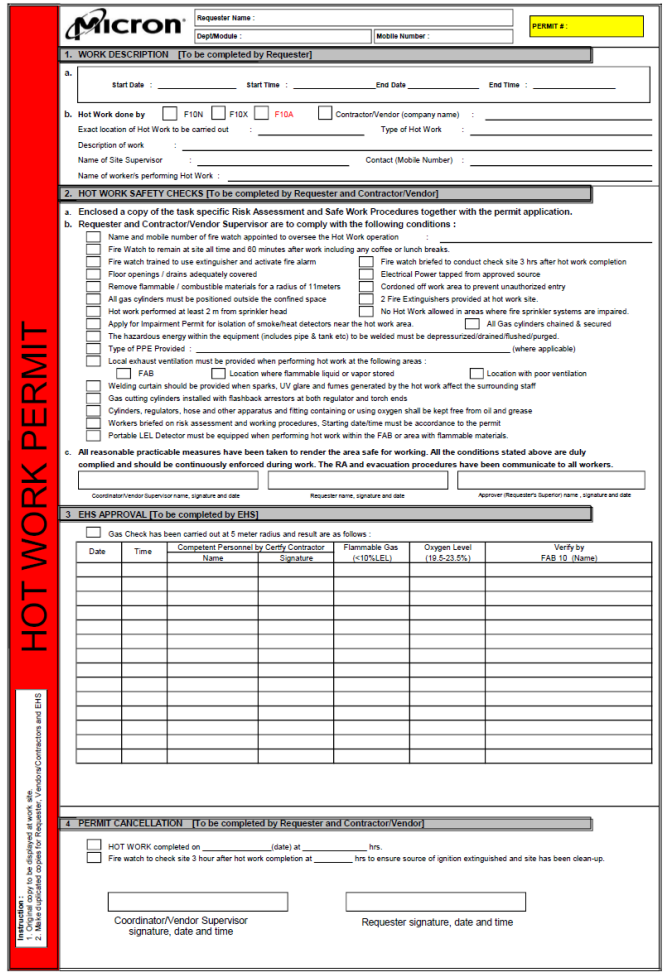


HOT WORK PERMIT

Micron

Requester Name :
Dept/Module :
Mobile Number :
PERMIT # :

1. WORK DESCRIPTION [To be completed by Requester]

a. Start Date : _____ Start Time : _____ End Date _____ End Time : _____

b. Hot Work done by ☐ F10N ☐ F10X ☐ F10A ☐ Contractor/Vendor (company name) : _____

Exact location of Hot Work to be carried out : _____ Type of Hot Work : _____

Description of work : _____

Name of Site Supervisor : _____ Contact (Mobile Number) : _____

Name of worker/s performing Hot Work : _____

2. HOT WORK SAFETY CHECKS [To be completed by Requester and Contractor/Vendor]

a. Enclosed a copy of the task specific Risk Assessment and Safe Work Procedures together with the permit application.

b. Requester and Contractor/Vendor Supervisor are to comply with the following conditions :

- ☐ Name and mobile number of fire watch appointed to oversee the Hot Work operation : _____
- ☐ Fire Watch to remain at site all time and 60 minutes after work including any coffee or lunch breaks.
- ☐ Fire watch trained to use extinguisher and activate fire alarm
- ☐ Fire watch briefed to conduct check site 3 hrs after hot work completion
- ☐ Floor openings / drains adequately covered
- ☐ Electrical Power tapped from approved source
- ☐ Remove flammable / combustible materials for a radius of 11meters
- ☐ Cordoned off work area to prevent unauthorized entry
- ☐ All gas cylinders must be positioned outside the confined space
- ☐ 2 Fire Extinguishers provided at hot work site.
- ☐ Hot work performed at least 2 m from sprinkler head
- ☐ No Hot Work allowed in areas where fire sprinkler systems are impaired.
- ☐ Apply for Impairment Permit for isolation of smoke/heat detectors near the hot work area.
- ☐ All Gas cylinders chained & secured
- ☐ The hazardous energy within the equipment (includes pipe & tank etc) to be welded must be depressurized/drained/flushed/purged.
- ☐ Type of PPE Provided : _____ (where applicable)
- ☐ Local exhaust ventilation must be provided when performing hot work at the following areas :
  - ☐ FAB ☐ Location where flammable liquid or vapor stored ☐ Location with poor ventilation
- ☐ Welding curtain should be provided when sparks, UV glare and fumes generated by the hot work affect the surrounding staff
- ☐ Gas cutting cylinders installed with flashback arrestors at both regulator and torch ends
- ☐ Cylinders, regulators, hose and other apparatus and fitting containing or using oxygen shall be kept free from oil and grease
- ☐ Workers briefed on risk assessment and working procedures, Starting date/time must be accordance to the permit
- ☐ Portable LEL Detector must be equipped when performing hot work within the FAB or area with flammable materials.

c. All reasonable practicable measures have been taken to render the area safe for working. All the conditions stated above are duly complied and should be continuously enforced during work. The RA and evacuation procedures have been communicate to all workers.

Coordinator/Vendor Supervisor name, signature and date | Requester name, signature and date | Approver (Requester's Superior) name , signature and date

3 EHS APPROVAL [To be completed by EHS]

☐ Gas Check has been carried out at 5 meter radius and result are as follows :

Date	Time	Competent Personnel by Certify Contractor Name	Competent Personnel by Certify Contractor Signature	Flammable Gas (<10%LEL)	Oxygen Level (19.5-23.5%)	Verify by FAB 10 (Name)

4 PERMIT CANCELLATION [To be completed by Requester and Contractor/Vendor]

☐ HOT WORK completed on _____(date) at _____ hrs.
☐ Fire watch to check site 3 hour after hot work completion at _____ hrs to ensure source of ignition extinguished and site has been clean-up.

Coordinator/Vendor Supervisor signature, date and time

Requester signature, date and time

Instruction :
1. Original copy to be displayed at work site.
2. Duplicate copies to be issued to Requester, Vendor/Contractor and EHS

Implement Hot Work Permit system for hazard assessment, verification and approval of safety checks of the work area.

Good Housekeeping

Maintain good housekeeping and ensure the surrounding areas are free from flammable and explosive substances.

Hoses shall be laid out so that they are not likely to be cut, tripped over or damaged.

Fire Blanket and Barrier

Appropriate fire blankets conforming to ANSI/FM 4950 standard shall be provided to contain sparks arising from welding and cutting operations.

Holes in the floors, ducts and walls must be covered with fire-rated noncombustible material to prevent sparks from falling through unnoticed onto people or combustible materials below.

Visible hazard warning signs and barricades shall be in place when the hot work area is accessible to personnel other than the Hot Work Operator or Fire Watch.

Oxy-fuel Equipment – Gas Cylinders Handling

Move the gas cylinders in wheeled trolleys designed for the purpose and ensure that they are securely fastened to the trolley during movement to prevent damaging the cylinder valves and topple hazards.

Do not roll the cylinders and use them as a support for load even when they are empty.

Cylinders must always be kept in upright position, even while they're being moved. Cylinders should be secured at all times.

Oxy-fuel Equipment – Prohibition of Hot Work

No hot work (Cutting or welding) shall be performed on used drum, barrels, tanks, vessels or containers, until they have been cleaned so thoroughly that there are no flammable materials which might produce fire are inside it.

No hot work (Cutting or welding) shall be performed directly on or adjacent to an unprotected, active sprinkler head or heat/smoke detection device.

Global EHS – Construction Electrical Safety Requirements

Electrical Hazards

Electrical hazards include:

- Electrocution
  - Death
- Electric shock
  - Electric current passing through the body
- Electric burns
  - Effects of an electric arc
- Electrical Arc flash and/or Arc blast effects
  - Effects resulting from a high energy electric arc
- Explosion
- Chemical release / spill
- Electrical Fires
- Falls from elevation

Lock Out Tag Out (LOTO) / CoHE Requirements

- Contractor shall establish a Lock Out Tag Out (LOTO) or Control of Hazardous Energy (CoHE) procedure and submit it to the Project Architect/Micron for review and approval.
- LOTO/CoHE procedure ensures that all hazardous energy sources of a machine are isolated, disconnected and discharged prior to commencing work like maintenance, repair, and installation of machine.
- Only locks specifically designed for lock-out and tag-out are to used. Household locks are prohibited.
- CoHE to be applied to the power source and not on control circuit switches.
- This is to prevent the machine from being inadvertently activated or energized while the work activity is in progress.
    1. De-energize equipment
    2. Lockout/Tagout equipment
    3. Dissipate/Discharge energy
    4. Validate and confirm zero energy
    5. Perform Work
    6. Remove Lock Out/Tag Out devices
    7. Re-energize the equipment

Qualified Electrical Worker Requirements

- Personnel who have required training, certification, demonstrated skills and knowledge in the construction and operation of electrical equipment and installations.
- Received safety training, and certification to identify electrical hazards and reduce the associated risk.
- Licensed by local Authorities to carry out electrical work, electrical switching within the license terms, knowledgeable on Micron site electrical systems safety and reliability requirements.

General contractor to engage qualified electrical worker as per applicable local Regulation. The roles and responsibilities may vary with different countries requirements. Below are few of the examples:

  - Carry out electrical testing & commissioning
  - Ensuring compliance to local electrical codes and licensing requirements
  - Review RA and control measures including PPE for live electrical work.
  - To review electrical work and switching activities
  - Conduct electrical safety audits

Authorized Electrical Worker Requirements

- Authorized Electrical Worker (AEW) maybe permitted to carry out electrical works under authorization by Qualified Electrical Person.
- A contractor or vendor employee who have required training, certification, demonstrated skills and knowledge in the construction and operation of electrical equipment and installations.
- Received electrical safety training and certification to identify electrical hazards and reduce the risk of the associated work.
- Knowledgeable on Micron site electrical systems, safety and reliability requirements.
- General contractor to engage Authorized Electrical Worker as per applicable local Regulation. The roles and responsibilities may vary with different countries requirements.
- All temporary electrical installations, equipment and tools shall be checked and certified safe for use prior to usage on site by an Authorized Electrical Worker and thereafter monthly and after any repairs. The AEW shall provide a sticker on the equipment and tools indicating the date of inspection and that it is safe for use.
- General workers are not authorized to work on or near live electrical equipment or installation.

Approval for Electrical Work

- NO electrical work is allowed to proceed without approved permit, step by step method statement / procedure with clear owner for each step and review process.
- All electrical works shall be reviewed by Qualified / Authorized Electrical Worker and approved by Supervisor.
- Prior to work, all workers and supervisors are briefed on the work steps as per method statement by coordinator. Briefing shall cover major steps, roles and responsibilities, associated risk and its mitigation. Only those people participated in the briefing shall be allowed to conduct the task.
- Any unplanned work when observed need to be reported to the coordinator for risk assessment and approval before proceeding.
- Contractor to provide approved detail Risk Assessment and its risk control measures.
- Example of electrical works:
  - All type of electrical testing and commissioning
  - Cables laying and termination
  - Electrical switching
  - Temporary power works
  - Electrical equipment installation and dismantling

No step-by-step method of statement / procedure = No Approval = No Electrical Work

Portable Electrical Tools Requirements

- Electric power tools must use Earth Leakage Circuit Breaker (ELCB) adaptor (For Asia/Europe) / Ground Fault Circuit Interrupter (GFCI) adaptor (For USA).
- Portable electrical tools are to be tested or inspected at least every quarterly by Authorized Electrical Worker.
- Tools to be tested OK and labelled by Qualified / Authorized Electrical Workers.

Check that the OK label is still valid

Make sure power tool has electrical protection

Electrical Earth Leakage / Ground Fault Protection Requirements

- Power Socket
  - ELCB or GFCI Adaptor
- Industrial Socket
  - Earth Leakage / Ground Leakage protection at the temporary distribution board
- Temporary Distribution Board
  - Earth Leakage Protection / Ground Fault Circuit Protection

ELCB/GFCI

10 mA ELCB Adaptor

6 mA GFCI built in socket

Industrial Socket

Generator Set

- Location of the temporary generator shall be reviewed and approved based on the risk factors such as, potential smoke /fumes risk, carbon dioxide accumulation, carbon monoxide accumulation, potential fuel or fluid spill risk, air contamination to cleanrooms and other airconditioned areas.
- Generator set are to be inspected periodically by Qualified Electrical Worker.
- Generator set should be barricaded with restricted access.
- Generators and welding sets in use on site are always adequately and effectively earthed during operation.
- Ensure that the earthing/grounding cables are not removed or loosen.

‘Live’ Electrical System Requirements

- Working on ‘Live’ electrical should be avoided except when absolutely necessary with the following safety measures:
  - The Permit to Work must be reviewed and approved by Qualified Electrical Worker.
  - Only Qualified / Authorized Electrical Workers are allowed to work on ‘Live’ electrical system.
  - Must carry out non-routine work risk assessment and follow control measures.
  - PPE like arc-flash suit, electrical gloves, face shield, electrical safety shoes must be worn as per RA approved by Qualified Electrical Worker.
  - Full time supervision required by Qualified / Authorized Electrical Workers (Buddy system).
  - Access to the live or exposed electrical work location shall be controlled.

Temporary Power Distribution Board

- Must be installed & commissioned under Qualified / Authorized Electrical Worker supervision.
- Access to electrical distribution board must not be blocked.
- Temporary power cable routing approved by the Qualified / Authorized Electrical Worker .
- Temporary cables must be supported as per cable support design.
- All power cable termination shall be performed by Qualified / Authorized Electrical Worker only.
- Must provide Earth Leakage / Ground Fault Leakage protection
- Fire extinguisher suitable for electrical fire fighting should be available near the distribution board.
- Periodical inspection by Qualified Electrical Worker.
- Shall be provided with signage indicating energization with required warning signage against potential hazard such as electrical shock and arc flash etc.

‘Live’ Electrical Switch Room Requirements

During construction stage, Contractor need to ensure the following for ‘Live’ electrical switch room:

- Switch room access to Qualified / Authorized Electrical Worker only. Any access by others shall be accompanied by Qualified / Authorized Electrical Worker.
- The switch room door shall always be locked.
- Adequate “Danger High Voltage” labels and warning signs are displayed.
- Fire extinguisher suitable for electrical fire fighting are provided in the Switch Room.
- Electrical One Line / Single Line Drawing are displayed at prominent position.
- Rubber mats shall be provided
- PPE cabinet with PPEs are provided.
- A logbook is maintained in the switch room to record all access and activities.
- Access to electrical rooms are to be controlled with the use lock and key where authorized workers are expected to draw the keys from an Authorized Manager.
- Access to live electrical panels by opening the back cover is prohibited unless it the power to the panel is locked and tagged out.
- Risk for fire protection system operation, its mitigation and response shall be communicated to all people who need to access the electrical rooms.

PPE for Electrical Work

Rubber Gloves

Insulated Shoes

Arc Flash Suit

Hard Hat/Face Shield

- PPE to be worn as identified in the electrical works approved Risk Assessment (RA) or Hazard Job Hazard Analysis (JHA).
- The qualified or authorized electrical worker shall review the PPE requirement.
- PPE shall be in good working condition.

- The list of PPE include:

1. Electrical gloves certified for rated voltage
2. Electrical Safety Shoes
3. Safety Goggles
4. Hard hat
5. Face Shield
6. Rubber Mat
7. Hearing Aid (When required in the RA/JHA)
8. Arc Flash Suit (When required in the RA/JHA)
9. Fire retardant clothing

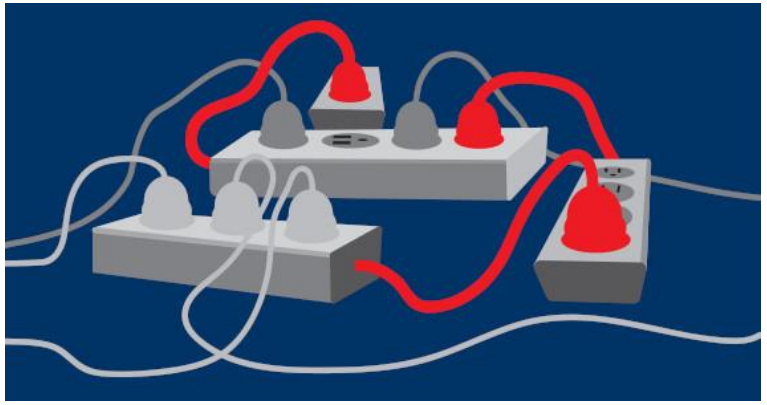
Power Outlets and Extension Cords

Power Outlets

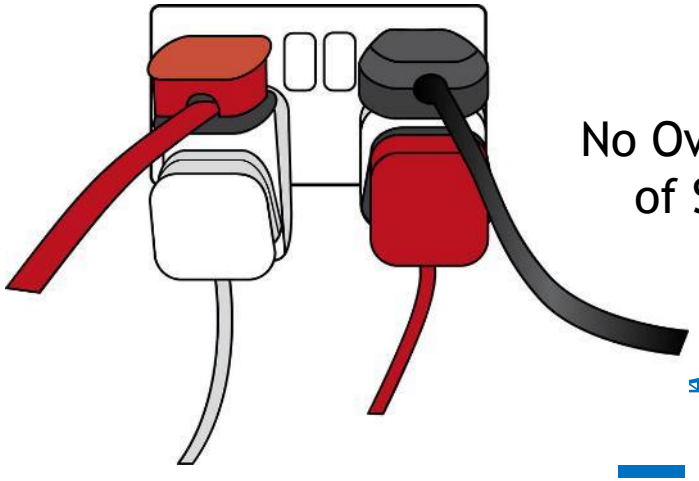
- Do not overload outlets by using multiple outlets devices to increase the number of outlets at that socket

Extension Cords should NOT:

- Fix / install to structures
- Extend through walls, ceilings, and/or floors
- Be placed under doors or floor coverings
- Be subjected to physical or environmental damage
- Do not plug one extension cord to another extension cord (no daisy chain)
- Do not use damaged cords, strips or plugs
- For temporary usage only



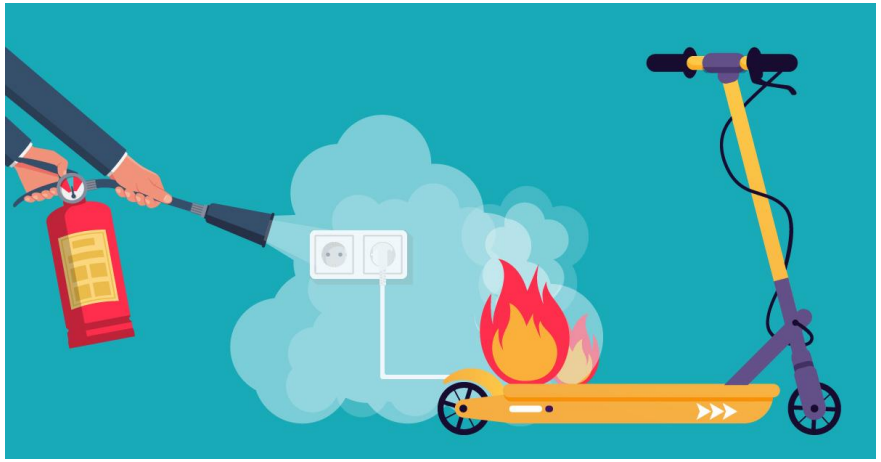
No Daisy Chaining



No Overloading of Sockets

Equipment / Personal Devices Charging

- Do not charge equipment unattended. Any charging of equipment overnight should be monitor at least remotely through CCTV, or closed-circuit television and at designated charging area.
- Disconnect from power when the battery is fully charged. Do not overcharge the battery.
- Ensure that the charger and battery are from original manufacturer.
- Do not charge the battery in hazardous / flammable storage rooms.
- Check the battery for any damages such as bulging, cracking and leaks before charging.
- Do not dispose battery into general waste.



