

National Occupational Standards

Sector: Building and Construction

Occupation: Tower Crane Operator

MQF Level: 3

Units:

- TCO301: Contribute to health and safety requirements in the workplace
- TCO302: Carry the daily walk around checks prior to operating the tower crane
- TCO303: Draw the lift plan and understand the lift plan
- TCO304: Changing of the reeving system according to the load
- TCO305: Carry out lifting operations using a tower crane

TCO301: Contribute to health and safety requirements in the workplace

This unit lists the knowledge and skills required by a person holding this position to contribute to carrying out safe work activities in compliance with health and safety activities.

Upon completion of this unit the persons carrying out this work will possess the necessary knowledge and skills to follow health and safety procedures which ensure that their actions do not create health and safety risks to self or to others.

Performance Criteria

The candidate must have the necessary knowledge and skills to:

1. Follow safe working practices in accordance with the workplace health and safety regulations.
2. Identify potential hazards associated with own work practices and the workplace and report them in accordance with organisational procedures.
3. Follow correct procedures in the event of hazards or injury or ill health.
4. Carry out work practices to comply with supplied information to contribute to a healthy, safe, and secure working environment.

Required Knowledge

The Level 3 Tower Crane Operator must know and explain:

1. Their roles and responsibilities under the Health and Safety Act as amended by Act XXVII of 2000 or any subsequent current legislation.
2. Their health concerns associated with the workplace and safe practices when carrying out work activities.
3. The importance of co-operating with their employer on matters related to health and safety to safeguard their own wellbeing and that of others affected by their work activities.
4. The organisational policies regarding legislation and guidance which need to be complied with.
5. The potential hazards in the workplace such as electricity and other utility services, contaminants, hazardous and non-hazardous substances, waste materials, working at height, work equipment, access equipment, obstructions, fire risks, manual handling, proximity, third party hazards, and changing weather conditions.
6. The importance of being aware and alert to the presence of hazards on site and other work areas.
7. The effect of any toxic or hazardous substances detected on site and what precautions need to be taken.
8. The importance of health surveillance and fitness to operate – should not be under the effect of drugs, alcohol and medicines or any medical condition that could impair his/her performance when operating the tower crane.
9. The importance of correct storage of combustibles and chemicals on site.

10. The arrangements to follow regulations regarding security on site and in the workplace e.g., storage of materials, components, tools, plant, and equipment.
11. The importance of working around mobile plant and equipment on site- keeping safe distances away from working machinery.
12. The security arrangements and procedures that should be observed and followed when working on site.
13. The procedures for dealing with accidents and emergencies associated with the workplace and environment.
14. The importance of reporting accidents and near misses to superiors.
15. Personal responsibility for behaviour of health, safety and welfare on site and the consideration of others.

Required Skills

The Level 3 Tower Crane Operator must be able to:

1. Comply with their individual duties and legal obligations under the Health and Safety Act XXVII of 2000 or any subsequent current legislation.
2. Work according to health and safety regulations and other relevant regulations that apply to the work requirements.
3. Comply with safe working practices in accordance with organisational procedures.
4. Recognise any hazards and hazardous materials associated with workplace activities and how changing circumstances could increase those hazards.
5. Report any hazards and risks and changing circumstances to superiors in accordance with organisational procedures.
6. Report near misses and accidents to superiors.
7. Recognise emergency situations and report them in accordance with organisational requirements.
8. Identify and use the provided Personal Protective Equipment (PPE) and Respiratory Equipment (RPE) when necessary to carry out work duties.
9. Comply with organisational procedures for safely working around mobile plant and equipment.
10. Assist in carrying out work activities to protect work areas from damage.
11. Demonstrate good personal behaviour for workplace health safety and welfare.

TCO302: Carry the daily walk around checks prior to operating the tower crane

This unit lists the knowledge and skills required by a person holding this position to contribute to the carrying out of the daily walk around check of the tower crane.

Upon completion of this unit the persons carrying out this work will possess the necessary knowledge and skills to carry out the daily walk around check which will then ensure that the tower crane to be operated in this lift is free from any visible defects.

Performance criteria

The candidate must have the necessary knowledge and skills to:

1. Identify any faults in the tower crane.
2. Follow the correct procedure to report any faults or defects and make sure that any faults are rectified prior to operation of the tower crane.
3. Assist in rectifying any faults.
4. Check tower crane certification validity.
5. Prepare the tower crane for lifting.

Required Knowledge

The MQF Level 3 Tower Crane Operator must know and explain:

1. The effect of any defects on the proper operations of the tower crane performance.
2. How to follow organisational procedures in filling of the daily walk around check sheet.
3. How to understand the tower crane structure, jibs, drives, slewing assembly, trolley, sheave and hook block, wire ropes, hoisting units, motors, and brakes.
4. How to understand the tower crane electrical supply panel, and especially how to switch ON/OFF the supply.
5. How to understand load labels attached to the tower crane.
6. How to understand the decals symbols on the tower crane remote control.
7. The nomenclature of the tower crane components.
8. The position of tower crane sensors and have knowledge about the function of load moment indicators and tower crane instrumentation.
9. How to report any defects in the tower crane.
10. The importance of having the wire guided properly in the trolley guides, proper trolley movement and adequate trolley brakes.
11. The importance of hoisting the wire rope appropriately on its drum, wire rope passing appropriately in the hoisting guides, and having adequate hoisting brakes.

12. The slewing motion of the tower crane and having adequate slewing brakes.
13. That the tower crane base should be certified by warranted civil engineer upon first set up of tower crane.
14. That the tower crane should be certified annually by warranted mechanical engineer.
15. The importance of greasing pulleys, slewing ring mechanisms and guides.

