

ASIA APPLICATION STANDARDS

GMR 4.7

Impact From Moving Parts of Machines



Description: These critical controls and performance standards apply to hazardous equipment (i.e. mobile, fixed, large or portable) in Lendlease operations where people could be fatally injured if they come into contact with moving parts of that machine (e.g. moving tracks and large conveyors). This applies for exposure to equipment during operation, maintenance and troubleshooting e.g. escalator and lift motors.

All applicable local, national and international environment, health and safety legislation and recognised codes, standards and other external requirements must always be complied with. Where there is a difference between Lendlease Standards and those required by legislation recognised codes, standards and other external requirements the higher standard must be applied.

GMR Subsection: 4.7.1 Guarding

Controls: Implement robust machine operating guarding standards for hazardous equipment.

Performance Standards:

- i) All moving parts of hazardous equipment must be fitted with suitable guards. Guards are to be retained by fasteners that adequately secure the guarding and prevents accidental dislodgement.
- ii) Support maintenance and troubleshooting must be inclusive of a documented safe system of work, including isolation systems involving personal isolation locks with routine inspections carried out to identify if guarding is fitted and functional and in good working order.
- iii) Check that guarding fully protects the moving part and can withstand applied forces without dislodgement.
- iv) Identify and assess the risk of fault-finding, cleaning and maintenance tasks that bring people in proximity to exposed energised machine components.

General Requirements

Methodology

1. Ensure a risk assessment is conducted with associated safe work procedures developed and communicated to work personnel for works in close proximity to energized components and moving parts of equipment and tools.
2. Pre-entry inspections of machinery and tools must be carried out prior to first use on site to ensure all moving and hazardous parts are suitably covered, fenced and/or otherwise protected.
3. Machinery and tools guarding must be of the original manufacturer fitted type and must not be modified at any time.
4. Safe isolation must be ensured prior to any works on energised equipment with moving parts e.g. for maintenance and trouble shooting. Isolation procedures shall be in accordance with the requirements specified in Section 4.4.4 – Isolation.

Delivery

1. Powered tools and equipments with moving parts must only be operated by personnel trained in the safe handling and operation of the tool/equipment.
2. Loose clothing and cotton or other woven type gloves must not be worn when working at or near powered tools with operational moving parts e.g. drills, grinders etc, to avoid risks of entanglement with the moving parts.
3. Guards must be routinely inspected to be fitted and functional, and properly secured to prevent accident dislodgement.



Machinery moving parts guarded with robust secure covers

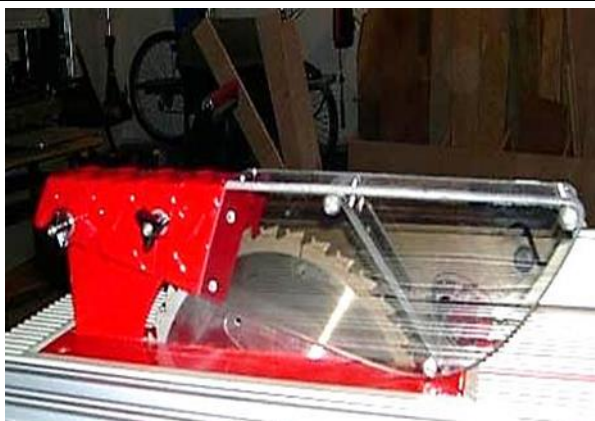
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Generator set with all engine and moving parts enclosed with lockable doors



Guarding on a bench drill



Guarding on the cutting blade of a bench saw



Equipment must be safely isolated and locked out prior to commencing trouble shooting, maintenance and repair activities



LOTO implemented for construction machinery

GMR Subsection: 4.7.2 Preventing Access

Controls: Appropriate physical and non-physical security must be in place to prevent access to specific areas with hazardous equipment where guarding cannot be provided, and operations and maintenance activities are being undertaken.

Performance Standards:

- i) Identify energy sources with the potential for fatal outcomes that are unable to be guarded prior to commencing the operation. Identify, implement, communicate and verify alternate controls (e.g. interlocked physical barriers and light curtains).
- ii) Check exclusion zones use suitable physical distance, barrier types, and stability to prevent inadvertent, accidental, unintended and casual interaction with the moving parts.