No charging of PMD battery is allowed at site

Monthly Electrical Safety Audit

Contractor to conduct electrical safety monthly electrical inspection report by Qualified Electrical Worker:

Examples of audit scopes:

- Electrical distribution system
- Electrical rooms and its access controls
- Earthing/Grounding system
- Lightning protection
- Diesel Generator system
- Temporary power outlet and lighting
- Check for defective parts, faulty insulation, improper grounding, and loose connections

Tools & Instruments for electrical works

Calibrated & Inspected

Insulated Tools

Tested & Qualified

Faulty Screen

No Insulation

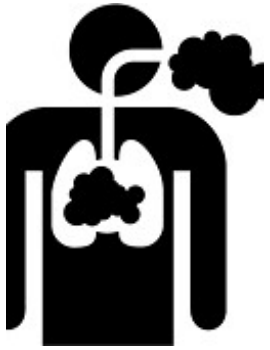
Expired Calibration

- Tools and instruments must be tested by Qualified / Authorized Electrical Worker for good working condition.
- Tools and instruments must be insulated type.
- Perform a visual inspection of the insulated tool each time you plan to use it. If there is any damage to the outer insulated layer, do not use the tool and inform your supervisor.
- Electrical instruments/meters must have valid calibration certificates.
- All the tools to be accounted before and after work to prevent being misplaced inside electrical equipment.

Global EHS – Construction Confined Space Safety Requirements

Permit-Required Confined Space

A Permit-Required Confined Space is a confined space with one or more of the following characteristics:



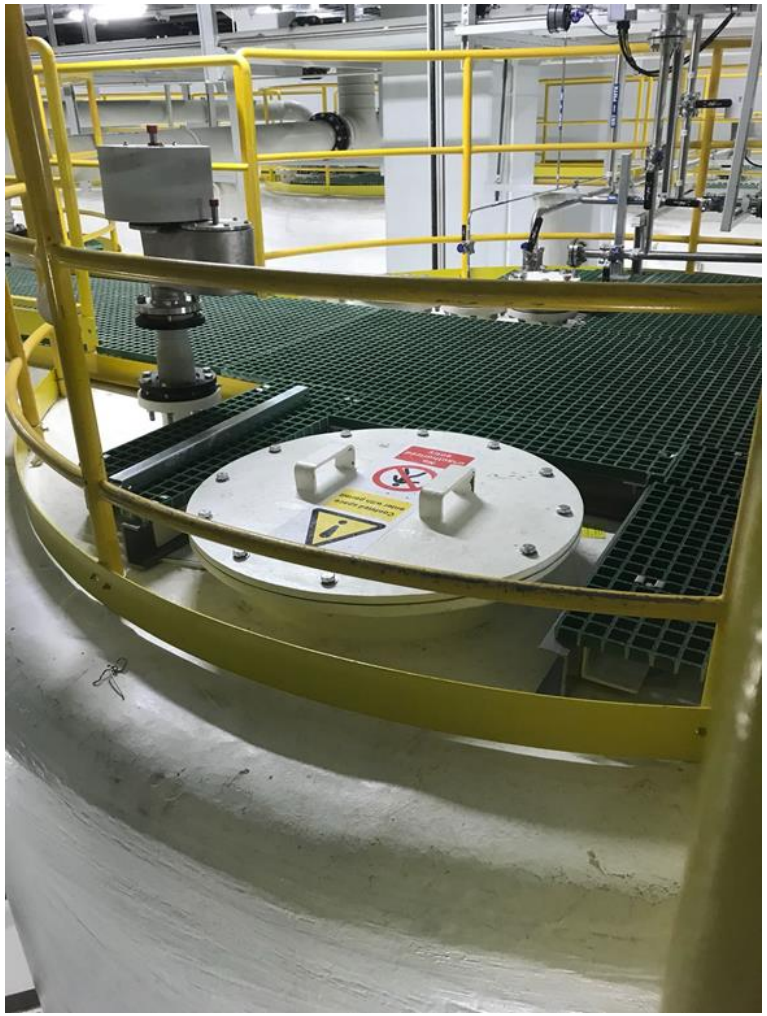
Potential Atmospheric Hazard

Engulfment

Hazardous Configuration (Entrapment)

Other Serious Safety or Health Hazards

Confined Space Examples



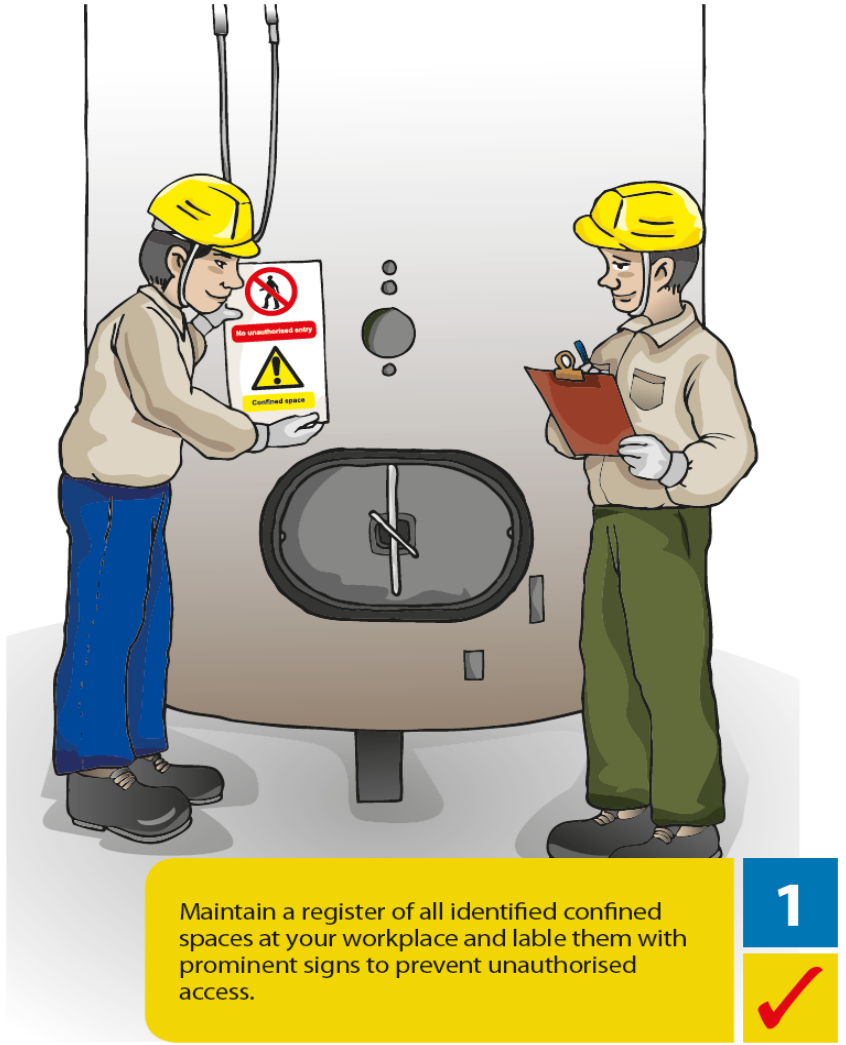
Confined Space Examples

Confined Space Permit

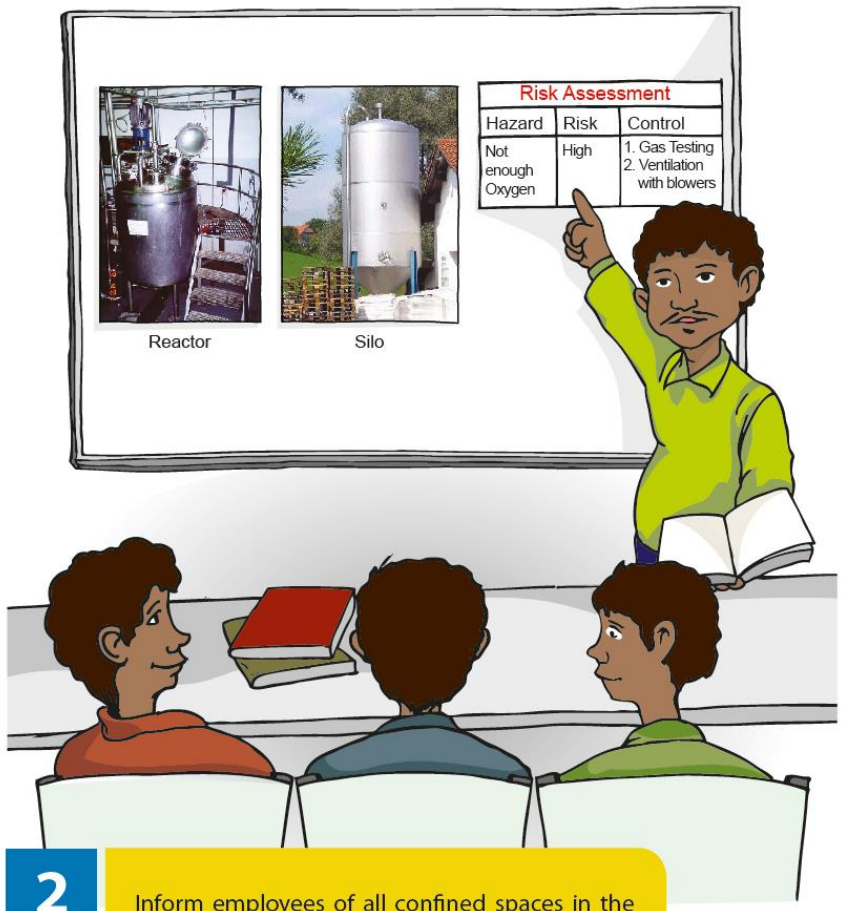
- No person shall enter or work in a permit-required confined space without an approved entry permit. Site shall ensure that all confined space work permit shall comply with local EHS regulatory requirements and Micron EHS standards.
- The entry permit shall adhere to local Government legislation for confined space permit and should generally include the following:
  - Identification of the confined space;
  - Location of the confined space;
  - Purpose of entry;
  - Entry date and time duration;
  - Validity of the permit;
  - Potential hazards in the confined space;
  - Control measures;
  - Personal Protective Equipment (PPE);
  - Emergency response and rescue plan;
  - Name of confined space attendant and entrants;
  - Results of the atmospheric testing of the confined space;
  - Provision of ventilation;
  - Names and signatures of confined space entry supervisor/assessor, and authorized manager.

Identification of Site Confined Spaces

- A qualified person shall conduct an evaluation of the project to identify possible confined spaces.
- The Contractor shall produce a register, which enlist the confined spaces within the construction site.
- Each confined space shall be assigned a unique identifier as well as the hazards.



Training of Confined Space



Confined space entry personnel shall also attend any local mandatory training requirements needed to accomplish the mission of entering, working and exiting the space safely.

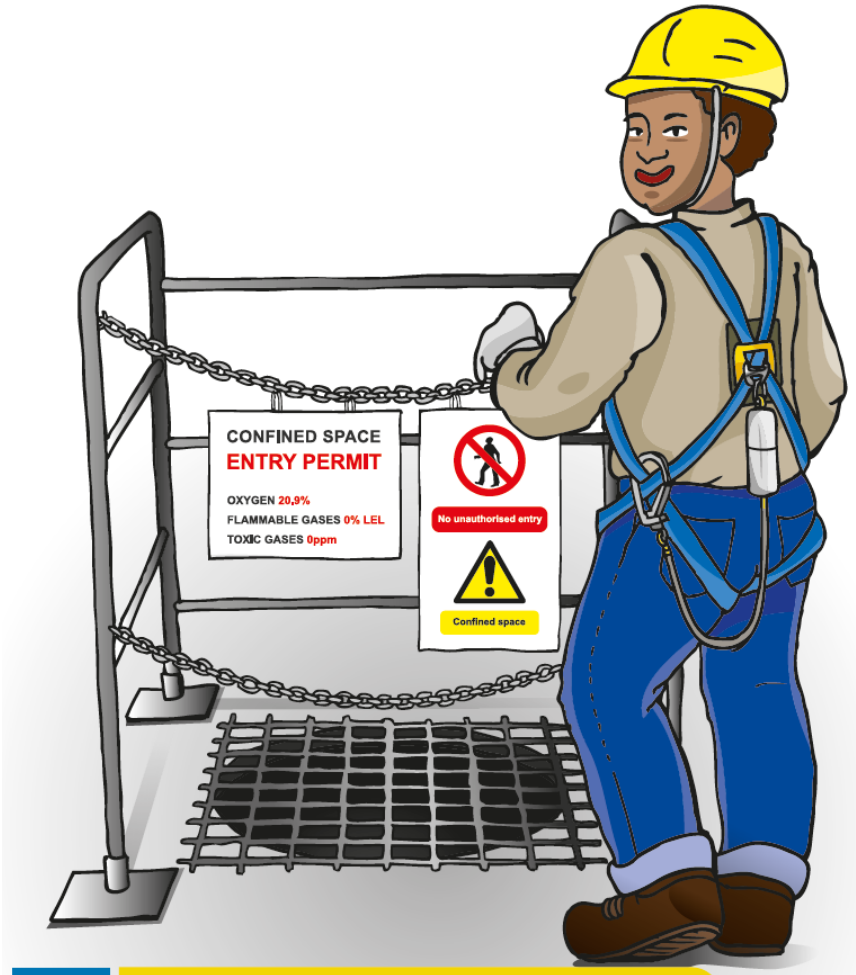
Records and certificates of mandatory training by local Authority shall be kept at the entry of confined space.

Confined Space – Pre-entry

- Safety measures identified in risk assessment shall be taken when opening the covers to confined spaces, in the event the space is under pressure or hazardous materials from inside.
- Do not enter any suspected confined space unless authorized by Confined Space Supervisor and/or EHS team.

Prevent Unauthorized Entry

- Safety barriers shall be placed to separate workers from hazards of confined space.
- Danger and warning signages to be placed at the entry of confined space.
- Post confined space permits at the entrances of confined space.



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Prevent unauthorised workers from entering confined spaces by placing barriers and warning signs and post endorsed entry permits at the entrances of confined spaces.

Log Out and Tag Out

- Identify all energy sources inside confined space.
- Energised systems may include electrical, mechanical, steam, compressed (pneumatic) gas, hydraulic, gravity, wind, and radiation devices.
- Lockout, physical isolation, blocking or de-energising of the pipelines, valves, machinery etc to guard against the release of stored energy.

Gas Testing

- No person shall enter a confined space until it is tested to be free from any atmospheric hazards.
- Testing shall be carried out by a qualified trained confined space entry supervisor/assessor before entry into any confined space.
- Below are acceptable atmospheric limits:
  - Oxygen reading: ≥ 19.5 % Vol. to ≤ 23.5 % Vol.
  - Flammable gases and vapors reading: < 10% LEL
  - Toxic gases and vapors reading: < PEL values, or equivalent

Identify Proper Equipment

Supervisors have to identify proper equipment and tools and train workers on the proper usage before starting confined space work..

7

- Testing and monitoring equipment
- Communications equipment
- Personal protective equipment (PPE)
- Lighting equipment approved for ignitable or combustible conditions
- Barriers and shields to protect the space
- Rescue and emergency equipment
- Proper access and egress equipment

Gas Monitoring

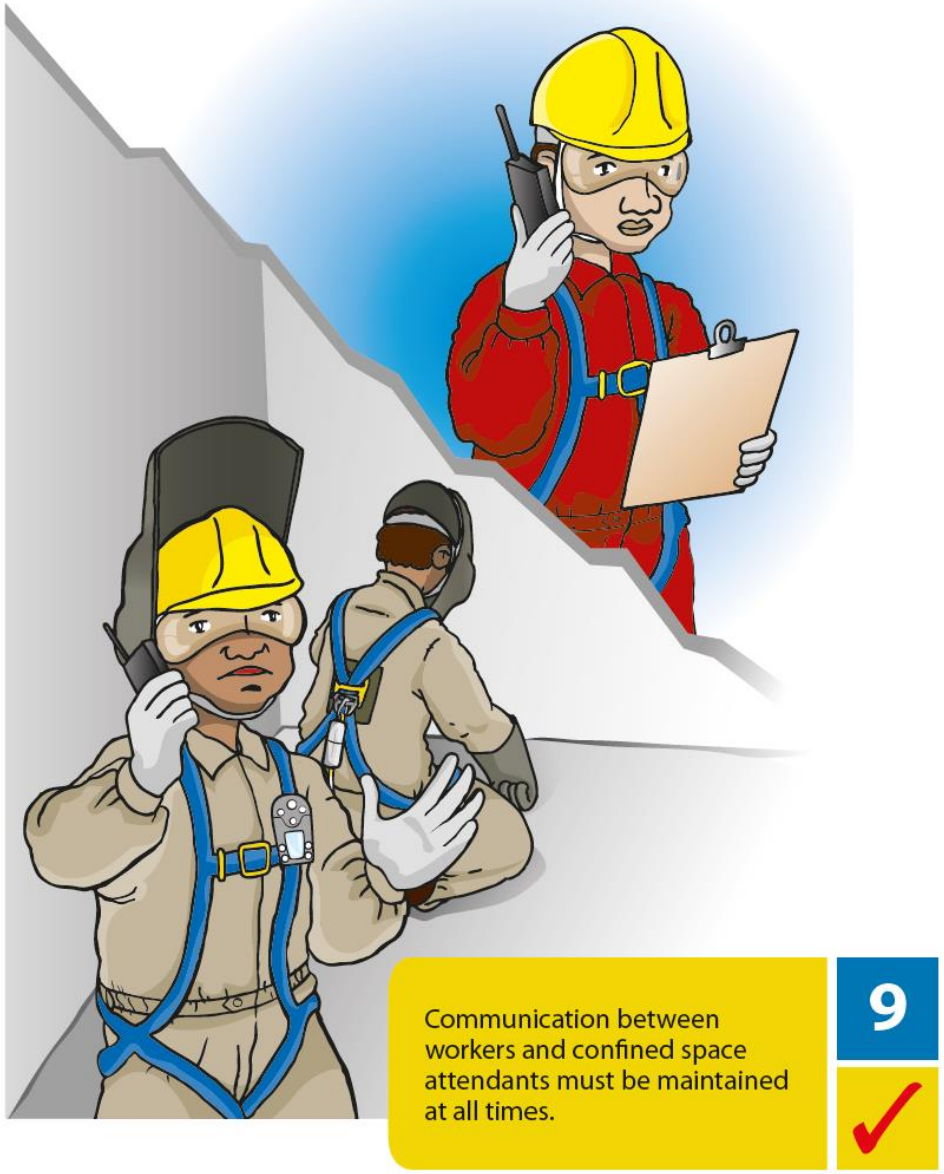
Gas monitoring shall be conducted by a competent confined space assessor to certify that the confined space is safe for workers to enter and thereafter at every hour (1) hour intervals.

Contractor is also encouraged to install continuous gas monitoring system where possible.

At least one person in a group working in the same vicinity shall be equipped with suitable instrument for measuring oxygen, combustible atmospheres and the identified toxic contaminants.

Proper Communication

- There must be an effective and reliable means of communication among all personnel inside and outside of the confined space.

