نظام الشارقة للسلامة والصحة المهنية
Occupational Safety & Health Sharjah

حكومة الشارقة
هيئة الوقاية والسلامة
Government of Sharjah
Prevention And Safety Authority

Code of Practice

Safe Selection and Use of Lifting Equipment

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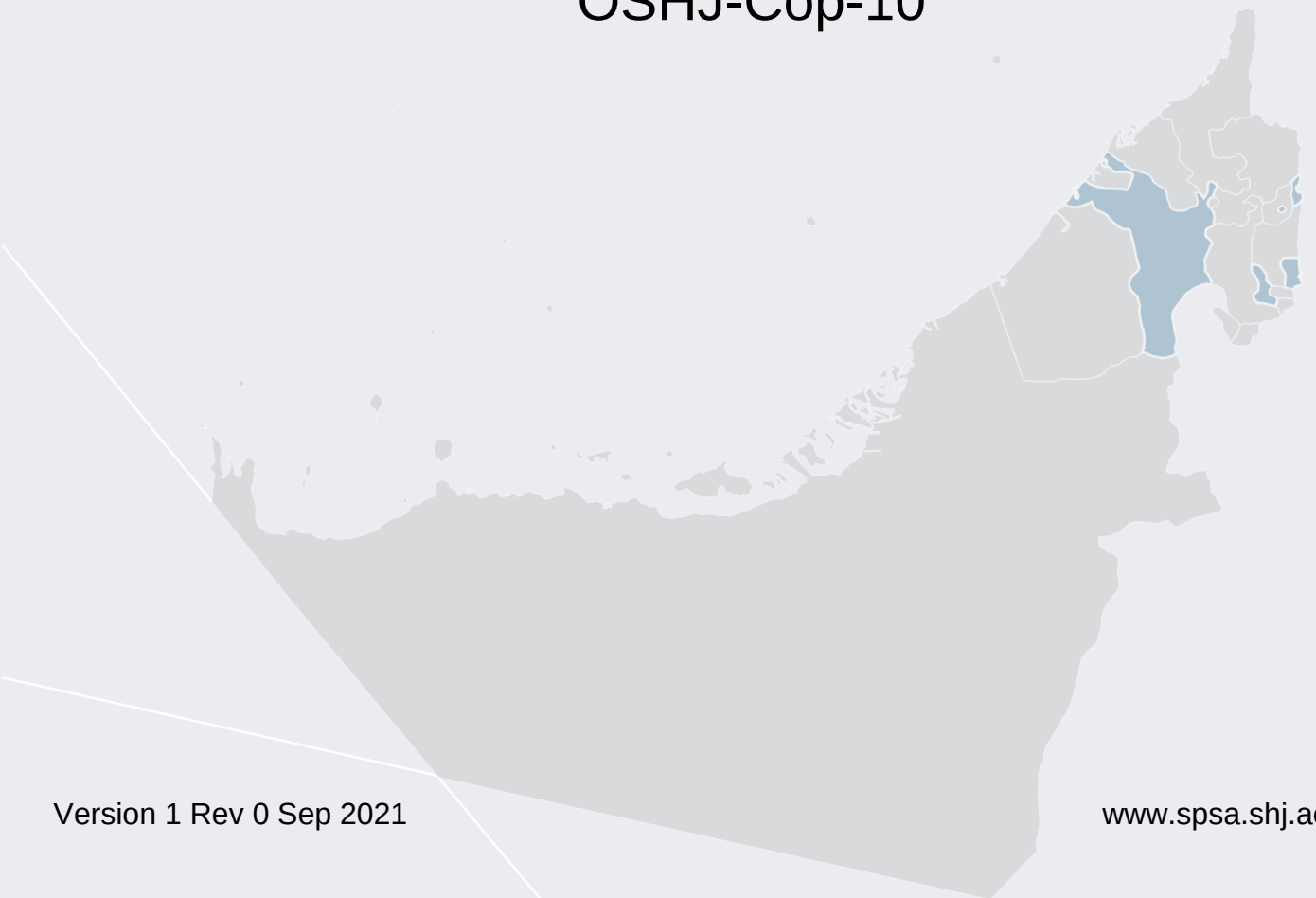

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1 Introduction

Lifting equipment is equipment used to lift and lower loads, this includes lifting accessories and attachments used to attach the load to the lifting equipment. The failure and/or misuse of lifting equipment has the potential to cause serious injury to employees and significant damage to property.