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- iii) Lock access to equipment with moving parts and energy sources representing a fatality risk when usage for that day or shift ceases. This includes preventing access to mobile plant.
- iv) Operational personnel with responsibility for access administration (e.g. security) must have a list of authorised key users. Check equipment is locked and has the capacity to prevent equipment use if found unlocked.

General Requirements

Methodology

1. All machinery and equipment where the risk of contact with moving parts exist must have inherently safe machine design to avoid exposure to the hazards.

Delivery

1. Effective safeguarding barriers must be in place on hazardous machinery and equipment with moving parts to prevent inadvertent and/or accidental contact.
2. Where it is reasonable impractical to provide safeguarding barriers to moving parts of machinery and equipment, other security systems must be considered and implemented to prevent access to these moving parts.
3. Regular maintenance and inspection regime must be in place to ensure all machinery and equipment including safety devices are always functioning properly.



Suitable types of metal fencing and panel systems around energised equipment

Fencing for a diesel generator installation



Chuck guards (interlocked) with tripping mechanism that disengages moving parts of the machine when opened or removed



Interlocked point-of-operation guarding

GMR Subsection: 4.7.3 Large Mobile Equipment Maintenance

Controls: Implement and monitor an appropriate maintenance regime for the equipment.

Performance Standards:

- i) All equipment must be registered using unique identifiers.
- ii) Maintenance must be in accordance with manufacturer's recommendations or at shorter intervals if required, with maintenance manuals provided prior to the equipment arriving on site and the inspection records remaining with the machine.
- iii) If earthmoving equipment is being operated with quick hitch devices there must be a safe system of work adopted. It is essential that physical mechanical locking pins are used to prevent uncontrolled release.

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General Requirements

Methodology

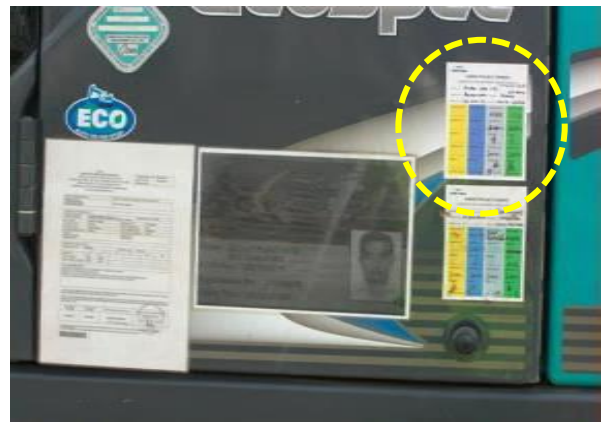
1. All Lendlease operations must maintain a Plant & Equipment Register which contains the details of all plant and equipment on the site. This includes cranes, excavators, forklifts, MEWPs and other large mobile equipment. At the minimum, the register must include the following information;
 - Plant and equipment type
 - Brand / model
 - Serial Number / Unique identification number
 - Name of contractor / owner
 - Date of last maintenance inspection and due date for next inspection
 - Date of 3rd Party inspection and certification, if any.
2. Plant and equipment deemed fit for use shall be entered into the site Plant & Equipment Register and affixed with a Lendlease inspection tag and / monthly inspection label.

Delivery

1. All plant and equipment to be used on Lendlease operations must be pre-inspected prior to entry or first use on site. Inspections must be carried out by competent personnel to ensure the plant and equipment is in good working order.
2. The following documents must be produced and available at these inspections, where applicable:
 - a) Plant and equipment operator's manual and maintenance manual/instructions
 - b) Routine inspection, maintenance and servicing logs / reports
3. Plant and equipment must undergo routine daily/weekly inspections to ensure they are in safe working order by competent persons and subjected to routine maintenance and servicing as per manufacturer's recommendations. Where there is no recommendation given, the maintenance and servicing shall be performed monthly.
4. Troubleshooting, maintenance, service and repair activities of plant and equipment must be carried out by trained personnel appointed by the manufacturer / owner and only with a valid risk assessment and safe work procedures for that activity.
5. All inspection, maintenance and servicing records must be kept with the equipment.



Excavator with unique identification number allocated and displayed



Equipment with Lendlease monthly inspection label and authorized operator details displayed

Quick Hitch Systems

Methodology

1. All earth moving machines and quick hitch systems must be fitted and maintained in accordance with the manufacturers' instructions and checks made to ensure compatibility with each other.
2. All earth moving machine operators must have written evidence of their training on how to operate the specific machines and quick hitch system they are required to use. Test operators understanding of the safe use and maintenance requirements of their specific machines and quick hitches by referring to manufacturers' instructions.