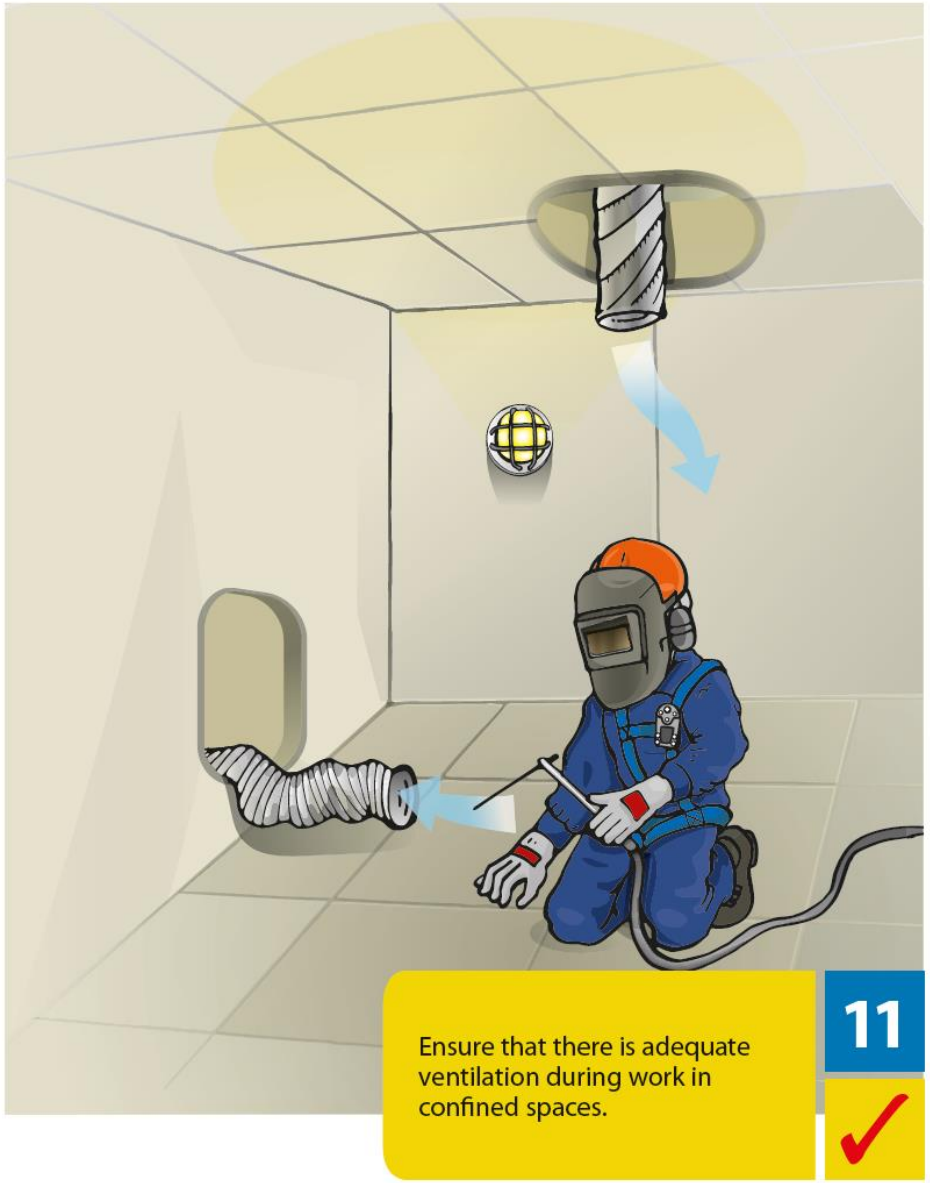


Prevent Unauthorized Entry

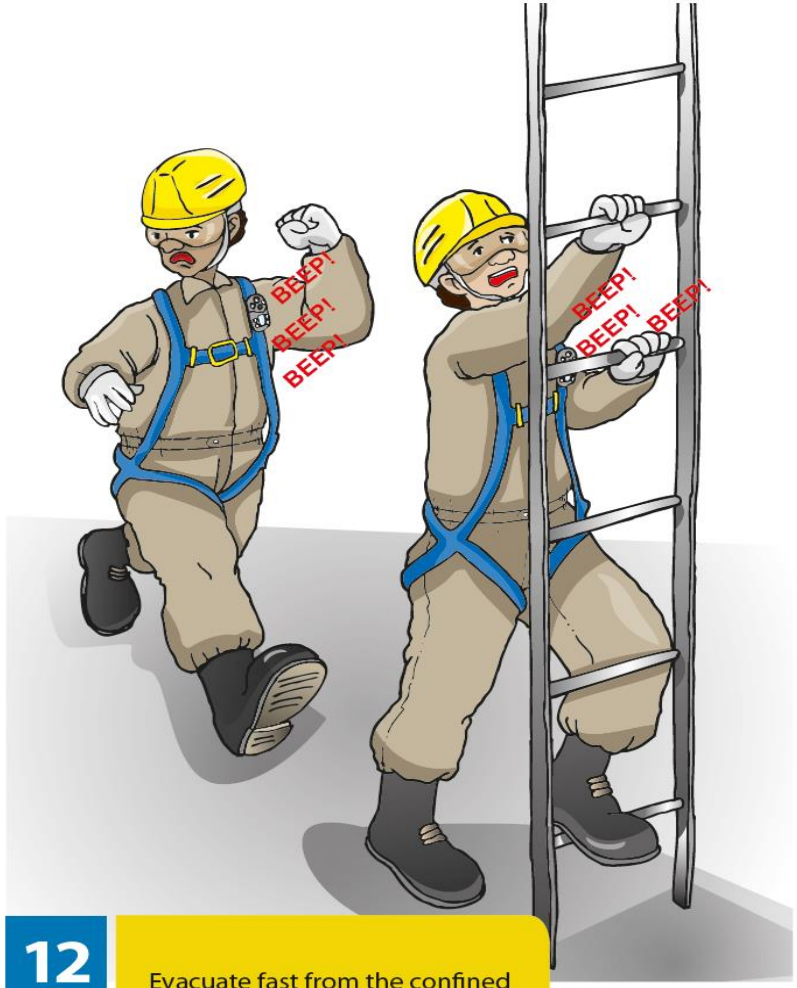
- Contractor shall have controlled RFID tag access/egress points to confined spaces, shafts, and tunnels to prevent unauthorized access.
- Confine Space Attendant(s) (CSA) shall always be present at access points for monitoring purposes.
- The CSA shall hold a competent certification and undergone necessary trainings to perform his duties.

Ensure Adequate Ventilation

- Adequate and effective continuous ventilation is required throughout the whole duration of confined space work.
- Ensure use of a mechanical air moving devices such as a blower to supply fresh air into the confined space and exhaust existing air inside it.
- The constant supply of fresh air will help to maintain the level of oxygen in the space within the safe range, as well as dilute the level of contaminants.



Emergency Response and Rescue



Evacuate immediately when the portable gas detector alarm goes off or any emergency situation occurs.

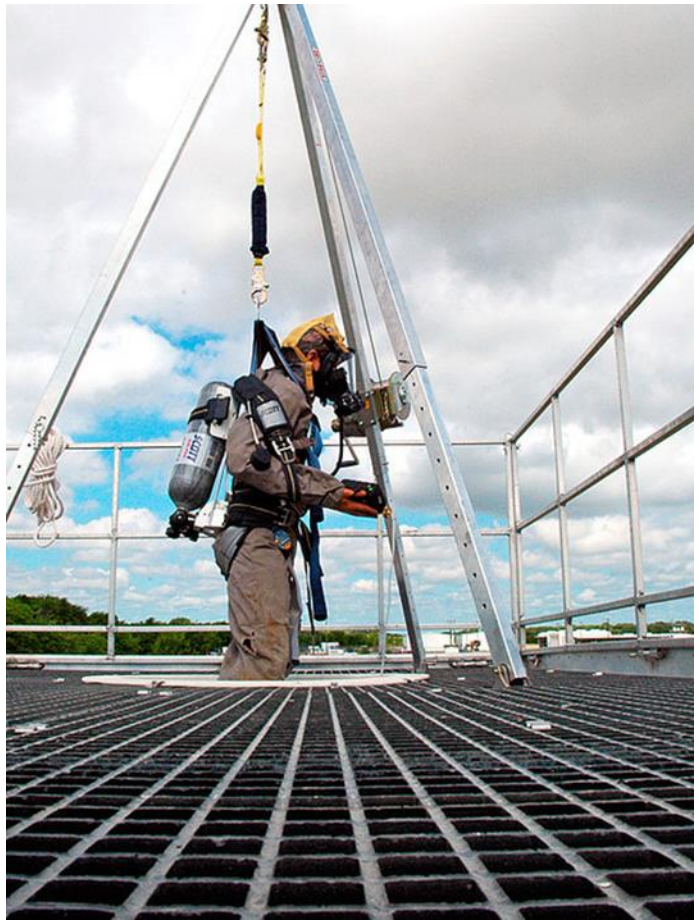
Confined Space attendant standby outside shall notify the EHS team and/or local public emergency services (e.g., local fire or ambulance service) when an emergency occurs.

Emergency Response and Rescue

- DO NOT enter the confined space to rescue your coworkers on your own.
- Workers who are not trained in proper rescue procedures must not undertake or be permitted to undertake rescue operations.

Emergency Response and Rescue

- The emergency response team is required to perform non-entry rescue tactics unless specifically trained on and fully equipped for entry rescue.
- It is recommended that the project engage with local external emergency services and/or fire department to conduct timely rescue operations.



Confined Space Signage Requirement

- For permit-required confined space, a sign reading “DANGER - PERMIT-REQUIRED CONFINED SPACE, DO NOT ENTER”, or one using other similar language required by local law, is the minimum identification signage requirements for a confined space.

- The site may display additional essential information, which may include the following:
  - Confined Space identification number
  - Emergency contact information, Department, Person in-charge, Site emergency number

Confined Space Poster Samples

CONFINED SPACE

DO NOT ENTER unless you are:

- ☑ Trained
- ☑ Briefed
- ☑ Authorised

CONFINED SPACE

IN AN EMERGENCY, CALL FOR RESCUE.

Contact Person: _____

Contact No: _____

CONFINED SPACE

BEFORE YOU ENTER:

- ☑ Do Gas Testing
- ☑ Check Ventilation
- ☑ Wear PPE
- ☑ Check Entry Permit

Global EHS – Construction Lifting Safety Requirements

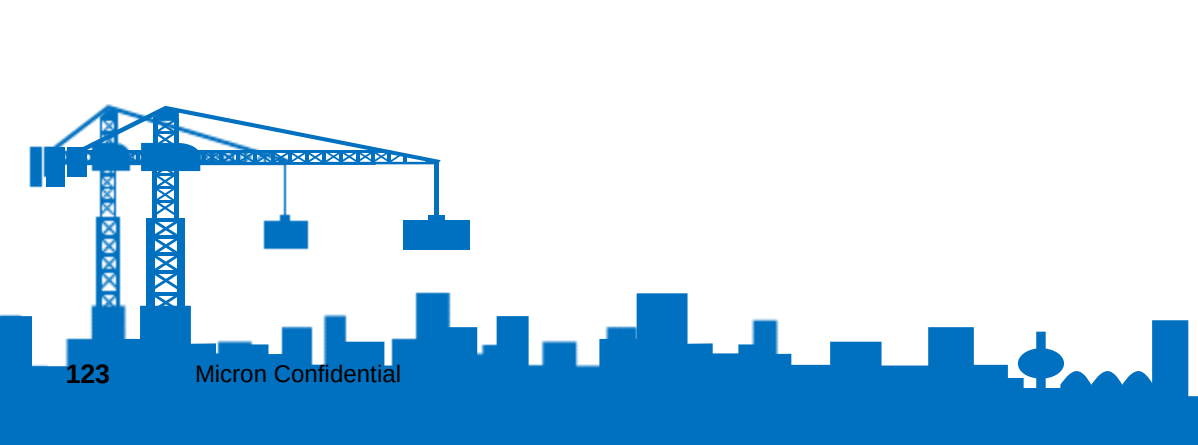
Crane Inspection and Checklist

- All lifting accessories and lifting equipment shall be designed, manufactured, inspected, tested and certified in accordance with applicable international standards. Lifting equipment shall undergo detailed examination by a competent person at least every 12 months.

- Contractor/Crane supplier shall submit Micron crane inspection checklist before crane deployment. Each crane only need to submit once after deployment to site.

Cranes and Rigging Inspection Checklist

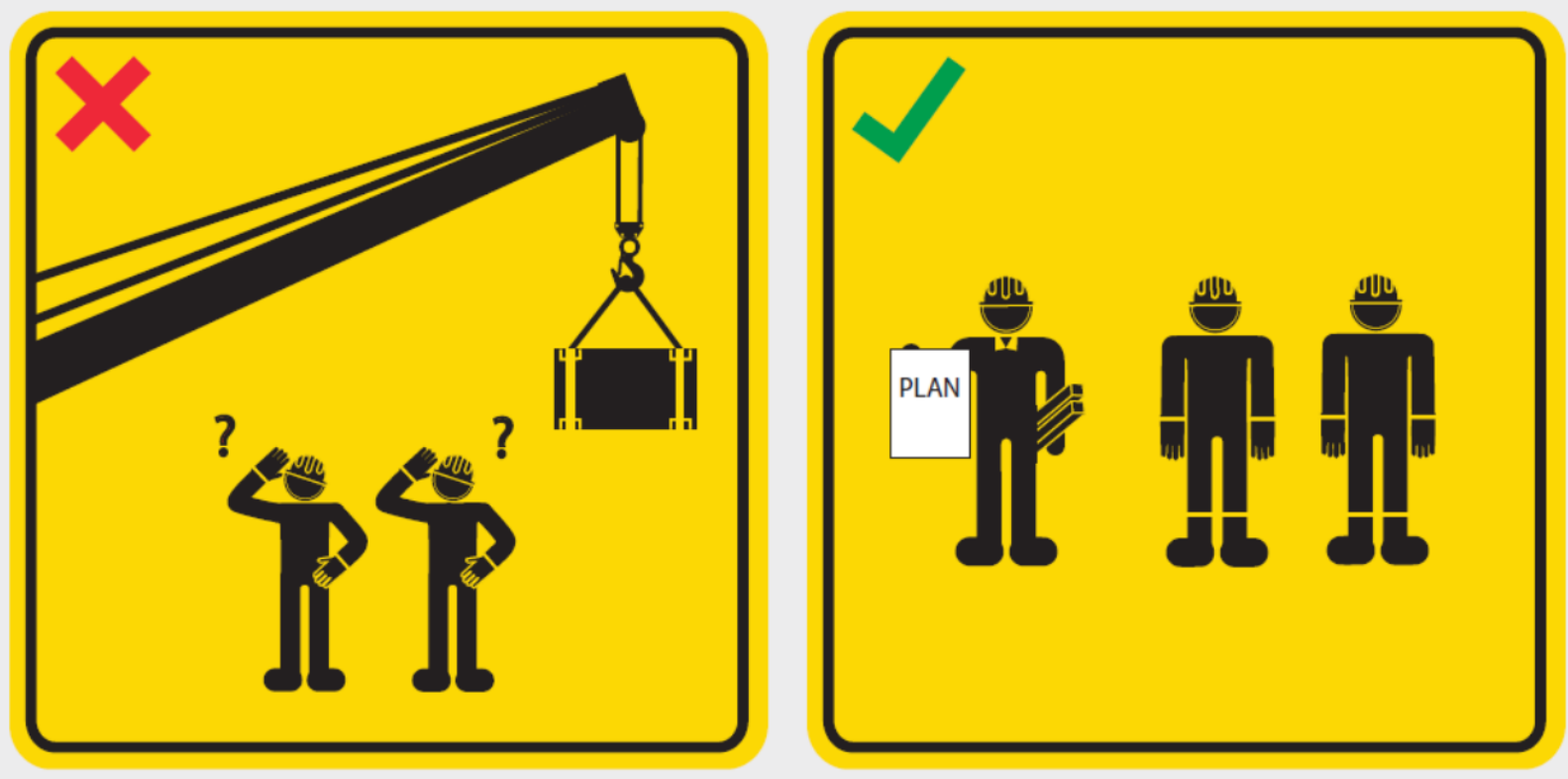
S/N	Check Items	*circle where appropriate
1	**Annual Crane Certification present?** *(Verification: Crane contractor has crane certification present within 1 year of lifting operations)*	YES / NO
2	**Crane operator has a current & valid Operator's License?** *(Verification: Operator presents crane Operator's License)*	YES / NO
3	**Operators completed daily crane inspections, and documented monthly crane inspections?** *(Verification: Witness operator perform visual inspection. Monthly inspection log available onsite to review)*	YES / NO
4	**Crane company supply a preventative maintenance log for the crane?** *(Verification: Log is present and documenting that crane has been serviced. To be verified within an hour)*	YES / NO
5	**Lift Director identified for all lifting activities?** *(Verification: Who is the Lift Director and his/her credentials)*	YES / NO
6	**Operators/Construction Field Manager aware of wind restrictions for crane?** *(Verification: Personnel knows the maximum wind speed which the crane can operate at)*	YES / NO
7	**Operators/Construction Field Manager aware of ground conditions where outriggers/tracks are set up?** *(Verification: lift location compaction & grading has been taken into account on the pick plan)*	YES / NO
8	**Operators and qualified riggers inspected rigging before each lift?** *(Verification: Observe inspections of rigging taking place before lift)*	YES / NO
9	**Pick Plan in place for each lift?** *(Verification: Pick plan is available)*	YES / NO
10	**Critical Lift Plan completed when needed?** *(Verification: Compare lift criteria to critical lift criteria to demonstrate if lift is a critical pick)*	YES / NO
11	**Operator/Construction Field Manager aware of overhead power lines and other overhead hazards?** *(Verification: Visually confirm line location at the location of the pick)*	YES / NO
12	**Power Company notified if working within 6 meters/20 feet of overhead lines?** *(Verification: Email or other evidences from power company stating de-energization)*	YES / NO
13	**Load chart with configurations and rated capacities of crane accessible to the crew?** *(Verification: visually verify in the cab of the crane)*	YES / NO



Lifting Crews

- There should be at least 3 crane crew members present for all crane activities.
- Lifting Supervisor (Lift Director), Signalman and Rigger must meet applicable local Authority training requirements.
- Lifting supervisors shall brief the lifting team members on the Lifting Plan before commencement of any lifting operation.
- The lifting supervisor (Lift Director) must stop the lifting operation immediately if the site condition deviates from the Lifting Plan.

Confirm the Capacity and Load



Ensure that the “rated load capacity” of the crane, or any lifting sling, gear or fitting is not exceeded. Confirm the weight of the loads being lifted before lifting operation.