2 Purpose and Scope

This Code of Practice (CoP) has been developed to provide information to entities to assist them in complying with the requirements of the Occupational Safety and Health System in Sharjah.

This Code of Practice (CoP) defines the minimum acceptable requirements of the Occupational Safety and Health System in Sharjah, and entities can apply practices higher than, but not lower than those mentioned in this document, as they demonstrate the lowest acceptable level of compliance in the Emirate of Sharjah.

This Code of Practice is applicable to all entities operating within the Emirate of Sharjah that undertake lifting operations or is involved in providing lifting equipment for others to use.

3 Definitions and Abbreviations

Entities:	Government Entities: Government departments, authorities or establishments and the like in the Emirate. Private Entities: Establishments, companies, enterprises and economic activities operating in the Emirate in general.
Risk:	Is the combination of likelihood of the hazard causing the loss and the severity of that loss (consequences).
Risk Assessment:	The systematic identification of workplace hazards and evaluation of the risks associated. This process takes existing control measures into account and identifies and recommends further control measures where required.
Hazard:	Anything that has the potential to cause harm or loss (injury, disease, ill-health, property damage etc).
Competence:	The combination of training, skills, experience and knowledge that a person has and their ability to apply all of them to perform their work.
Load:	Any load being lifted or lowered by lifting equipment, which includes materials, plant, equipment and people.
Lifting Operations:	An operation concerned with the lifting or lowering of a load using lifting equipment.
Lifting Accessories:	Any accessories that are used to attach the load to lifting equipment, providing a link between the two.
Operator:	A person who operates equipment or machinery.
Signaller:	Any employee who is giving direction to the operator of equipment.

Slinger/Rigger: Any employee who prepares and connects loads to lifting equipment and release at their destination.

Manufacturer's Manual: The instructions, procedures and recommendations provided by the manufacturer to ensure the safe operation, maintenance and repair of the equipment.

4 Roles and Responsibilities

4.1 Entity Responsibilities

- Identify all reasonably foreseeable hazards involving lifting operations, these hazards shall be adequately risk assessed;
- Adequately plan lifting operations;
- Ensure that lifting operations are adequately supervised;
- Ensure only competent operators are allowed to operate lifting equipment;
- Ensure that a process is in place to manage lifting operations;
- Ensure resources are available to implement adequate control measures required for lifting operations;
- Provide adequate information, instruction, supervision and training for employees involved in lifting operations and ensure employees are competent;
- Ensure lifting equipment and accessories provided for lifting operations is adequately examined, inspected and maintained and safely selected and used for the task;
- Ensure safe systems of work, lifting plans and any other control measures identified in the risk assessment are developed and implemented;
- Appoint competent persons to undertake specific roles and responsibilities with regards to the use of lifting equipment and accessories;
- Ensure that adequate emergency procedures are in place.

4.2 Employee Responsibilities

- Not endanger themselves or others;
- Those involved in lifting operations should inspect work equipment before each use and report any damage or defects identified in any lifting equipment or accessories;
- Follow a safe system of work and any precautionary control measures to ensure lifting operations are performed safely;
- Cooperate with the entity and receive safety information, instruction, supervision and training associated with lifting operations.

5 Requirements

Lifting equipment is used across different work activities and the risks associated with lifting equipment vary accordingly. Therefore lifting equipment selection and use shall be properly planned and assessed.

5.1 Planning

The entity shall assess the risks associated with lifting operations and take all reasonably practicable precautions to ensure the safety of employees and others who could be affected by work activities.