Delivery

1. Quick hitch systems must be fitted with safety bars or pins and well maintained (i.e. kept clean and greased) at all times to prevent the accidental release of tools and attachments e.g. buckets.
2. Make regular checks (at least weekly using check list) to ensure that:

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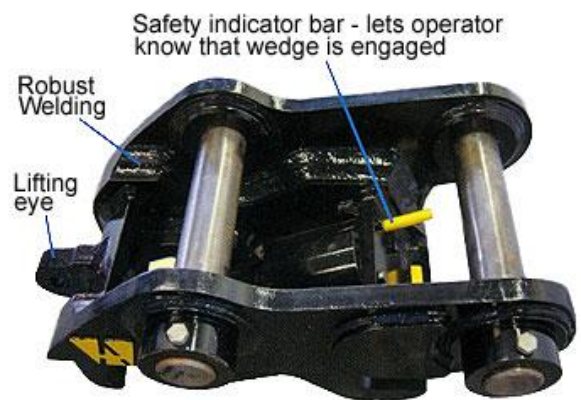
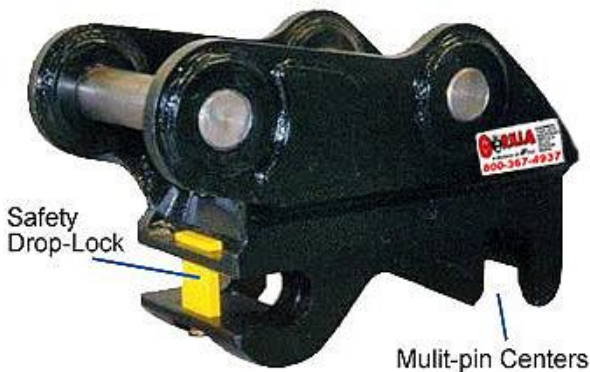
- a) All machines using quick hitch systems are used safely following the manufacturers' instructions (i.e. safety bars and pins are fitted to semi-automatic quick hitch systems);
 - b) They have the manufacturers operating manuals for the machine and any attachments and an up to date maintenance log (daily and weekly check lists based on manufactures requirements for the plant, hitch and attachments completed and signed off daily by the operator) available in the cab at all times; and
 - c) Effective exclusion zones to prevent workers being struck by machines or their tools are in operation.
3. Exclusion zones must be established and maintained around operating earth moving machines to prevent workers being struck by either the machine or any tool due to the failure of any quick hitch system. No unauthorized persons shall be allowed to work within 3 meters of an operating machine, or under any load or part of an operating machine at any time.
 4. For tasks where close proximity working is absolutely necessary, authorized competent workers are allowed to work in close proximity to operating machines, if the hitch systems used have locking mechanisms which physically prevent the attachment accidentally falling out (i.e. manual or semi-automatic quick hitch systems with safety bars inserted and any retaining pins in place (see photos) and safe work method statements are provided for the specific tasks.



Excavator with quick hitch coupler



Closer view of quick hitch system



Safety locking bar in place preventing ram block of excavator retracting and release of bucket
Safety bars in bright colour so that they can be more readily observed by the Operator to ensure that the wedge is engaged