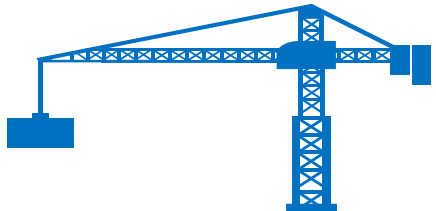
Critical Lifting Plan Requirements

Lifting Plan Checklist

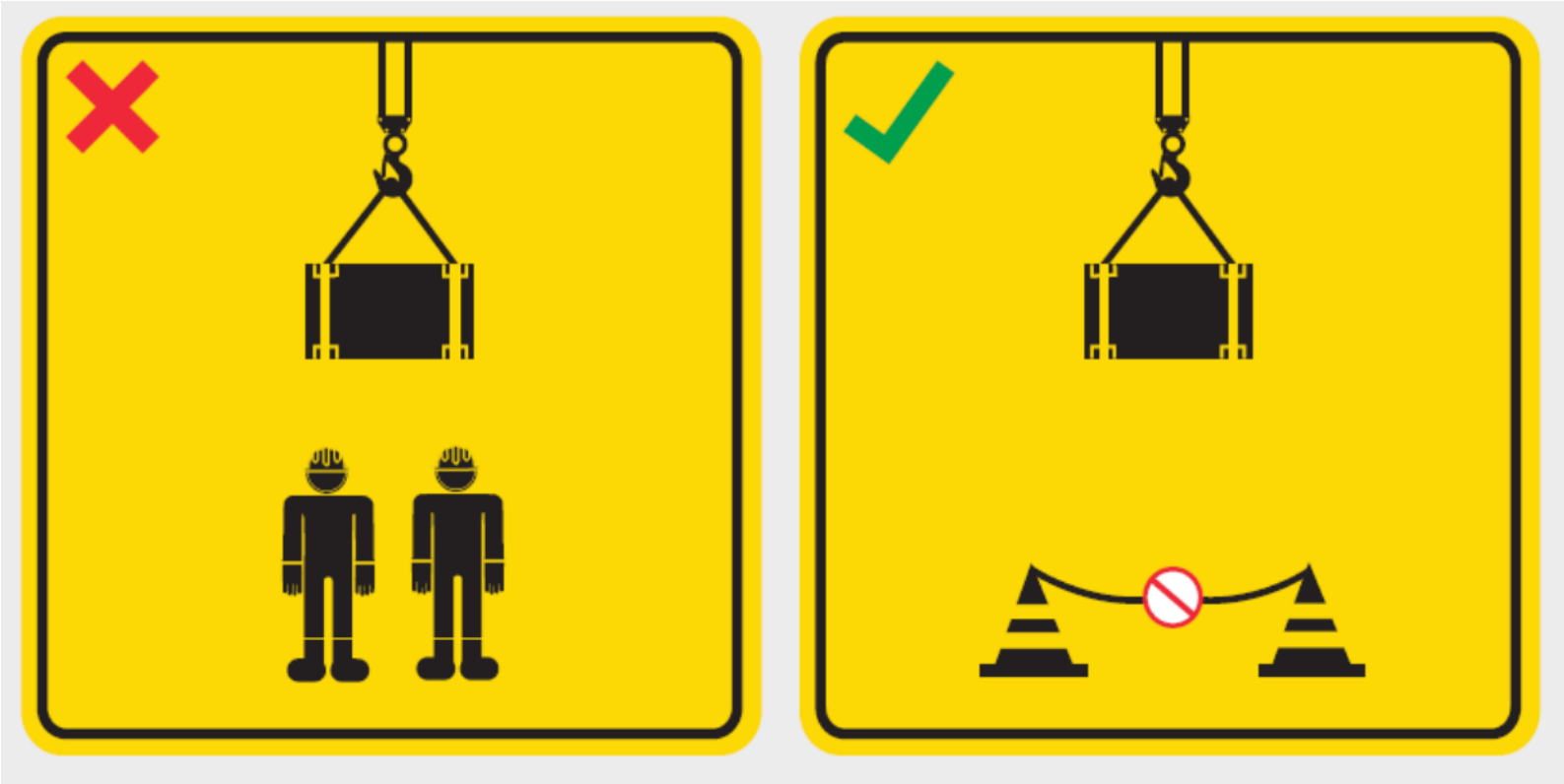
This checklist provides an overview of the main components of a lifting plan. These components in this checklist are non-exhaustive. Contractors are recommended to make the necessary adjustment to suit the project conditions.

S/N	Checklists	Yes	No	Remarks
Lifting team and lifting machine				
1.	Has a competent lifting team (Lifting Supervisor/Lift Director, Rigger and Signalman) been identified?			
2.	Is the exact weight of the load (including rigging and all components) specified?			
3.	Is the crane suitable for the identified lift in term of correct rated capacity and safe working load (SWL)?			
4.	Has the maximum load limits for the lift been specified according to manufacturer's recommendation?			
5.	Has the load chart limits been provided to verify boom angle, load radius and lifting capacity for each lift?			
6.	Is the Lifting Machine(s) undergo detailed examination by a competent person at least every 12 months?			
Drawings / Sketches				
7.	Are drawings/sketches provided for the following?			
	(a) Crane position in relation to any nearby streets or structures			
	(b) Location of all nearby utilities both underground and overhead			
	(c) Height of the lift to be accomplished			
	(d) Load radius from center pin of crane to center of the hook at load pick up (start) point			
	(e) Load radius from center pin of crane to center of the hook at load set (end) point			
	(f) Boom length and angle for the lift			
Rigging				
8.	Are the full sling details (include SWL and Factor of Safety) checked?			
9.	Is the lifting gear certificate for the selected rigging valid?			
10.	Is spreader type, length and SWL suitable for the lift?			
11.	Are shackles size, type and SWL suitable for the lift?			
12.	Sketch of rigging method provided?			
Operation				
13.	Are working and collapse zones of the crane within the safe boundaries?			
14.	Has the effect of wind and surrounding structure for lifting operation considered?			
15.	Has the access to lifting location been verified to be suitable?			
16.	Are excavation activities near lifting operations been considered?			
17.	Have overall ground conditions been verified stable?			
18.	As visibility (such as due to haze) been considered?			

- Critical Lifting plan is required for lift that is more than 70% of the rated capacity of the crane to be use.
- All critical lifts must be reviewed and approved by project management before the critical lift is allowed to proceed.



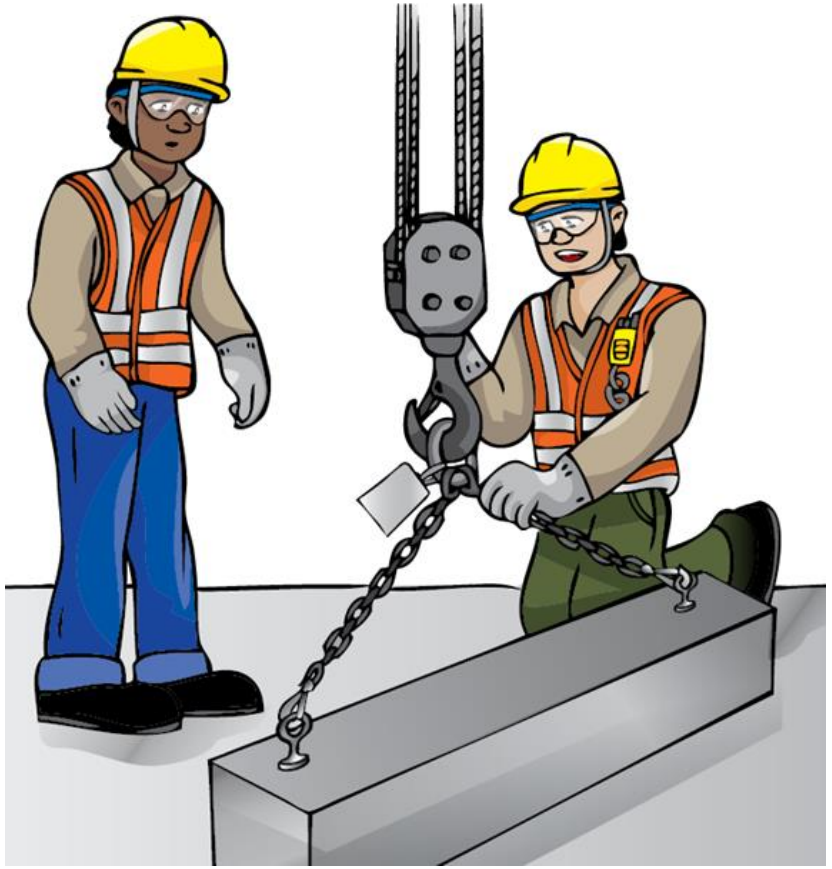
Lifting Zones Demarcation



Ensure <u>all workers</u> are clear of the crane operation area and are nowhere beneath the load while the equipment is being operated.

Checks before Operation and Inspection Identification

- All lifting equipment, gears and accessories shall be physically examined by Lifting Supervisor and/or Crane Operator before use.
- All lifting gear shall be identified with visible colour coding or attach some form of label/tag on a periodical basis (once a month etc), to ensure that lifting gear is still in good order and therefore still safe to be used.

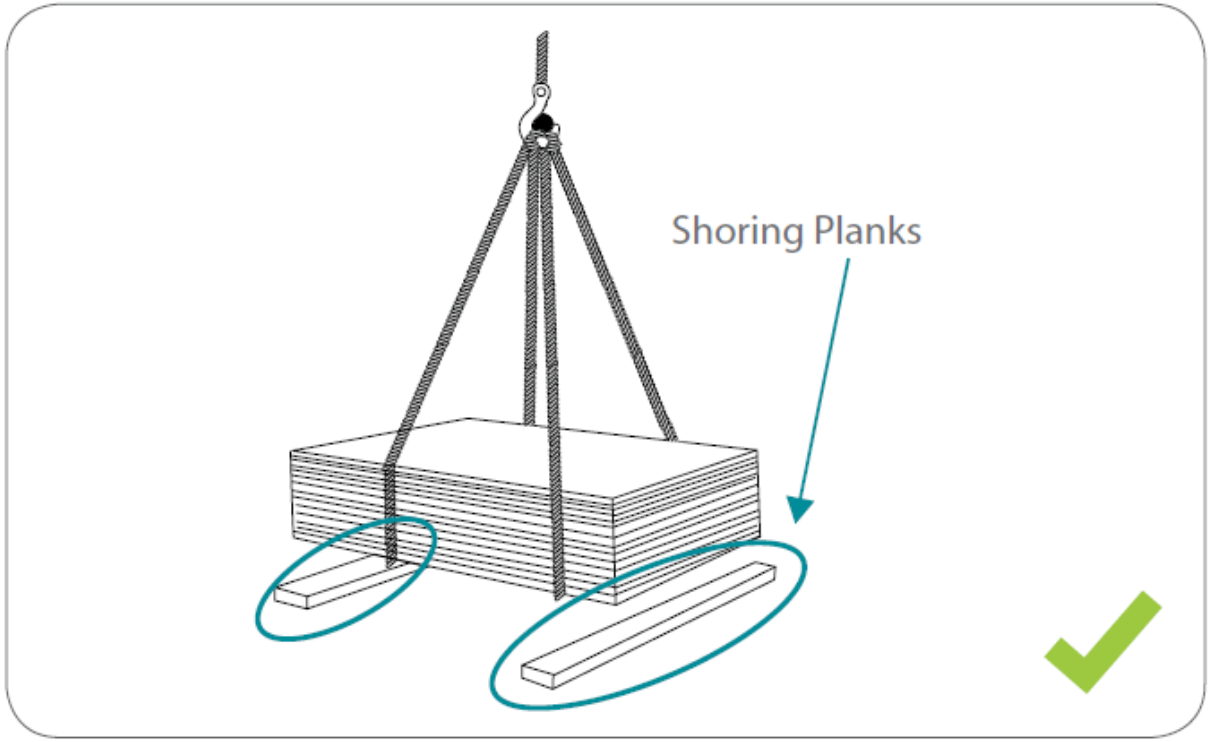


Periodical Inspection by Competent Person

- All lifting appliances and gears shall be inspected periodically, at least every 12 months by a Competent Person to the manufacturer's specifications and Safe Working Load (SWL).

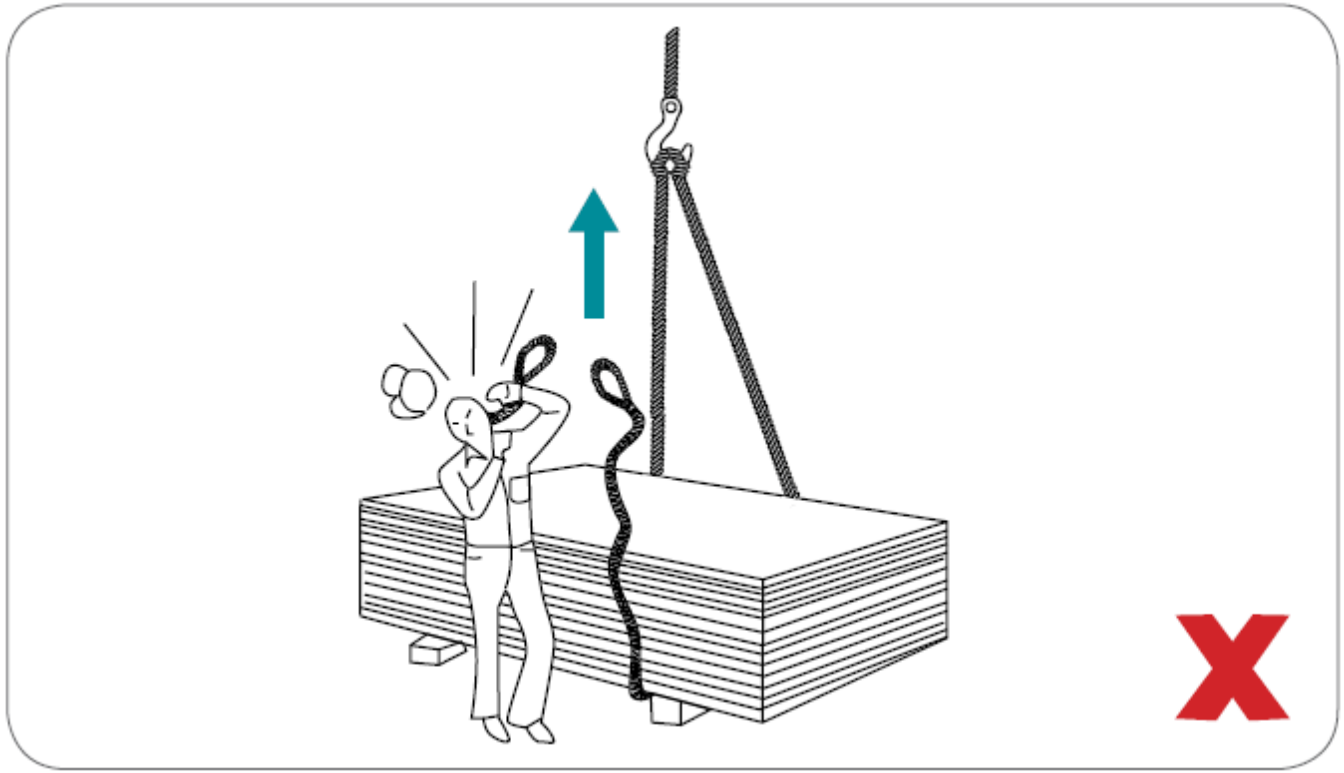
- Proof load test, if required, shall be carried out by an authorized party. The proof test is to demonstrate that the lifting appliance or lifting gear is structurally sound and fit for the SWL which it is designed for.

Usage of Shoring Planks



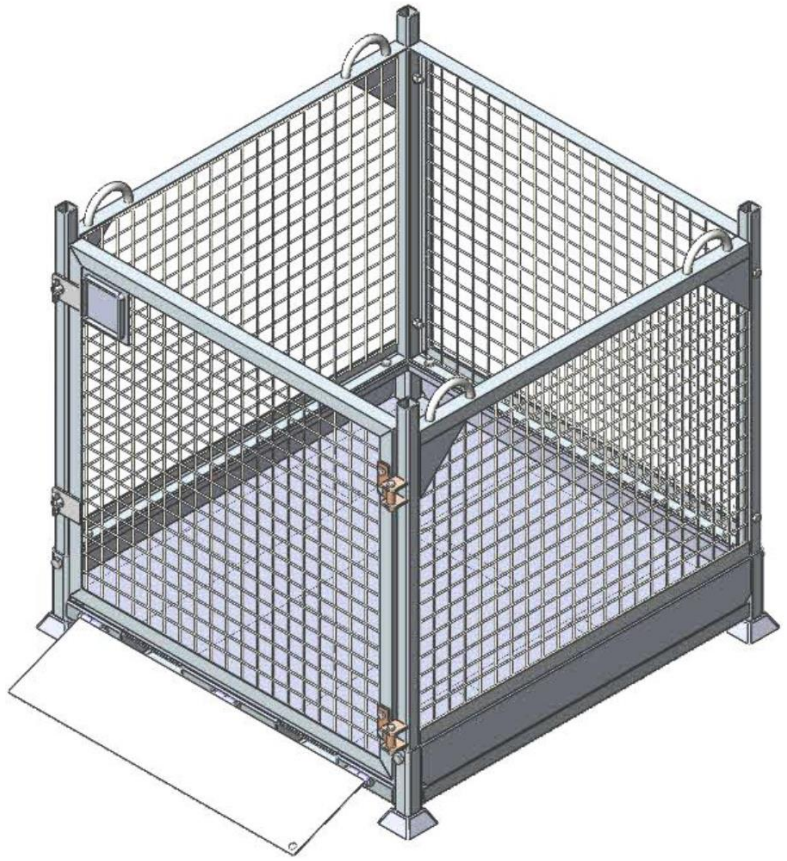
All loads shall be place on shoring planks during unloading to allow proper safe rigging in future.

Prohibition of Pulling of Slings using Crane



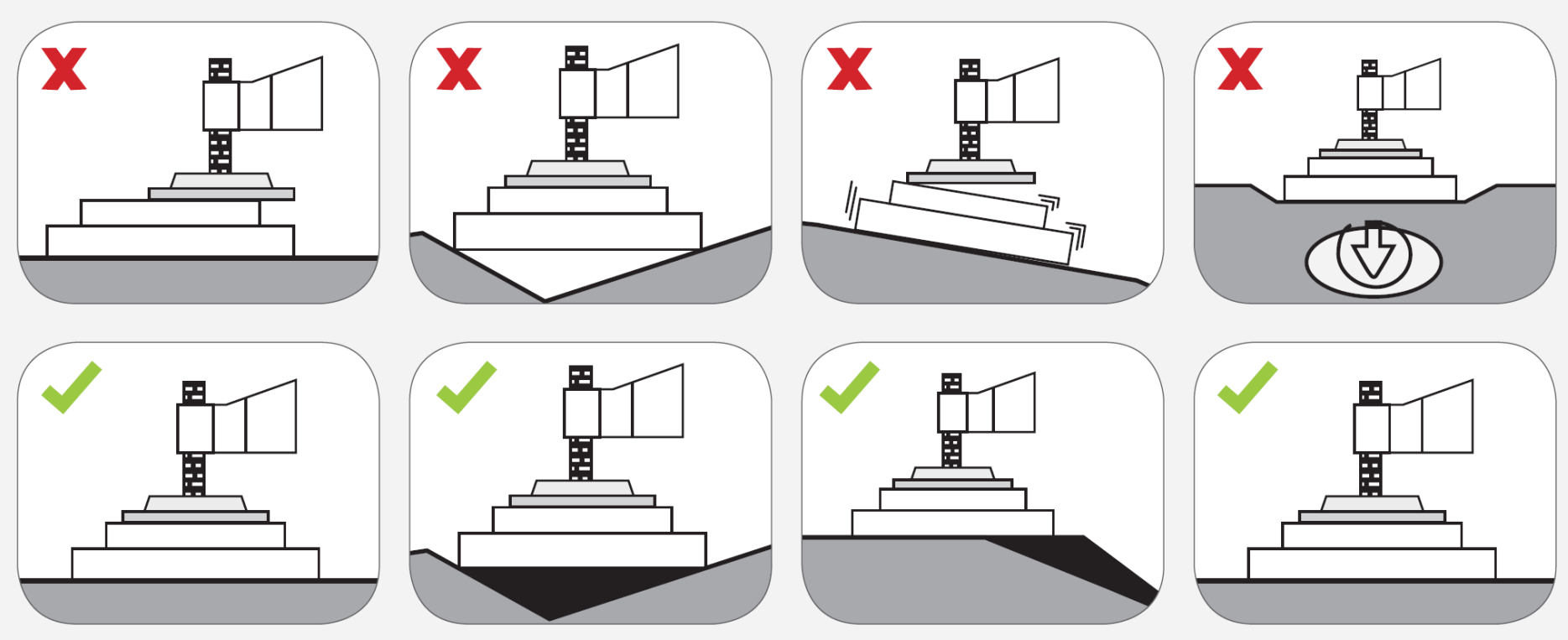
Do not use crane to pull out the slings from under any loads.