All lifting operations shall be planned to ensure that they are carried out safely and that all foreseeable risks have been taken into account.

Planning should be carried out by a competent person appointed for this purpose.

5.2 Risk Assessment

The entity shall ensure that lifting operations are assessed by a competent person as part of the planning process and shall identify the hazards associated with the proposed lifting operation. The assessment should evaluate the risks involved and the nature and extent of any measures required to mitigate those risks. The competent person shall also take into consideration hazards identified by the overall workplace risk assessments.

The risk assessment shall take into consideration the following factors, including but not limited to:

- The load its characteristics and the method of lifting;
- Lifting equipment and accessories testing and certification requirements;
- The adequate clearances between the load and the lifting equipment;
- Communication among relevant parties;
- Siting of cranes;
- Crane stability;
- Ground conditions;
- Weather conditions;
- Visibility;
- Attaching, detaching and securing loads;
- Proximity hazards and overhead services;
- Competence of operators, signallers and slingers/riggers.

Further information on risk assessment can be found in OSHJ-CoP-01: Risk Management and Control.

5.2.1 Selection of Lifting Equipment

The entity shall ensure that lifting equipment must be of adequate strength and stability and selected by a competent person for the purpose it is going to be used for, including but not limited to:

- The safe working load of lifting equipment and accessories;
- The frequency and duration of the work;

- The working environment, taking into account proximity hazards, space availability and suitability of the ground conditions;
- The weather conditions that exist or may occur at the site of the operation;
- Lifting radius;
- The mobility of the crane.

5.2.2 Safe System of Work

The entity shall ensure that each lifting operation is planned, supervised and carried out in a safe manner by a competent person. A safe system of work for lifting operations shall be developed and contain the following, including but not limited to:

- Planning the operation;
- Selection and use of the correct lifting equipment and associated equipment;
- Maintenance of the lifting equipment and associated equipment;
- Selection of appropriately trained and competent personnel;
- Provision of adequately trained and competent supervision;
- Provision for the safety of those involved in, and others who may be affected by the operation;
- Effective communication between all relevant parties;
- Ensuring that all necessary test certificates and other documents are in date and available;
- Preventing unauthorised movement or use of the lifting equipment.

A competent individual shall be appointed by the entity to take control of the planning and organising of the lifting activity.

5.2.3 Lifting Plans

The entity shall ensure a lifting plan addresses the risks identified by the risk assessment and identify the resources required, the procedures and the responsibilities so that risks are managed and any lifting operation is carried out safely. The plan should ensure that the lifting equipment remains safe for the period of lifting operations for which it might be used.

Tandem lifts are where two items of lifting equipment are used simultaneously to lift a load, a procedure should be in place to ensure safety. Where appropriate, this should be a written plan, drawn up and applied to ensure safety.

The requirement for planning should therefore address how risks identified by assessment will be eliminated or adequately controlled. Adequate planning of lifting operations should ensure that not only is suitable equipment provided but also that it can be used safely.

The degree of planning will vary considerably. It will depend upon the type of lifting equipment to be used and the complexity of the lifting operation. A lifting operation should be planned before the lift is started and the plan should cover the whole of the process, including the disassembly of the lifting equipment where this is necessary, and should consider potential difficulties.

Adequate planning of lifting operations is a combination of two parts:

- Initial planning to ensure that lifting equipment is provided which is suitable for the range of tasks that it will have to carry out;
- Planning individual lifting operations so that they can be carried out safely with the lifting equipment provided.

The balance between the two parts of the planning process will vary depending on the lifting equipment and the lifting operation.

For routine lifting operations the planning of each individual lifting operation will usually be a matter for the people using the lifting equipment, such as a slinger/rigger, the operator etc. The person carrying out this part of the planning exercise should have appropriate knowledge and experience and the organisation should have a simple plan, risk assessment and procedures in place to support them.