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Quick Hitch and Earth Moving Machines SAFETY CHECKLIST					
Scoring: Good Standards ☒ / Minor Failings ☐ Remedial Action Taken ☐ / Non-compliant ☐ Work Suspended					
Pre-start checks – conduct for each new Contractor operating earth moving machinery					Remarks
1.	Performance standards for the safe use of quick hitches detailed during procurement and Contractor standards and competence checked.	☒	☐	☐	
2.	Operator competence (training skills, knowledge and behaviour) checks conducted and signed-off before starting work on site.	☒	☐	☐	
Pre-start checks – conduct for each new Contractor operating earth moving machinery					Remarks
1.	Manufacturer's instructions for use and maintenance of each quick hitch are available with the specific machine they are fitted to. If the quick hitch is a retrofit, check that the operating hydraulic pressures are compatible with the machine.	☒	☐	☐	
2.	Manufacturer's instructions for use and maintenance of quick hitches are followed by operators. Ensure semi-automatic quick hitches are in good condition (cleaned and greased) and manual locking mechanism (bar/pin) is inserted by the driver during use.	☒	☐	☐	
3.	All machine operators are trained and competent in the safe use and maintenance of the quick hitches they use. (Conduct verbal checks and observations).	☒	☐	☐	
4.	Quick hitch manufacturer's maintenance checks are completed by the operator or competent person, and recorded in a log kept in the machine.	☒	☐	☐	
5.	Effective exclusion zones are established so that all workers are kept a safe distance away from earth moving machinery operations at all times.	☒	☐	☐	
6.	Where specific operations are identified where it is absolutely necessary for a person to work in close proximity to an operating machine, they are conducted by authorised workers and machines are fitted with manual or semi-automatic quick hitches with safety locking mechanisms in place.	☒	☐	☐	
7.	All earth moving machine operatives are trained in their use and have the manufacturer's operating and maintenance instructions readily available.	☒	☐	☐	
8.	All maintenance procedures for earth moving machinery are followed (by the operator or other appointed competent person) and recorded in a log kept in the machine.	☒	☐	☐	
Sample of a Safety Checklist for operating a Quick Hitch and Earth Moving Machine					
GMR Subsection: 4.7.4 Activations (Controls) and Emergency Stops					
Controls: Equipment must be of a design that allows emergency stopping by trip devices and has manual controls that prevent hazardous and inadvertent machine operation. Performance Standards: i) Review equipment brought to site to determine if it is equipped with a suitable number, type and location of trip devices or emergency stops. ii) Manual controls must be: - Clearly visible, identifiable, marked and positioned in a suitable location. - Their movement is consistent with their effect on machine operation. - In the appropriate language.					
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- iii) Establish an audible warning signal of sufficient duration and intensity for start-up where it is not possible to see all danger zones from the operator's console.
- iv) Check the design of machine controls to prevent inadvertent or unexpected start-up.
- v) Routinely test emergency stop or trip devices.

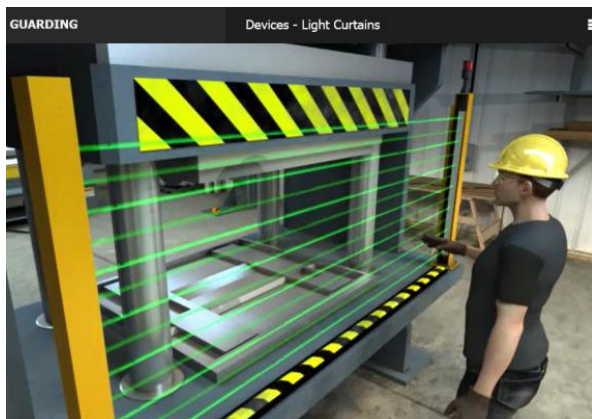
General Requirements

Methodology

1. All equipment with moving parts must be checked to have suitable trip devices or emergency stops that are clearly visible, identifiable, clearly marked and positioned in strategic locations for easy reach.
2. Machine controls must be designed to prevent inadvertent or accidental start-up.

Delivery

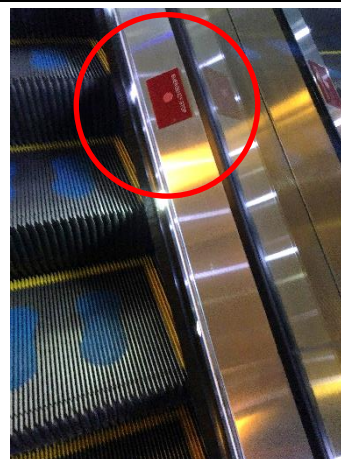
1. Audible warning signal of appropriate duration and intensity shall be in place for all start-ups. This shall be accompanied with visual means of warning, e.g. beacon light.
2. Emergency stop and/or trip devices shall be subject to a routine maintenance, inspection and testing regime.



Machine guarding trip device activates when safety distance from the machinery's moving part is breached



Bench drill machine with electrically interlocked guard and emergency stop function



Emergency stop button with signage on escalator landing and mid-point (for longer escalators)

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Emergency stop function on equipment and electrical control panels

Note:

- This Application Standards provide guidance that meets the GMR requirements.
- The requirements should be implemented across projects to ensure that projects comply with GMR and reduce risks associated with the works.
- If site conditions require changes to proposed standards, please consult your project EHS leads and/or Country EHS managers and/or Regional EHS team to confirm the intent of the GMRs are still met.

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