Securing of Loose Materials during Lifting



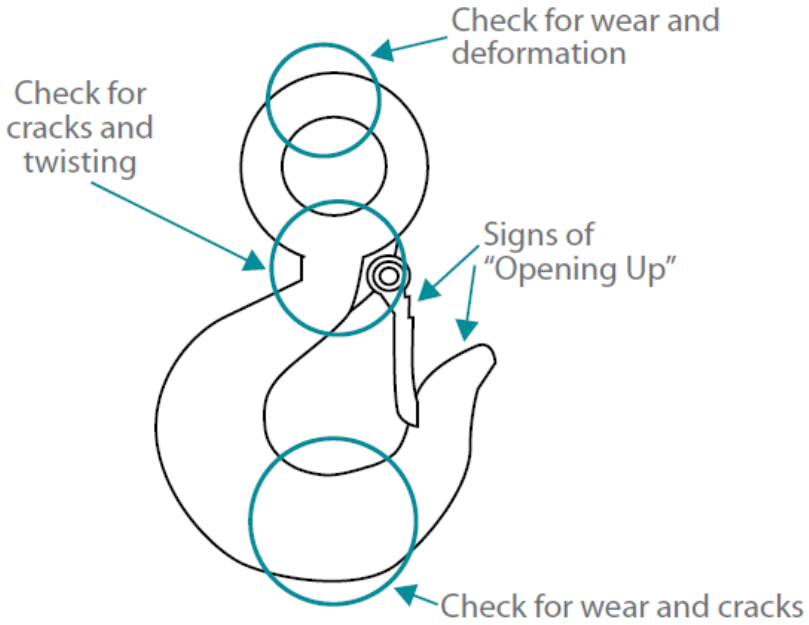
All loose materials (bricks, timbers etc) must be place in a hoisting cage or container to prevent any falling object hazard during lifting operation.

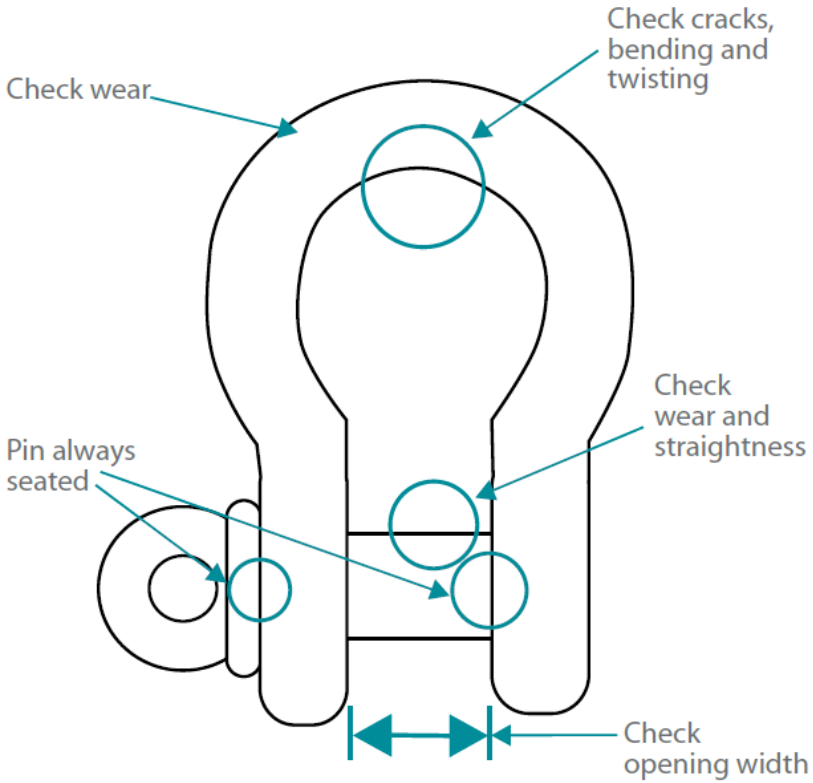
Crane Outriggers Guidelines



If lifting on outriggers, the load chart rating applies only when all the outrigger beams are fully extend and all tires are clear of the ground.

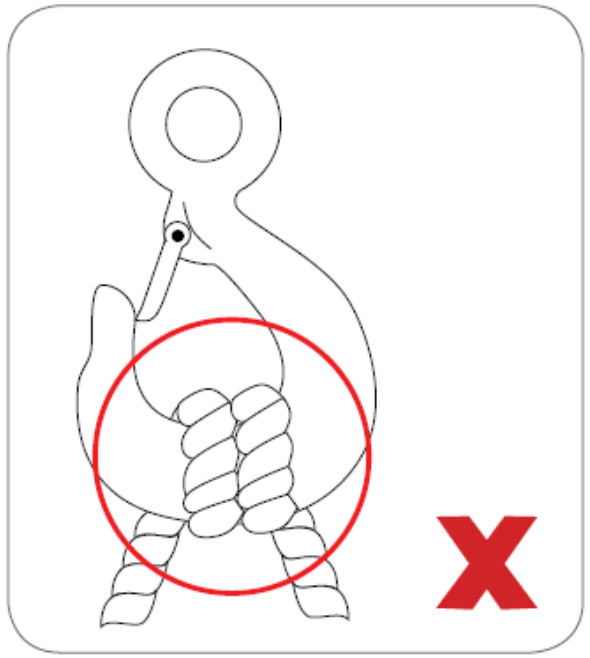
Check Shackles Condition before lifting

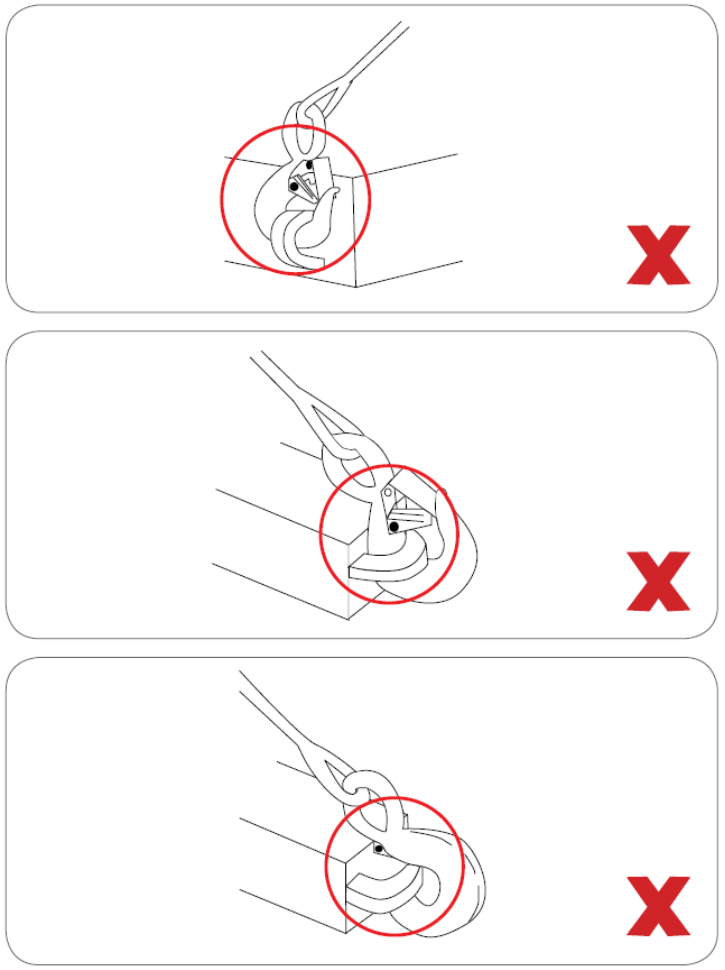




Check and ensure that the lifting hook latch and shackle is in good condition.

Wrong Hooking Methods

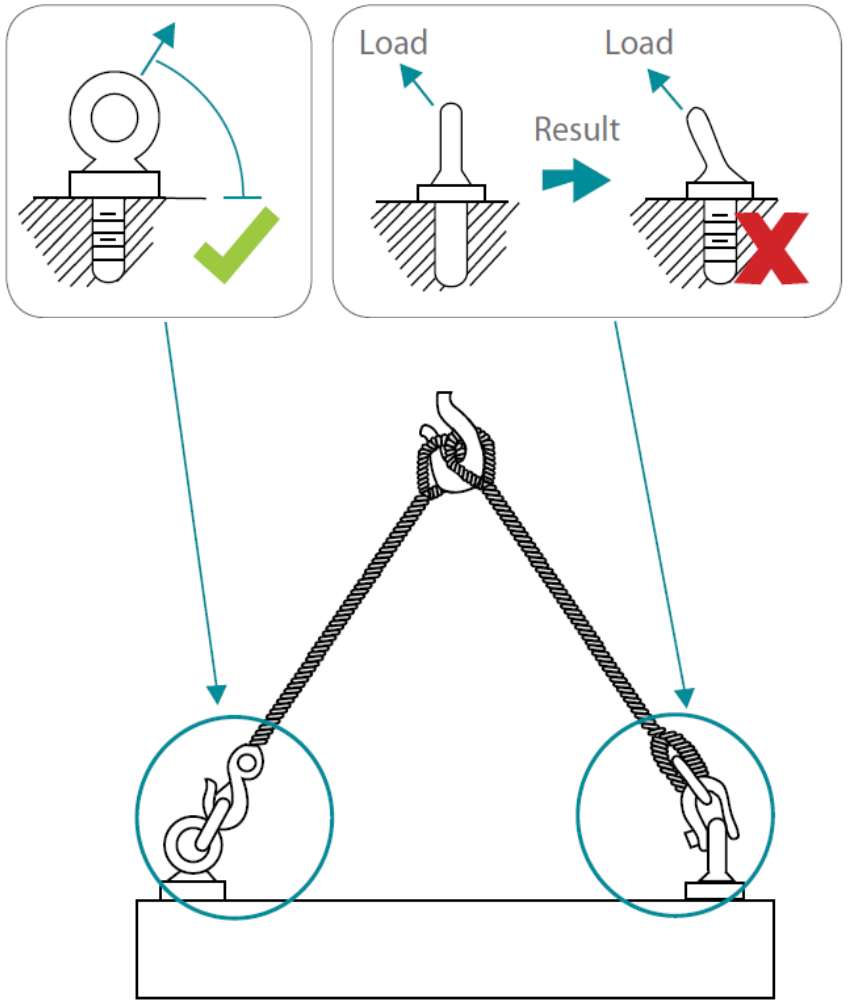




Wrong hooking methods often lead to shackle failure, broken or damaged.

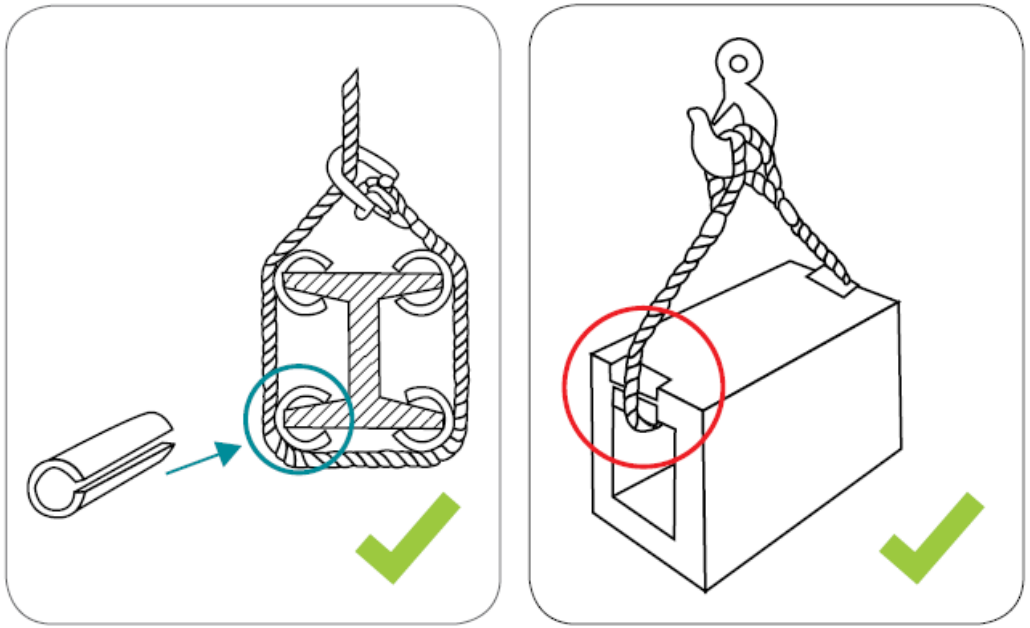
Correct loading method of shackle

Ensure that the eye bolt does not bend due to incorrect loading method at the loading point.

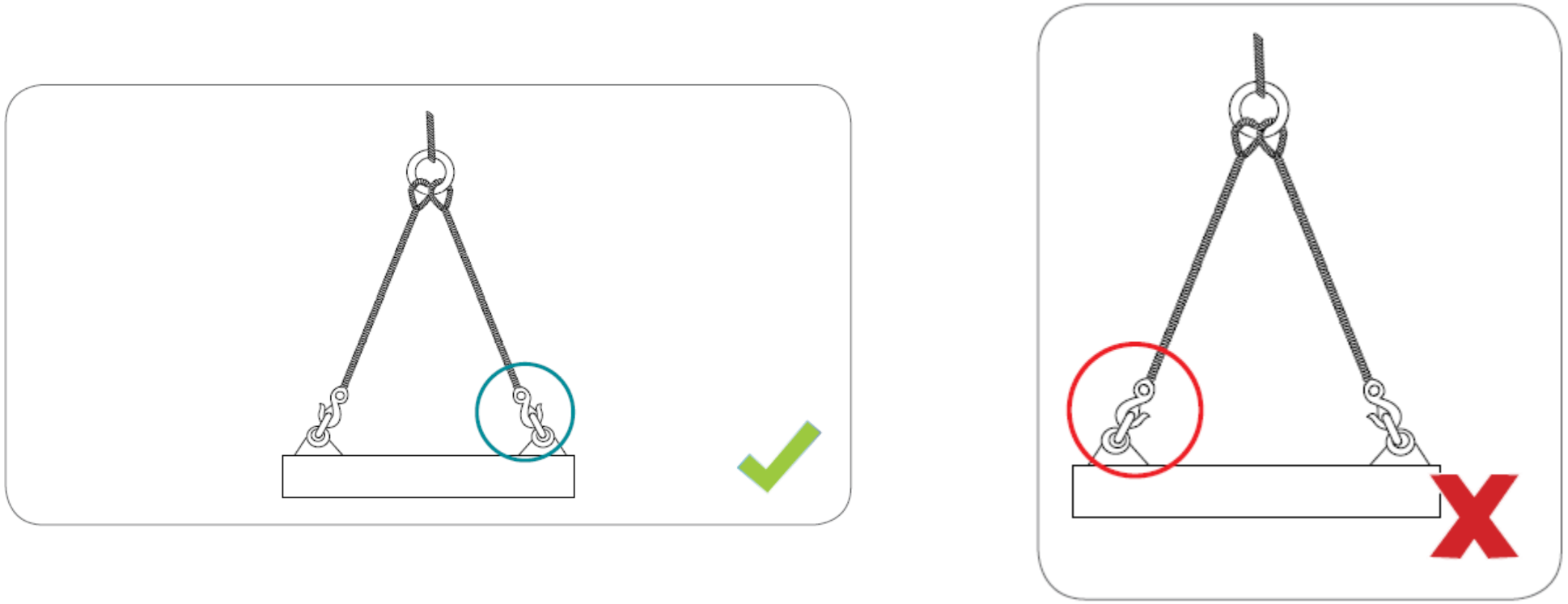


Use of Paddings

Correct use of paddings to prevent damage to the slings.

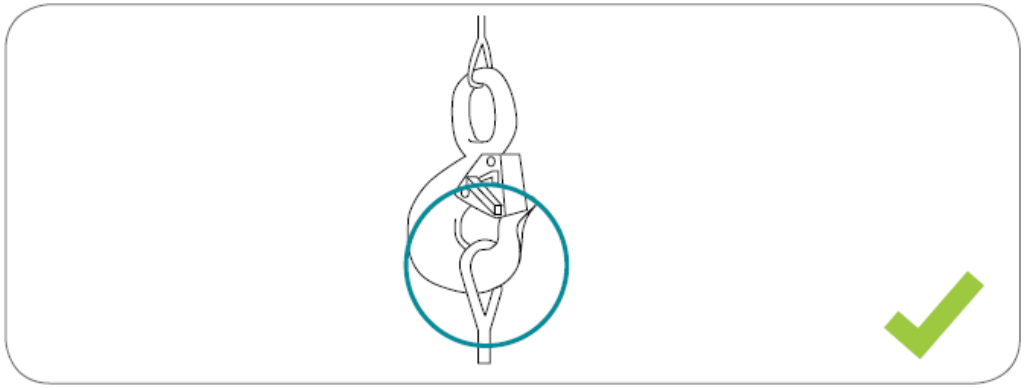


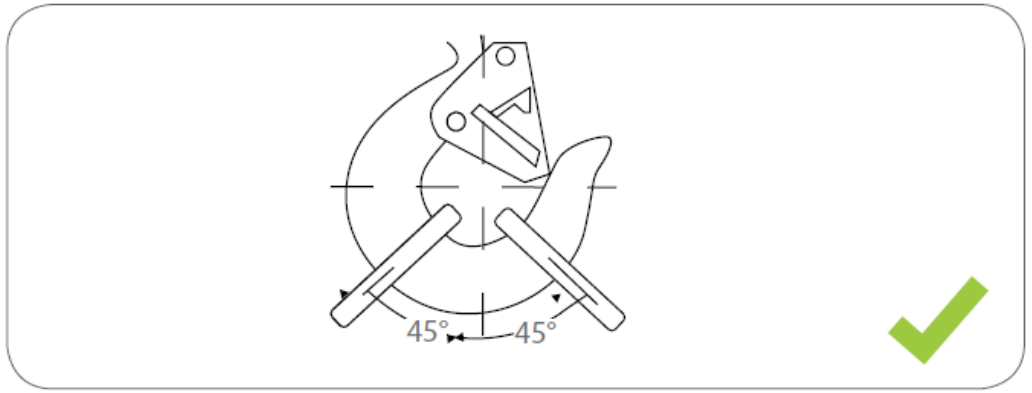
Lifting Hook Correct Position

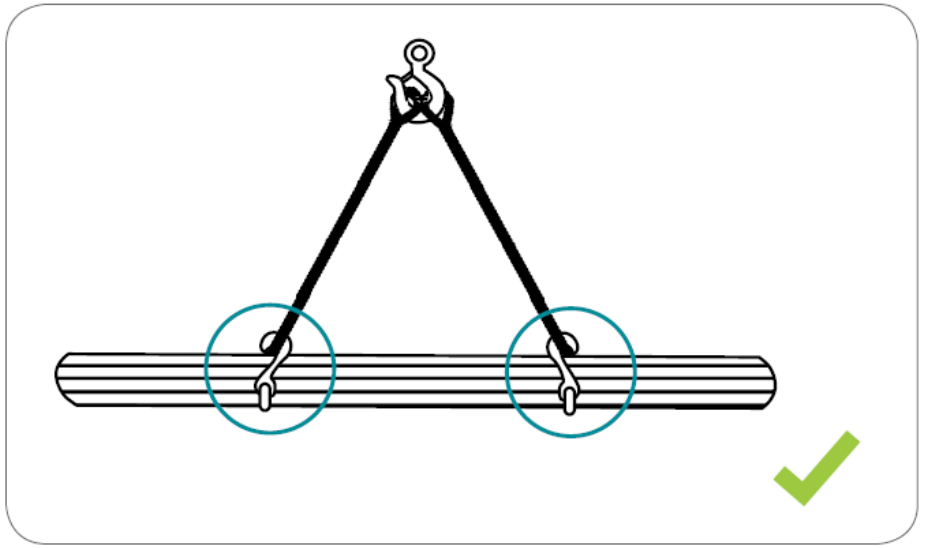


Secure the hook facing out. Do not secure the hook facing in.