A simple plan for routine use of an overhead travelling crane, includes:

- Assessing the weight and size of the load;
- Choose the right accessory for lifting, depending upon the nature and weight of the load and the environment in which it is to be used;
- Check the anticipated path of the load to make sure that it is not obstructed;
- Prepare a suitable place to set down the load;
- Fit the sling to the load using an appropriate method of slinging;
- Make the lift, a trial lift may be necessary to confirm the centre of gravity of the load and tag lines in place to stop the load swinging;
- The release of slings, boards or similar may be necessary to prevent trapping of the sling;
- Clear up.

5.3 Safe Use of Lifting Equipment

The entity shall ensure that prior to using lifting equipment or performing lifting operations, the following factors are considered, including but not limited to:

- The work is planned and has been adequately risk assessed by a competent person;
- A safe system of work has been agreed and communicated to all employees involved;
- A lifting plan has been documented, and all employees involved follow the correct means of lifting, and the correct lifting accessories are used safely;
- The area where lifting operations are being conducted is defined and unauthorised access to the area prevented by the use of suitable barricading;
- The safe working load for lifting equipment and accessories is clearly marked on all lifting equipment and known by operators, signallers and slingers/riggers;
- Load radius indicators should be used to show the operating radius and the corresponding safe working load;

- Safe load indicators should be used to prevent a crane exceeding its safe working load;
- Where two pieces of lifting equipment are used within the same radius, adequate control measures shall be introduced to prevent collision;
- Weather conditions shall be monitored and lifting operations stopped when the wind speed exceeds the limit specified in the lifting equipment manufacturer's manual;
- Means of communication shall be adequate and agreed between the operator, signaller and slinger/rigger;
- All employees involved in lifting operations have received information, instruction, supervision and training, and are adequately supervised by competent persons.

5.4 Cranes

There are different types of cranes and each type of crane has certain features which make it suitable for particular activities.

Mobile Cranes **-** Mobile cranes tend to be suitable for short duration operations where movement around a site may be required. As they are self-propelled, they are able to move around a workplace and perform a variety of tasks. Due to their size and weight, they can be expensive to transport from site to site. The lifting element of the crane is attached to a chassis, which is either driveable on the public highway or fitted with caterpillar tracks and is transportable on a flatbed truck. In specialist circumstances, the crane may be sited on a floating craft for marine operations.

Crawler Cranes **-** The crawler type crane is usually less suitable for use on the public highway since it is run on tracks rather than wheels. Maneuverability around the work site is good since this type of vehicle can negotiate uneven ground. The ground stability when the vehicle moves or is stationary must be capable of withstanding the load bearing pressures exerted by the tracks.

Mounted Cranes **-** A crane can also be mounted on a commercial truck chassis, whose primary function is to load and unload the vehicle. The hydraulically powered jib can extend and articulate in order to reach the carrying aspect of the vehicle. The stability of this type of crane during lifting operations relies on the correct placement of stabilisers known as outriggers to prevent the vehicle tipping over. The truck mounted mobile crane will need to have outriggers removed/withdrawn and the jib reached in, prior to movement.

Tower Cranes **-** There are many different types of tower cranes available depending on the type of jib and method of operation, the most common being "trolley jib" or "saddle jib". Tower cranes are used in construction for large structures such as bridges and high-rise buildings and are transported to the site in pieces and then assembled.

Gantry Cranes **-** Consist of a framework of a supported horizontal beam or lattice along which a trolley moves. The bases of the uprights may have wheels fitted which run on railway tracks, allowing the gantry to move backwards and forwards. The area which can be covered is the full length of the gantry rails and the width between. Whilst giving great flexibility within the area, they cannot provide lifting capability outside. Some are fitted with rubber wheels which can steer and drive the gantry and they are used extensively for handling freight containers.