Proper hooking of Shackle

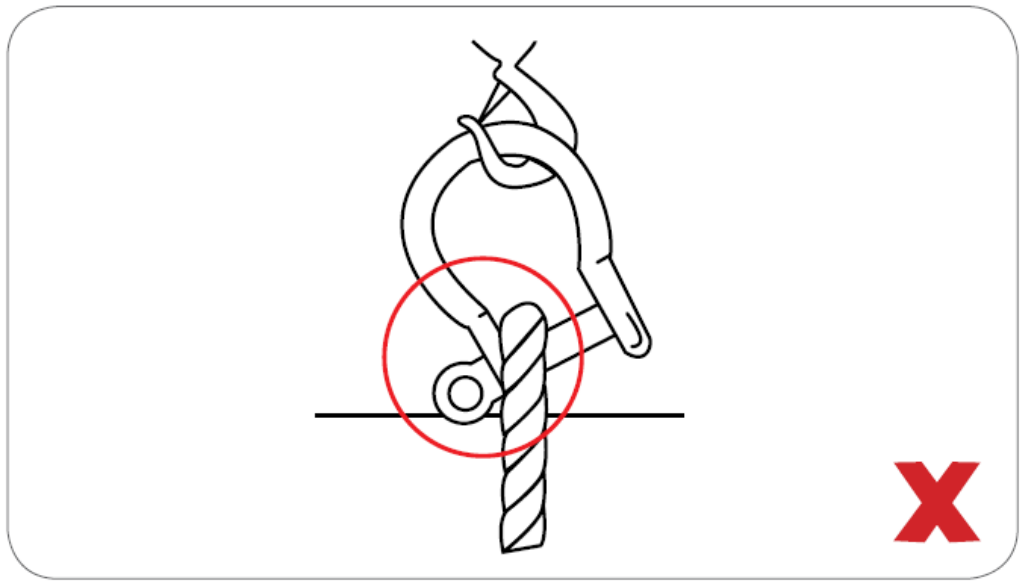


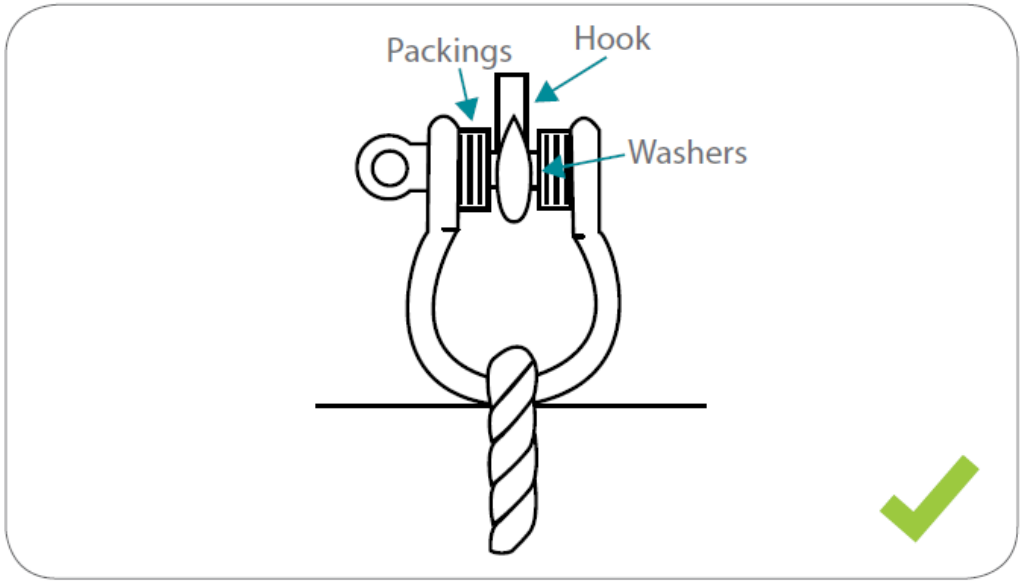




Ensure that the shackle is hooked up correctly and equally space apart.

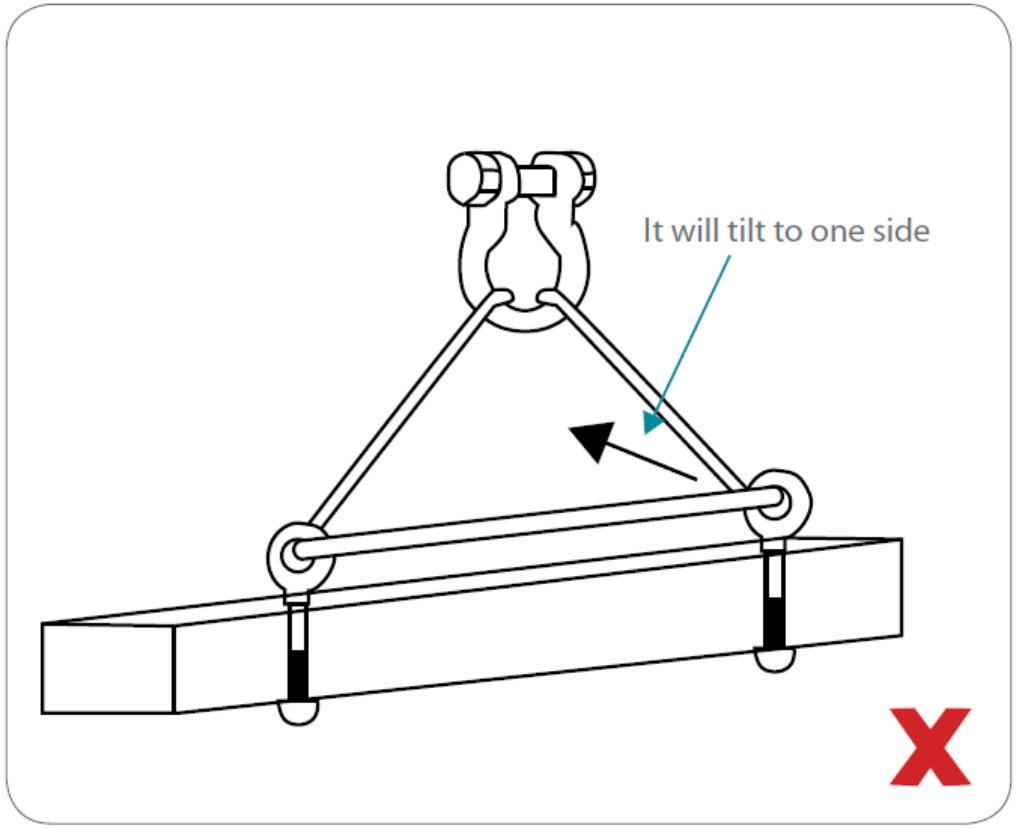
Proper Rigging Guidelines





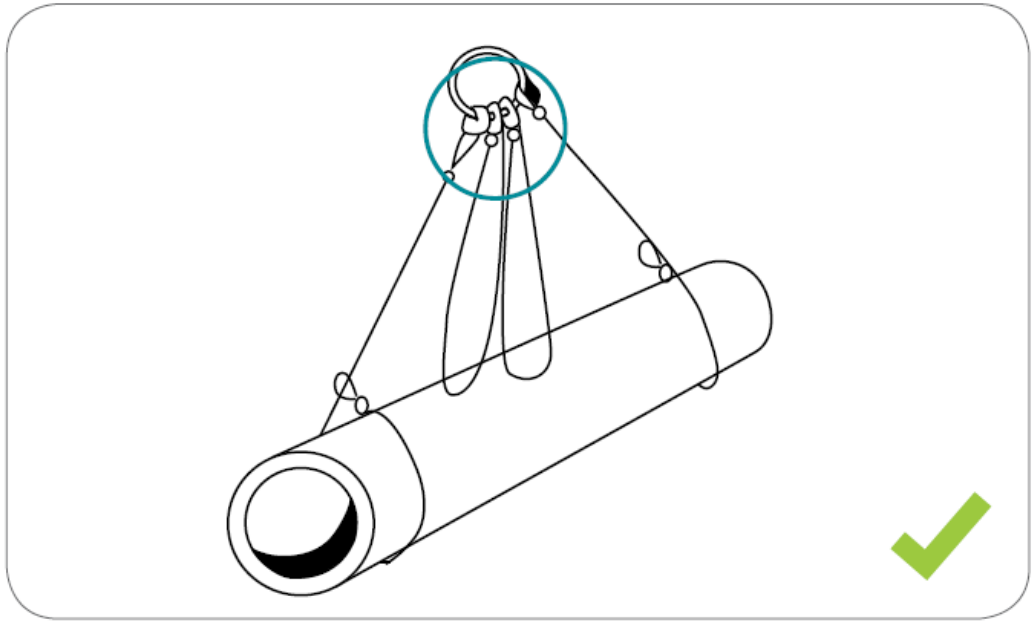
Ensure that the shackle is not pulled down at a angle. Add washers to centralise the position of shackle, if necessary.

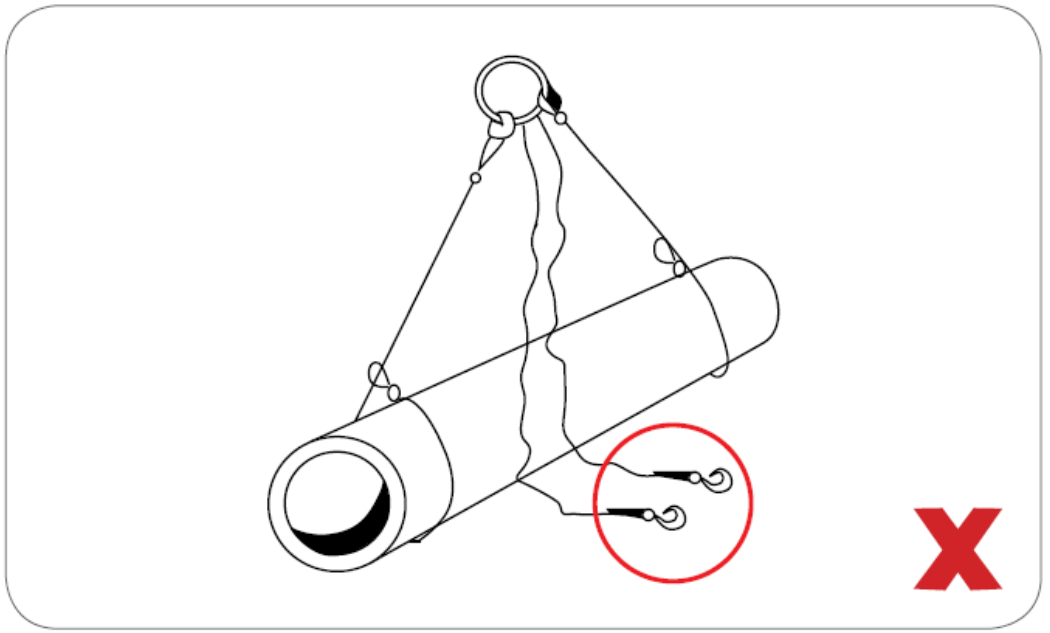
Wrong hooking of Sling



Do not tie the sling from one eye bolt to another.

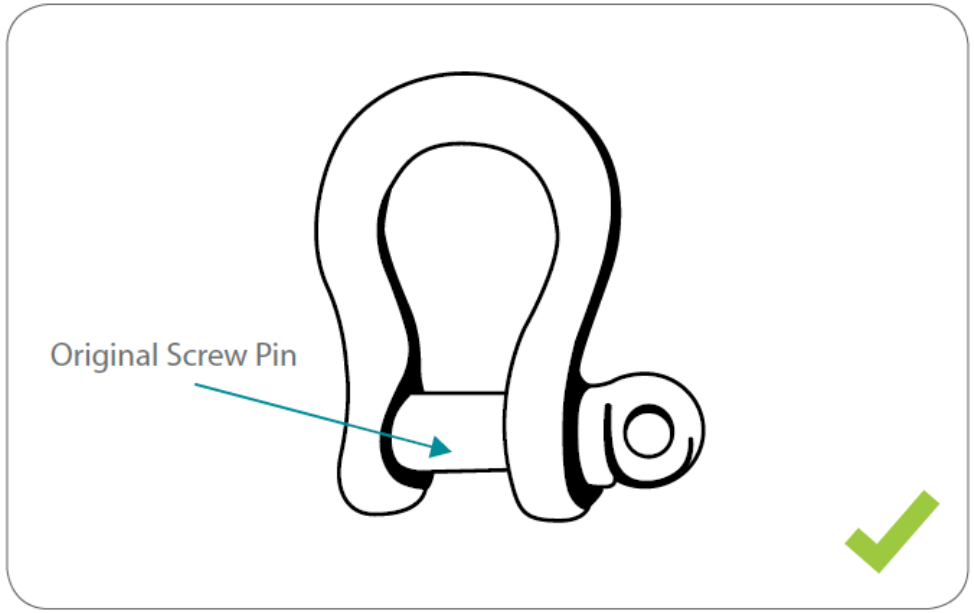
Secure of Unused Slings

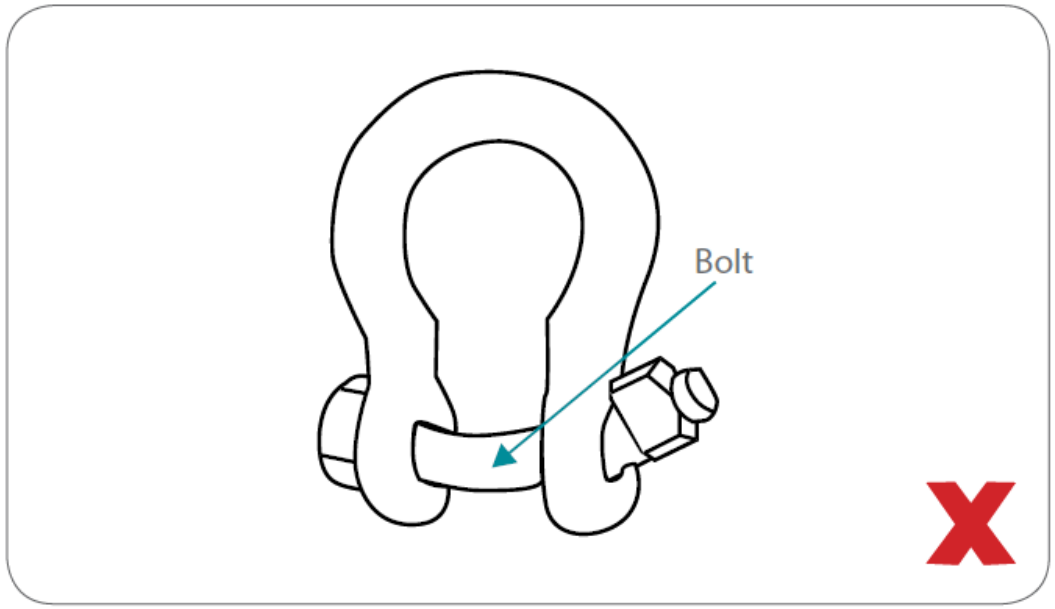




Ensure that any unused slings are hooked up properly.

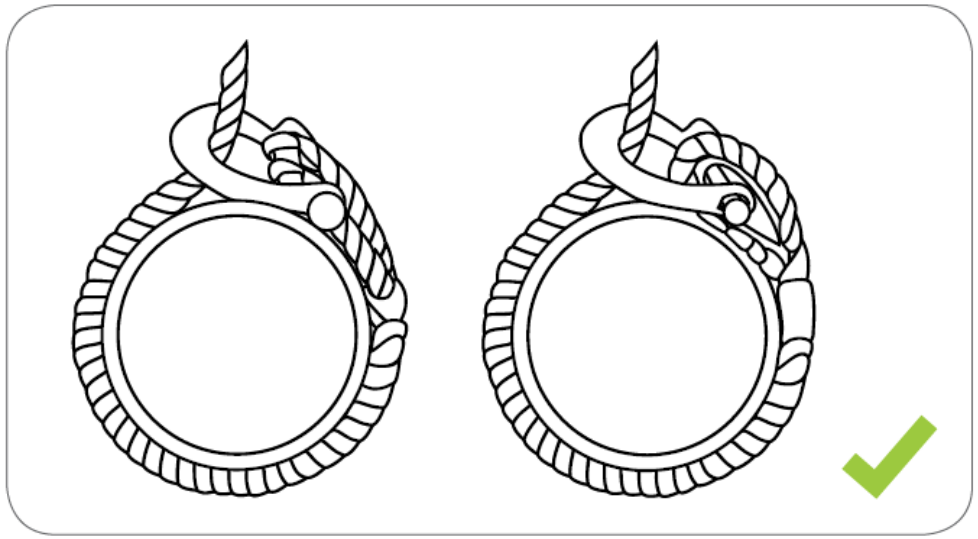
Shackle original Screw Pin

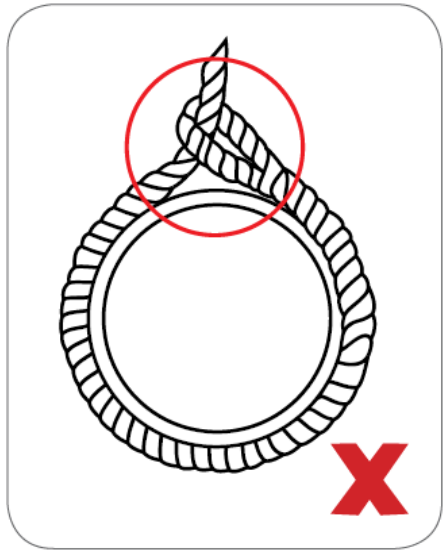




Use the original screw pin for the shackle. Do not use bolt and nut as substitute.

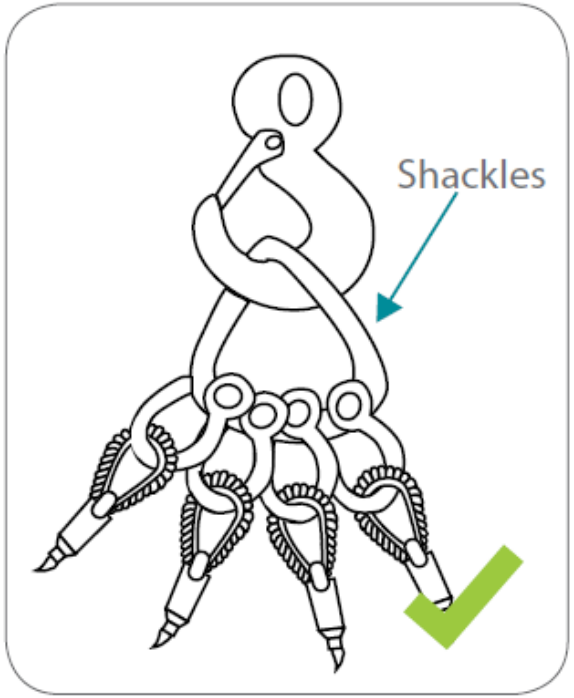
Risk of Cutting on Wire Rope

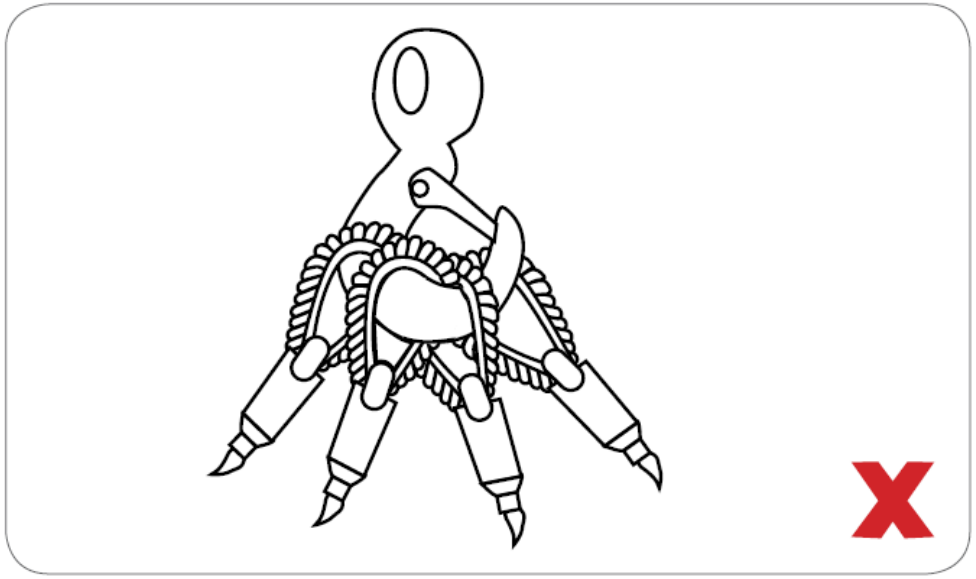




Ensure that there is no risk of cutting on the wire rope running line.

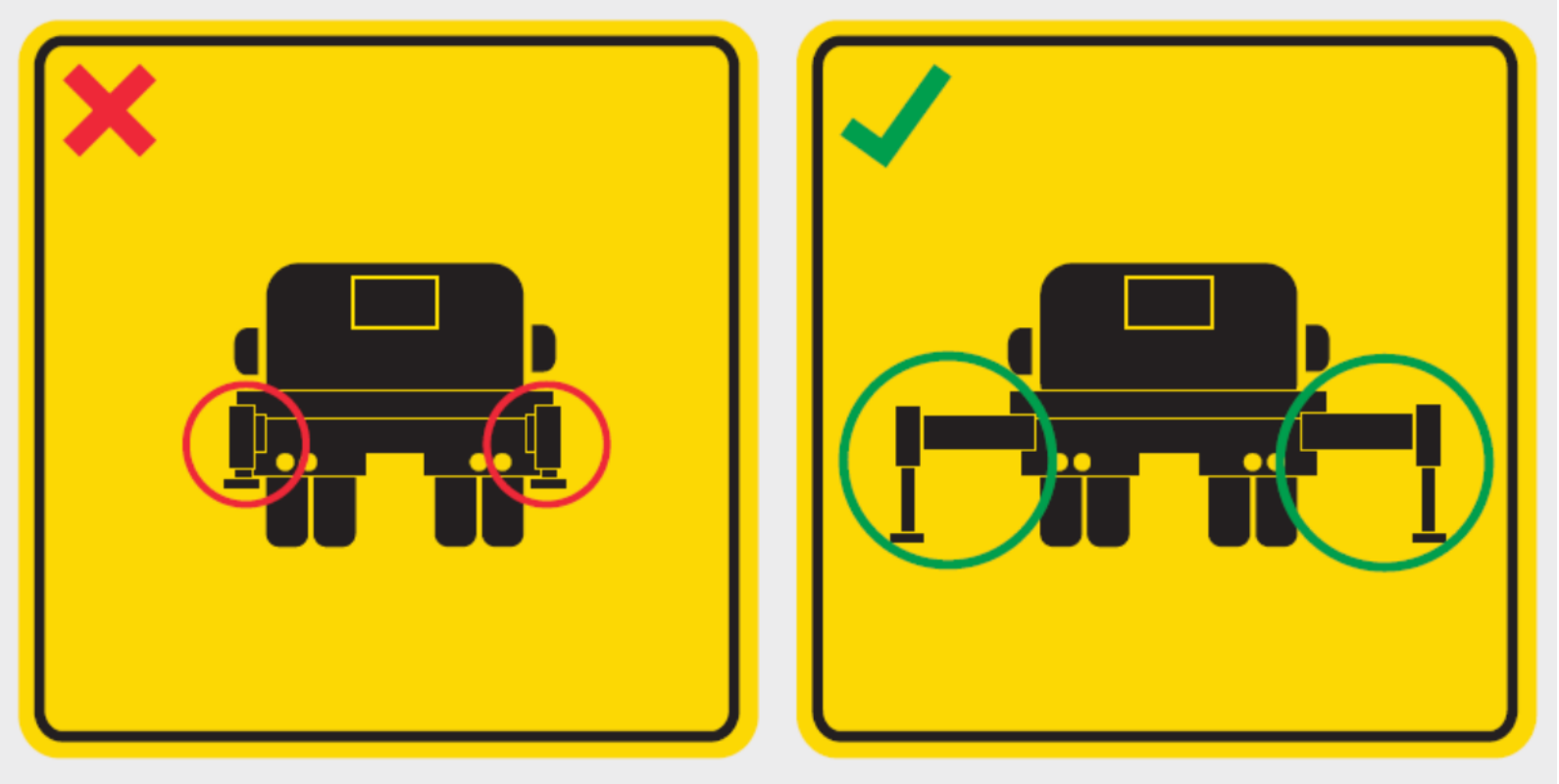
Joining of Slings Eye





Be careful when joining slings eye. Use an additional shackles when joining sling eyes.

Lorry Crane Safety



Lorry crane operator need to ensure that any outrigger must be **fully extended** and properly secured. The proper deployment of the outriggers can provide the necessary stability and balance when operating the lorry crane.

Lorry Crane Outrigger – Ground Condition

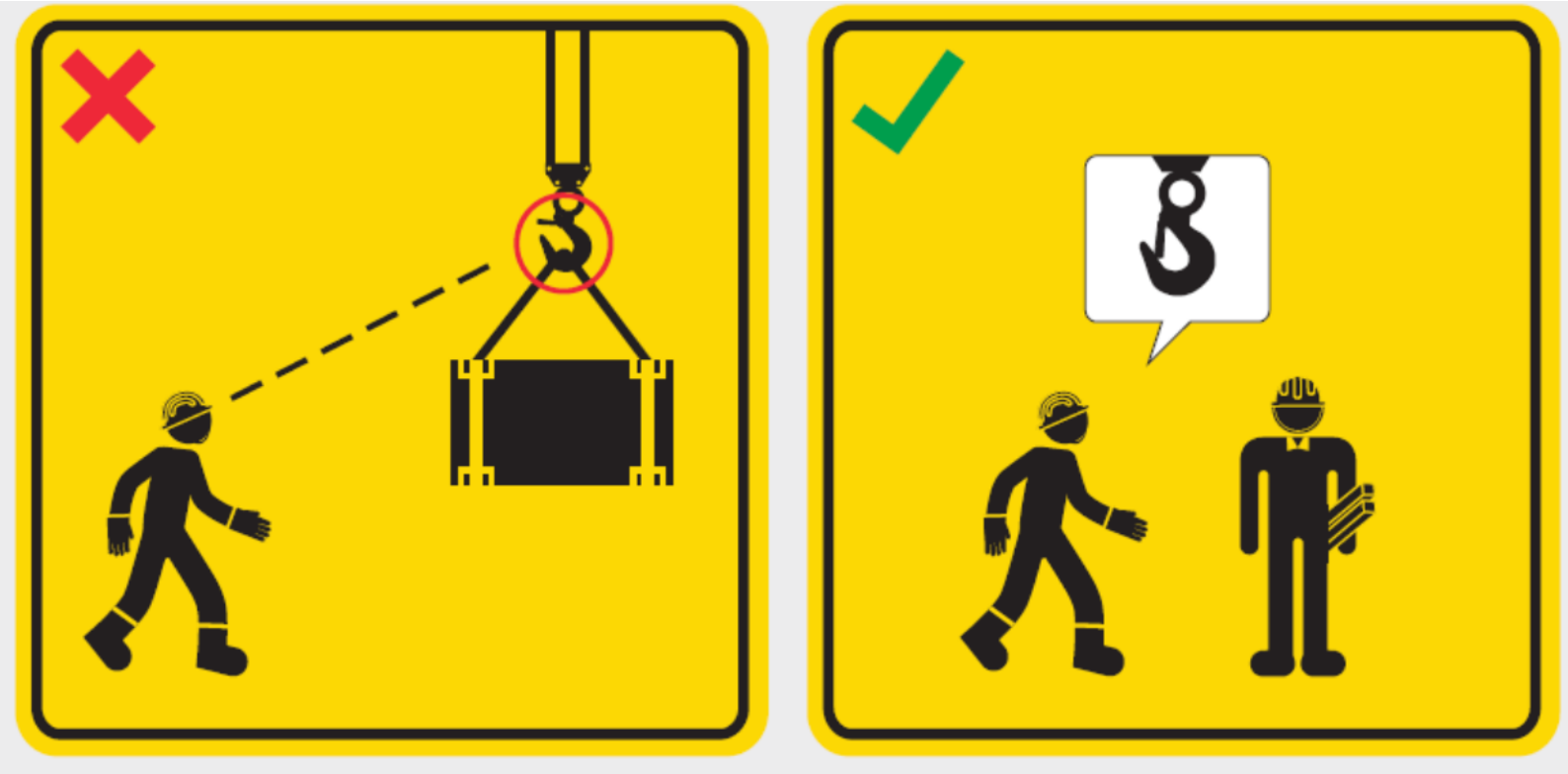
Grassy Patch

Manhole Cover

Drain Grating

The ground condition must have enough stability and bearing capacity to support all loads placed on it by the lorry crane.

Human Factors - Supervision



Lastly, human factors are critical in safe lifting. People can make mistakes and may break rules. This need to be addressed in planning and close supervision of lifting operations.

Global EHS – Construction Access and Egress Safety Requirements

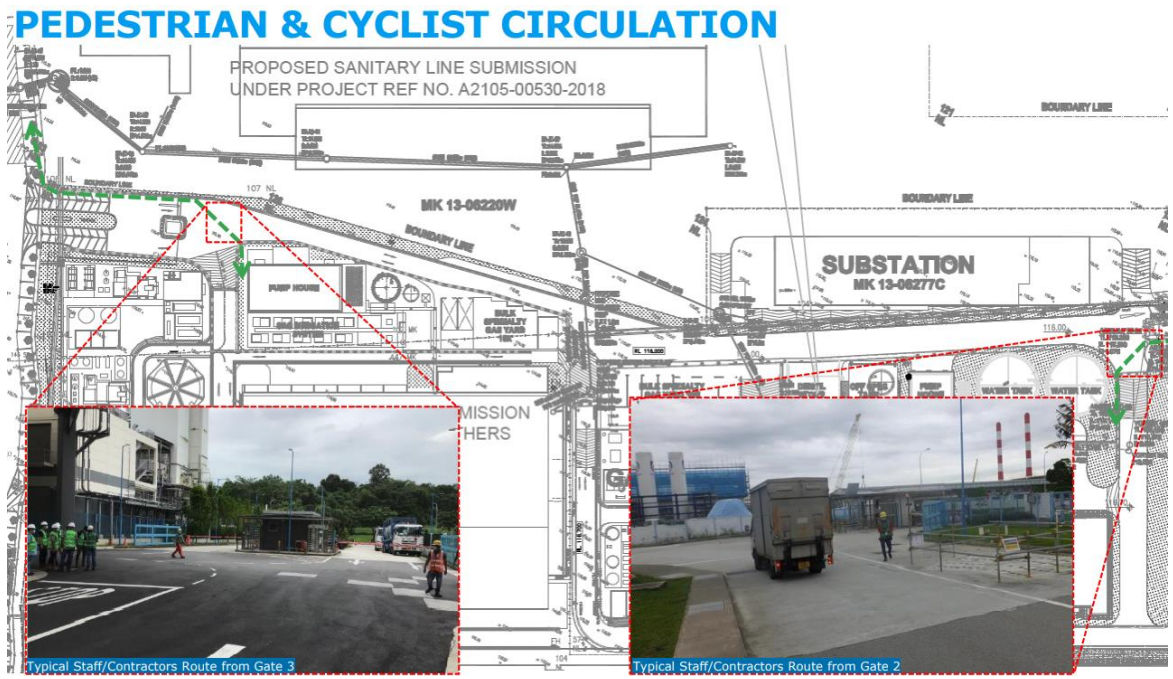
Traffic Safety Management Requirements

- Effective site traffic management will mean reduced risk of serious traffic-related incidents happening in the construction sites.

- Contractor shall submit “Traffic Safety Management Plan” before project commencement.

- The traffic safety management plan should take the following into consideration:

  1) Transport activities taking place on site;
  2) Workplace traffic layout and conditions;
  3) Types of vehicles operating in the premises;
  4) Traffic safety measures, rules and regulations;
  5) Environmental conditions such as road and weather;
  6) Pedestrian and cyclist designated pathways;
  7) Drivers' behaviors and habits; and
  8) Training and competency of drivers.



Traffic Safety Management Requirements

"Traffic safety measures, rules and regulations" shall include, but not limited to, the following:

1) Separation of pedestrians from vehicle movements.
2) Ensure pedestrian walkway is clearly painted and well connected throughout the site.
3) Install road hump, zebra crossing, raised crossing etc to regulate the speed of vehicles.
4) Deploy traffic marshal/banksman to help regulate traffic flow for heavy vehicles, forklift, MEWP etc.
5) Install suitable workplace traffic or safety signs to warn or inform driver and pedestrians at sites.
6) Prohibition of vehicle parking near corners and pedestrian crossing.
7) Install convex mirror at road corners and pathways that are lack of lateral visibility.



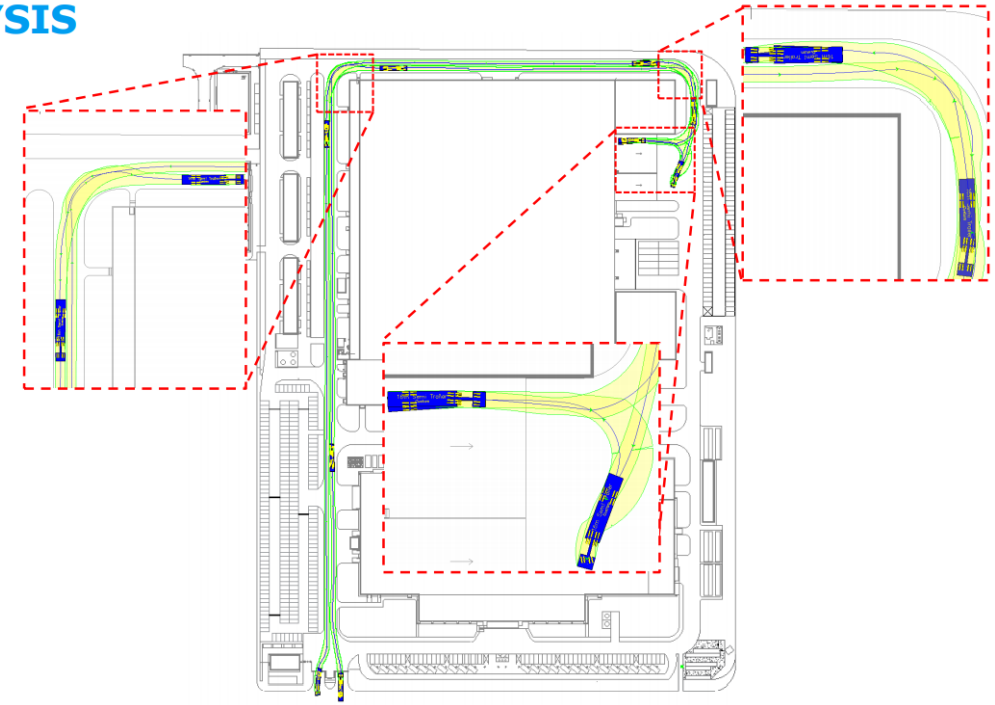



Traffic Safety Management Requirements

Contractor shall conduct a traffic “Swept Path Analysis”, which calculate and analyze the movement and path of different parts of vehicles when vehicles are undertaking a turning maneuver at the main traffic pathways of the project site.

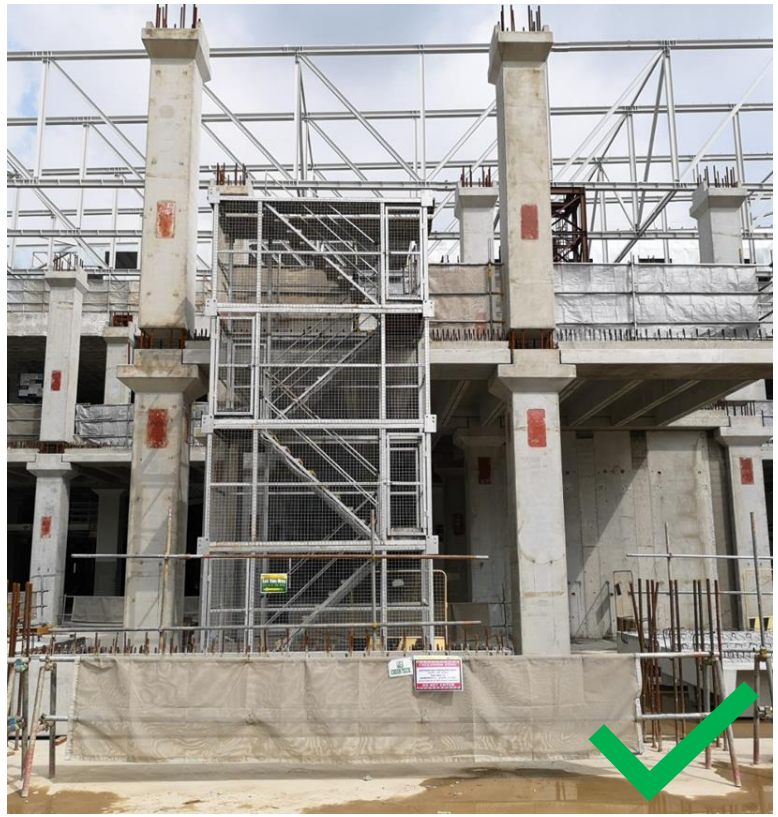
SWEPT PATH ANALYSIS
16M SEMI TRAILER

- Vehicle routing allow Semi Trailer to travel in both directions.
- Semi-Trailer can manoeuvre through the site safely, however two Semi-Trailer (travelling the opposite direction) cannot manoeuvre through corners at the same time.
- There is sufficient space in the area of the loading bay to change directions of the vehicle.