5.4.1 Safe Selection of Cranes

The entity shall ensure that when selecting the appropriate crane for the operation, the following factors are considered, including but not limited to:

- Weights, dimensions and characteristics of the loads to be lifted;
- Operational speeds, lifting radius, heights of lifts and areas of available movement;
- Number, frequency and types of lifting operations;
- Length of time for which the crane will be required, or anticipated life expectancy for a permanently installed crane;
- Site, ground and environmental conditions, or restrictions arising from the use of existing buildings;
- Space available for crane access, erection, travelling, operation and dismantling;
- Any other special operational requirements or limitations imposed including environmental conditions.

Having decided upon the type of crane and knowing the overall requirements involved, a crane that will safely meet all the specified requirements of the planned lift should be selected.

5.4.2 Siting of Cranes

The entity shall ensure that the siting of the crane takes into account all the factors that may affect its safe operation, including but not limited to:

- The crane standing and support conditions;
- The presence and proximity of other hazards;
- The effect of wind;
- Operator visibility;
- The adequacy of access to allow the placing or erection of the crane in its working position and for dismantling and removing the crane following completion of lifting operations.

5.4.3 Crane Standing or Support Conditions

The competent person shall ensure that the loads imposed by the crane can be sustained by the ground and any means of additional support provided. The loads imposed by the crane can be obtained from the crane manufacturer, supplier or other parties on the crane design. The calculated loadings shall include the combined effects of the following:

- The dead weight of the crane, which includes any counterweight, ballasting, outriggers or foundation where appropriate;
- The dead weight of the load/s and any lifting attachment/s;
- Dynamic forces caused by movements of the crane;
- Wind loadings, taking into account the degree of exposure of the site.

5.4.4 Crane Stability

To ensure the stability of a crane the following safety devices can assist, including but not limited to:

- Rated capacity indicator **-** An automatic indicator is required on certain jib cranes to give warning of an approach to the safe working load and a further warning when an overload occurs. The warnings should be clearly evident to the driver;
- Load radius indicator **-** A load radius indicator is required on jib cranes having variable safe working loads according to the radius at which they are operated. It should be clearly visible to the driver and indicate accurately the safe working load and radius for whatever configuration of the crane is used;
- Motion limit devices **-** Motion limit devices can be fitted to limit hoisting, derricking – which is the vertical movement of the jib, travelling, slewing, traversing, climbing or any other crane motion which could threaten the stability of the crane;
- Overload cut out devices **-** Switches or other devices may be fitted to cut out crane movement when the crane is in an overload situation. Only movements that permit the crane to be returned to a safe condition should remain operative;
- Level indicator **-** Crane level indicators should be used in accordance with the manufacturer's manual to ensure that the crane is not operating outside of specified tolerances;
- Anemometer **-** Anemometers or other wind-speed measuring devices should have their indicators mounted in clear view of the crane driver or, if appropriate, the person controlling the lift to ensure that the crane is not operating outside of specified tolerances;
- Machinery guarding **-** All guarding should be properly fitted whenever the crane is in motion or use and maintained in good condition.

5.4.5 Visibility

There are different types of auxiliary devices that can be used to indicate the position of the load to the operator of the lifting equipment. These include camera systems and visual markers, either on the lifting equipment or on the ground indicating the position of the load accurately. The type of device chosen will depend on the lifting equipment with which it will be used, where it will be used and the particular lifting operation.

Where these auxiliary devices are insufficient, a system of work shall be followed providing the operator with information on the position of the load. This will usually involve the appointment of a competent person to give clear instructions to the operator. This competent person may be referred to as a signaller or a banksman. The competent person should have a clear view of the path of the load. They should be in a safe position and be in view or able to communicate effectively with the operator of the lifting equipment.

The lifting equipment operator and the competent person shall use a reliable means of effective communication. This could be by using hand signals, radios or telephones etc.

Further information on hand signals can be found in OSHJ-GL-17: Safety Signs and Signals.

5.4.6 Attaching/Detaching and Securing Loads

The slinger/rigger is responsible for attaching/detaching and securing the loads to the lifting equipment.