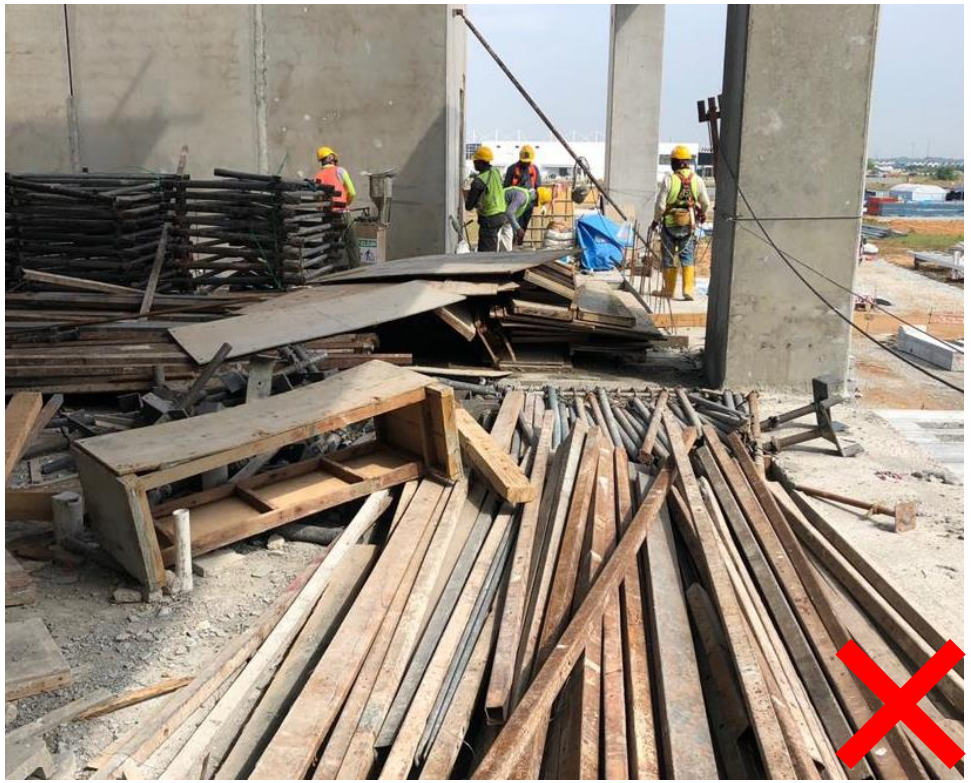
Building Access Requirements

Unsafe: Scaffold and vertical ladders used to access different work areas and floors



Best Practice: Provide proper temporary stairway access with landing areas to different floors

Housekeeping Access Requirements

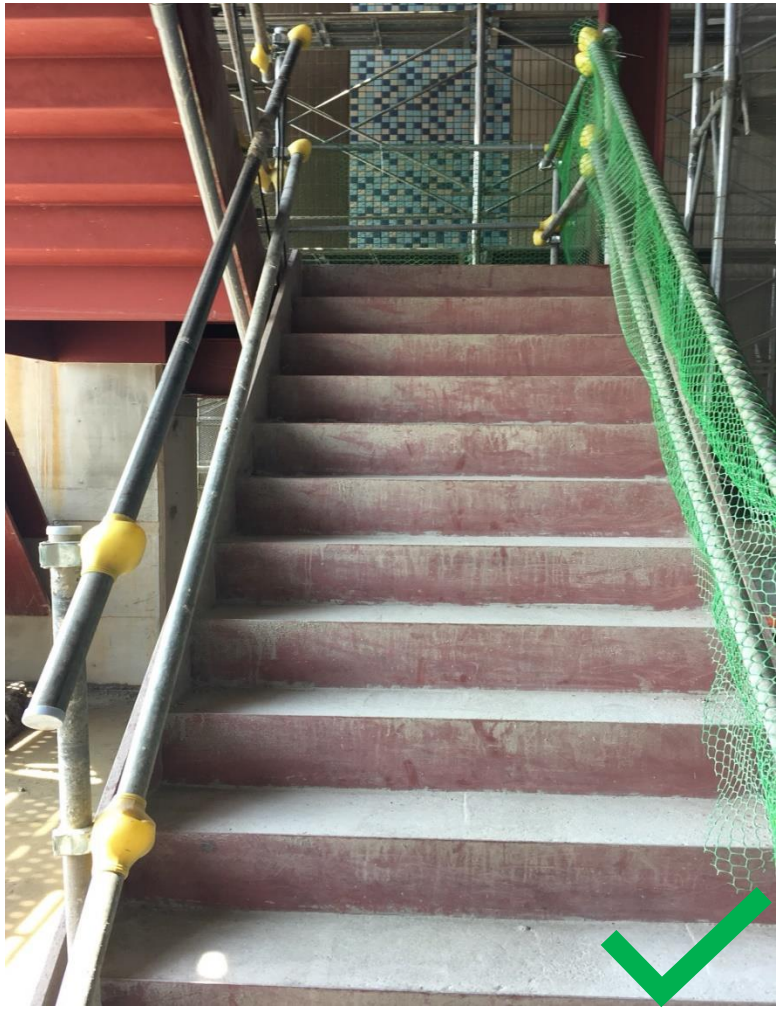


Unsafe: Poor housekeeping resulted in blocked access and egress

Best Practice: Good housekeeping and designated access and egress

Stairways Access Requirements

Unsafe: Stairway open for use without guardrails and tripping hazards



Best Practice: Stairway installed with proper guardrails and clear of tripping hazard

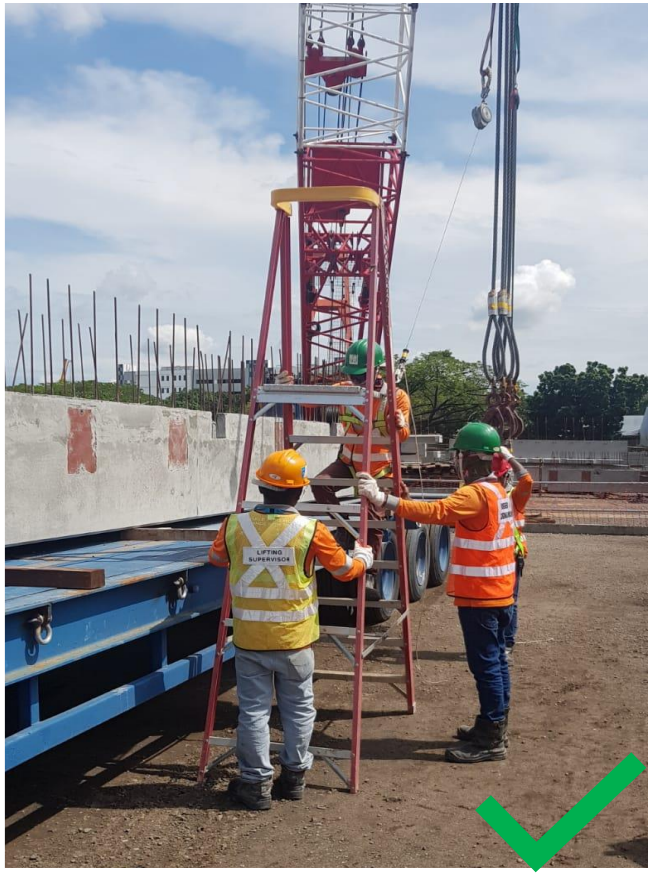
Walkway Access Requirements

Unsafe: Designated walkway beside heavy vehicles movement area.

Best Practice: Provide designated paved clean walkway with guardrail.

Vehicles Access Requirements

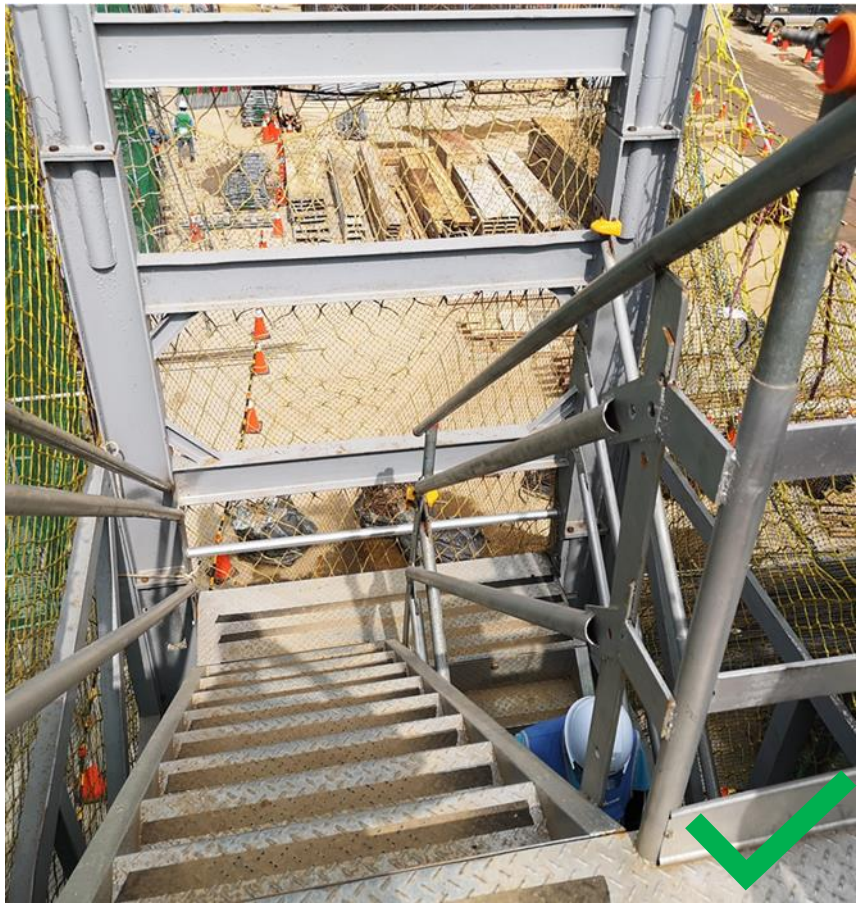
Unsafe: Vertical ladder used in inclined position for access to vehicle



Best Practice: Use proper platform ladder or similar for access to vehicle

Work Areas Access Requirements

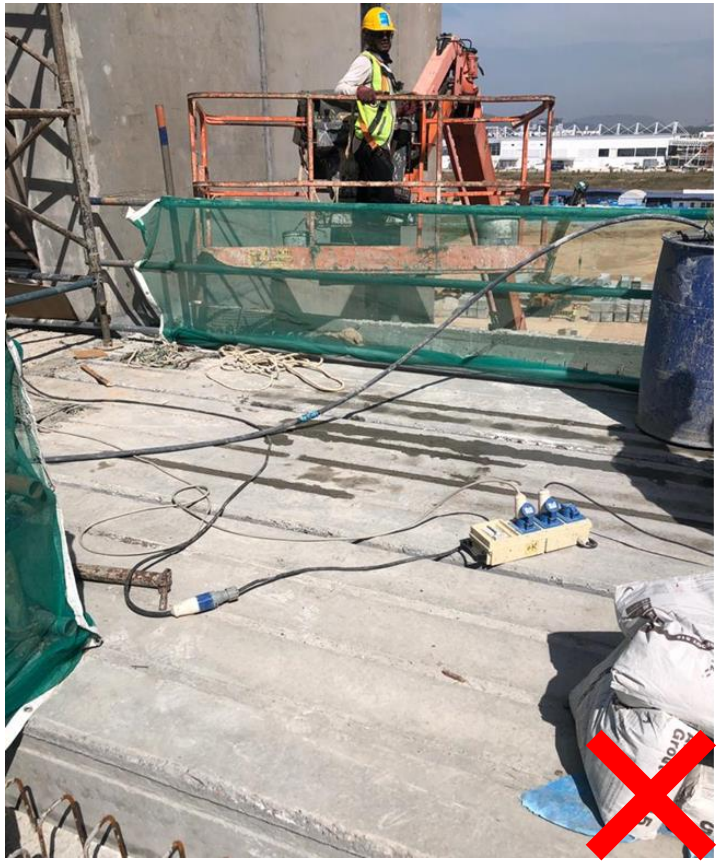
Unsafe: Workers using re-bars and timbers as alternative methods for access to work areas



Best Practice: Provide proper temporary stairway access to work areas

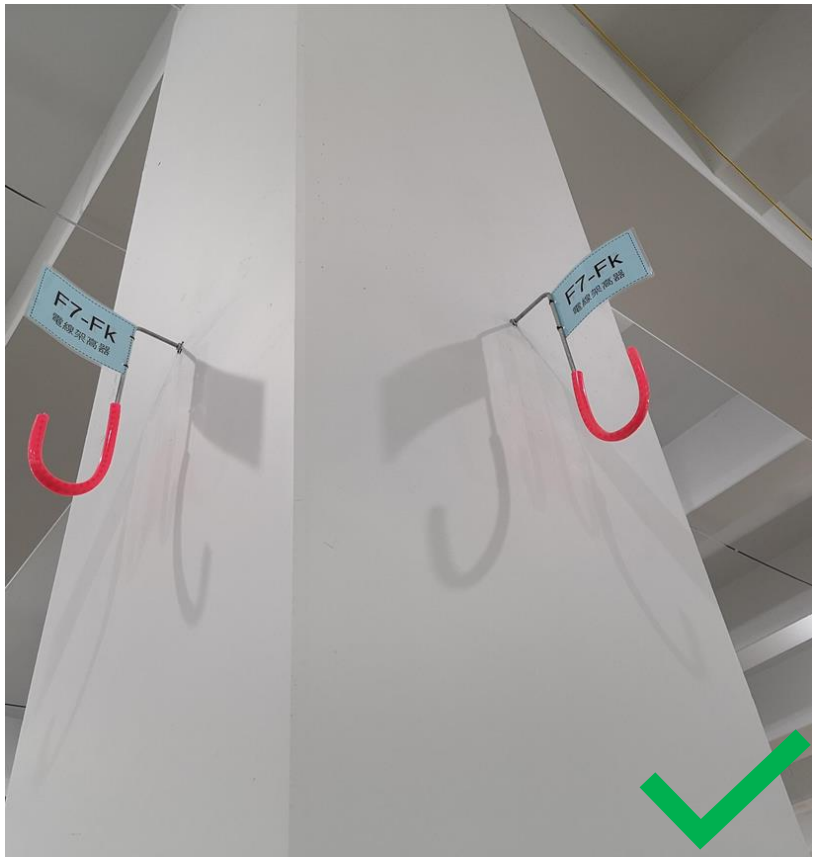
Electrical cables Requirements

Best Practice: Electrical cables hang above 2 meters at areas used for access and egress



Unsafe: Electrical cables laying on the ground which was used as access and egress

Electrical cables Requirements



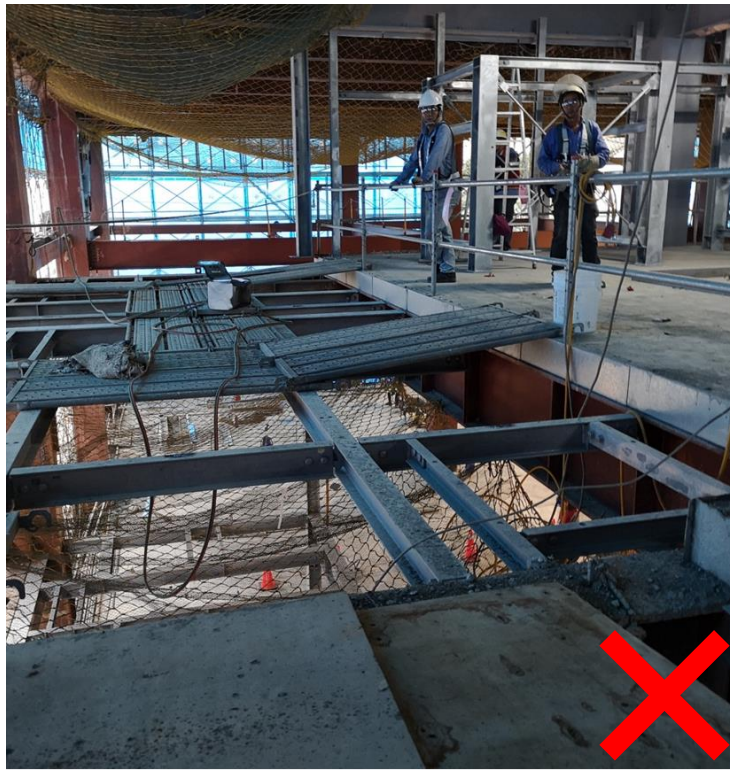
Best Practice: Electrical cables hang above 2 meters at areas used for access and egress

Building Entry and Exit Requirements

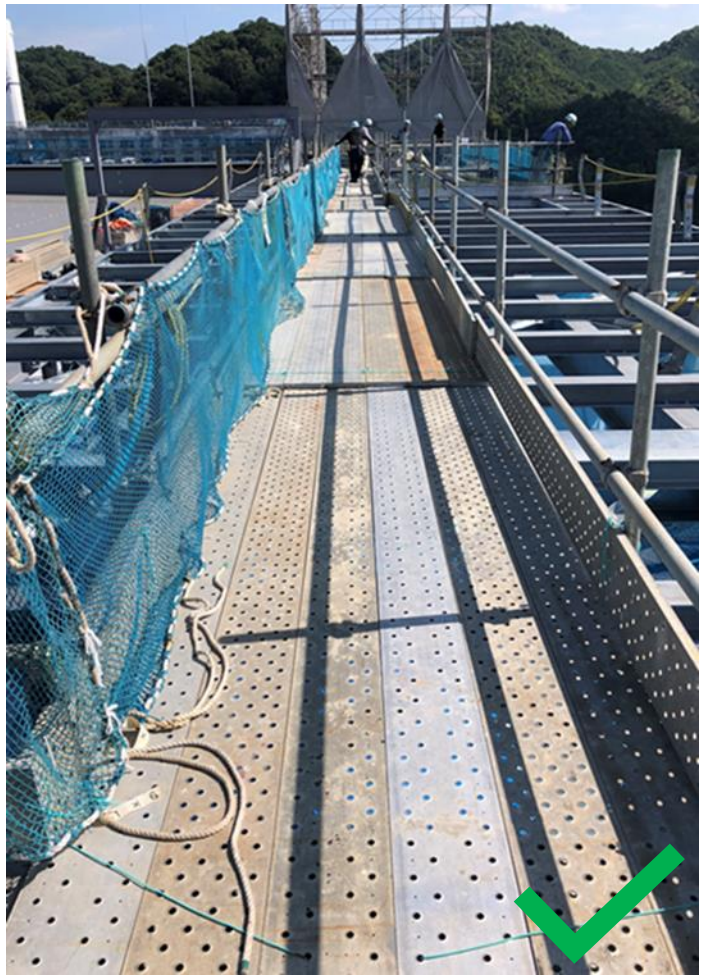
Unsafe: Makeshift timber platform and scaffold ladder used as access and egress

Best Practice: Designated entrance with safety notices and signages

Steel Work Access Requirements



Unsafe: Platforms access to work areas do not have guardrail and lifeline



Best Practice: Proper walking platform with guardrails leading to the work areas

Hole Opening Access Requirements

Unsafe: Hole opening covered with unsecured platform and exposed to falling hazard

Best Practice: Hole opening with guardrails, cover, toe-board and danger notice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