The slinger/rigger should have the necessary training and competence to select suitable lifting accessories. The slinger/rigger should receive adequate information, instruction, supervision and training and practical experience on the principles of selection, use, care and maintenance of lifting accessories including any limitations on use. This should include, where necessary, the methods of slinging loads, the methods for rating multi-legged slings, interpretation of markings on lifting accessories and derating lifting accessories for particular adverse conditions of use such as when lifting in adverse weather conditions.

The lifting operation should not commence until the slinger/rigger has indicated that it is safe to do so and they or the person in control of the lifting operation has given the authority to do so. The slinger/rigger should normally only obey the instructions of the identified person in charge of the lifting operation. In either case, a system of work should be in place which ensures that the slinger/rigger is in a safe position before the lifting operation begins.

Where there is a risk of the load breaking up and this could result in injury to people below, the slinger/rigger should take additional measures to ensure that the load remains intact and in a safe condition.

Suitable precautions must be taken to prevent the load or lifting equipment from being damaged by sharp edges or due to the loads shifting while they are lifted.

5.5 Weather Conditions

Various weather conditions could have an effect on the integrity of the equipment or expose people to hazards which may mean that lifting operations have to be stopped, such as, excessive wind speed, poor visibility due to mist or fog, lightning, heavy rain, sea state etc. Other factors can produce unsafe conditions after the particular weather condition has finished, such as waterlogged and unstable ground following a period of heavy rain. A safe system of work must be in place which sets out what measures or actions need to be taken for particular weather conditions.

Safe systems of work should recognise that additional measures may be needed to reinforce the stability of the lifting equipment or to reduce the safe working load so that the lifting operations can be continued safely.

Lifting equipment must be thoroughly examined where weather conditions may have jeopardised its safety.

5.6 Proximity Hazards

The entity shall ensure control measures are in place which address the risks arising from proximity hazards. These measures should take into account the lifting equipment in use and the particular proximity hazard.

Proximity hazards, include but not limited to:

- Coming into contact with overhead power lines;
- Coming into contact with other work equipment or structures;
- Trench work and excavations;

- Other lifting operations in the vicinity;
- Low bridges, transport or traffic routes;
- Warehouse racking;
- Underground services such as drains or sewers.

Where such hazards exist and cannot be eliminated by the operators of the lift, the appropriate authority or utility provider should be consulted for guidance on control measures.

The danger to or from underground services, such as gas mains or electric cables, should be considered. Precautions should be taken to ensure that the crane foundation is clear of any underground services or, where this is not possible, that the services are adequately protected against damage.

When the load passes an obstacle, the following precautions should be put in place:

- The crane path clearly defined by marking to ensure that it is kept free from obstruction;
- A suitable clearance distance provided between any part of the crane and any obstacle;
- Effective precautions taken to prevent access to any trapping hazards;
- Boundary lines for the stacking of goods be permanently marked on the ground.

5.6.1 Overhead Services

The entity shall ensure that parts of a crane, including rope, slings or load, do not contact or come near to overhead services when they are live.

The competent person should ensure that the relevant authority or utility provider is consulted, if the crane is to be used in close proximity to overhead services. Proximity alarms can be fitted on cranes to give warning when the crane comes within a predetermined distance of an obstruction.

Further information can be found on overhead power lines in OSHJ-CoP-09: Overhead and Underground Services.

5.7 Maintenance of Lifting Equipment and Accessories

The entity shall ensure that planned preventative maintenance is scheduled to ensure lifting equipment and accessories are maintained at regular intervals, taking account of:

- Planned preventative maintenance is based on the manufacturer’s manual;
- Review of the maintenance performed is scheduled and failures identified.

5.7.1 Thorough Examination and Testing

Lifting equipment shall be thoroughly examined and tested by a third party, including but not limited to:

- Before first use and at least every 12 months;
- Following installation and before putting into service;

- After every assembly on-site, before use, if moveable;
- Periodically when in use:
    - Lifting equipment for individuals at least every 6 months;
    - Lifting equipment for goods and materials at least every 12 months;
    - Or in accordance with an examination scheme devised by a competent person.
- Lifting accessories at least every 6 months for which a valid test certificate has been issued and which have been thoroughly examined within the previous 6 months should be used in a lifting operation.

The entity shall record and retain thorough examination and testing records.

5.7.2 Inspection of Lifting Equipment and Accessories

The inspection of lifting equipment and accessories shall be conducted at regular intervals between thorough examinations.

Any examination scheme for lifting equipment shall take into account:

- Legal requirements;
- Manufacturer's manual;
- The type of lifting equipment;
- How often it is used;
- The environmental conditions that it is used in.

Inspections shall be conducted:

- Prior to operations commencing in the form of a pre-operational check of lifting equipment and accessories as per the manufacturer's manual;
- Periodically as identified in the findings of the risk assessment with findings formally recorded in the lifting equipment and accessories inspection register.

Inspections shall only be conducted and findings recorded by a competent employee. All lifting accessories should be clearly marked with the safe working load and a unique identification number for recording purposes.

The entity shall record and retain inspection records.

5.8 Record Keeping

The entity shall ensure records for the following activities shall be retained and appropriately maintained, including but not limited to:

- Operator, signaller and slinger/rigger certificate;
- Lifting equipment and accessories inspection, examination and testing;
- Third party testing and certification;

- Repair, servicing and maintenance records;
- Log books and inspection check lists.

6 Training and Competence

The entity shall ensure that all personnel involved in the selection and use of lifting equipment are adequately trained.

The entity shall provide employees with training in languages and in a format that employees understand, including but not limited to:

- Operators, signallers and slingers/riggers should be adequately trained in the hazards of the lifting equipment they use and the precautions that they must take to ensure safe operation;
- Specific information and instruction on the safe selection and use of lifting equipment and accessories and the risks associated with using the lifting equipment and the control measures to be implemented to reduce these risks;
- Awareness of specific hazards identified in the risk assessment;
- Formal training for use on specific lifting equipment and accessories;
- Fire and emergency response procedures, including the use of first aid and firefighting equipment.

Periodic refresher training shall be conducted to ensure employees competency is maintained, including but not limited to:

- Where training certification has expired;
- Where identified as part of a training needs analysis;
- Where risk assessment findings identify training as a measure to control risks;
- Where there is a change in legal requirements;
- Where incident investigation findings recommend refresher training.

The entity must record and maintain accurate training records of OSH training provided to employees.

Further information on training can be found in OSHJ-GL-26: Training and Competence.

7 Emergency Preparedness and Response

The entity shall be prepared for emergencies that may occur during lifting operations. Due to increased risks from lifting operations, the entity needs to have a plan on what to do when an emergency occurs on how to respond to that emergency.

The factors to consider when developing an emergency plan, include but not limited to:

- Providing a rapid and effective rescue for tower crane operators in the event of a medical or other emergency;
- Responding to crane collapse, overturning or collision with other lifting equipment;

- Responding to a suspended load being dropped, entangled or hitting another object;
- Providing first aid response to employees who have been injured during lifting operations;
- Appointing emergency response personnel who can take charge and make decisions on behalf of the entity during an emergency and liaise with emergency services;
- Adequate firefighting and first aid equipment is available for the type of work activities and the equipment present in the workplace;
- Employees are trained in emergency response, including information of first aid arrangements and where first-aiders, first aid equipment and facilities are located;
- Employees are appointed as first-aiders and available at each location and on each working shift.

Further information on first aid can be found in OSHJ-CoP-16: First Aid at Work.

Further information on developing an emergency plan can be found in OSHJ-CoP-18: Emergency Preparedness and Response.

8 References

OSHJ-CoP-01: Risk Management and Control

OSHJ-CoP-09: Overhead and Underground Services

OSHJ-CoP-16: First Aid at Work

OSHJ-CoP-18: Emergency Preparedness and Response

OSHJ-GL-17: Safety Signs and Signals

OSHJ-GL-26: Training and Competence

9 Document Amendment Record

TITLE	Safe Selection and Use of Lifting Equipment		
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