Required Skills

The MQF Level 3 Tower Crane Operator must be able to:

1. Select and use the correct PPE during the walk around check.
2. Carry out the daily walk around check.
3. Know how to look for possible defects in all parts of the structures including mainly the machine room, counter jib, wire ropes, guides, and other vital components in the operations of the tower crane.
4. Know how to act and report possible defects.
5. Know how to climb safely onto the tower crane structure.
6. To switch ON/OFF the tower crane electrical supply.
7. Test the tower crane hoisting brake, slewing brake and trolley brake.
8. Check wire ropes, hook block, sheaves, pulleys, tower crane structure.
9. Report the tower crane for maintenance when required.

TCO303: Draw the lift plan and understand the lift plan

A lift plan is to be planned prior to every lift; the lift plan should include all the required details to carry out the lift safely.

Upon completion of this unit the tower crane operator should be able to assist in the drawing up of this lift plan. The assistant tower crane operator should also be able to understand the lift plan and assist the tower crane operator in its implementation.

Performance criteria

The candidate must have the necessary knowledge and skills to:

- 1 Identify potential hazards for this lift.
- 2 Report any hazards include these hazards in the risk assessment.
- 3 Prepare the lifting tackle to be utilised for this lift.
- 4 Check the Load Capacity Chart of this tower crane and confirm that load to be lifted and lifting radius are as recommended.
- 5 Choose the appropriate reeving system to be utilised for this lift.

Required Knowledge

The MQF Level 3 Tower Crane Operator must know and explain:

1. That all risks should be mitigated in a risk assessment.
2. That hazards should be included in the risk assessment and take mitigation measures how to reduce or eliminate the risk of an accident.
3. The range and the lift capacity of this tower crane.
4. The load weight to be lifted, load height and operating radius and those fit safely in the tower crane chart.
5. SWL, safe working load of the lifting tackle.
6. The full understanding of the lift plan, taking into consideration all the required factors.

Required Skills

The MQF Level 3 Tower Crane Operator must be able to:

1. Look for hazards nearby the area where the tower crane is set up.
2. Carry out the lift plan, taking into consideration all the important factors as lift weight, operating radius, wind speed etc.
3. Understand the lift plan and implement the lift plan.
4. Select the appropriate lifting gear as specified in the lift plan.

TCO304: Changing of the reeving system according to the load

This unit lists the knowledge and skills required by a person holding this position to contribute to the changing of the reeving system of the tower crane.

Upon completion of this unit the tower crane operator carrying out this work will possess the necessary knowledge and skills to change from two wire to four wire, or vice versa.

Performance criteria

The candidate must have the necessary knowledge and skills to:

1. Identify potential hazards during changing of the reeving system.
2. Report those hazards and include them in the risk assessment.
3. Communicate effectively and give instructions to the assistant tower crane operator, during changing of the reeving of the tower crane.
4. Change the reeving system according to the load to be lifted.
5. Follow the load capacity chart according to the present reeving system.

Required Knowledge

The MQF Level 3 Tower Crane Operator must know and explain:

1. How to lock the reeving system adequately.
2. The procedure when changing the reeving system.
3. The difference between two wire and four wire, the effect on lifting speed and lifting capacity.
4. The proper operation of the tower crane with different reeving and realise the consequences in the advent that the reeving system is not properly locked.
5. The load capacity of the tower crane under different reeving configurations.

Required Skills

The MQF Level 3 Tower Crane Operator must be able to:

1. Understand when it is required to change the reeving system.
2. Change the reeving system safely.

TCO305: Carry out lifting operations using a tower crane

This unit lists the knowledge and skills required by a person holding this position as a tower crane operator.

Upon completion of this unit, the tower crane operator carrying out this work will possess the necessary knowledge and skills to operate the tower crane on site

Performance criteria

The candidate must have the necessary knowledge and skills to:

1. Identify potential hazards during the lifting operation.
2. Tackle those hazards by taking mitigation actions how to reduce the risks.
3. Understand the instructions of the tower crane operator during the operation of the mobile crane.
4. Operate the tower crane, within its lifting range and capacity.
5. Watch out for any changing parameters during the lifting operation.
6. Communicate effectively and give feedback to the assistant tower crane operator, during lifting.
7. Ask for a spotter and take feedback through hand signals from the assistant tower crane operator in the operations of the tower crane.
8. Check that the wind speed is adequate for this lifting operation.
9. How to leave the tower crane unattended.

Required Knowledge

The MQF Level 3 Tower Crane Operator must know and explain:

1. That for no reason persons should not be present below suspended load.
2. How to identify any hazards that were not identified in the lift plan.
3. To never suspend load on third party property or public areas.
4. That public access areas where load is to be suspended should be cordoned.
5. That when the lift is not in the line of vision, it is required to coordinate with the assistant tower crane operator and as a spotter, who should communicate using hand signals in the manoeuvre of the tower crane.
6. The weight of the load being lifted.
7. The lift capacity chart and range of this tower crane.
8. The effect of wind on the lifting operation when is using a tower crane.
9. The safe distance to stay away from power lines.
10. The safe distance to stay from other machinery for e.g., other tower cranes.
11. How to follow the correct procedure to leave the tower crane unattended.

Required Skills

The MQF Level 3 Tower Crane Operator must be able to:

1. Identify any hazard that were not identified in the lift plan.
2. Include those additional hazards in the risk assessment and mitigate those hazards.
3. Keep a constant look out on during the lifting operation.
4. Take ownership of the lift, stay attentive, make a safe lift, and take immediate action whenever needed.
5. Carry out a safe lift, within the capacity of this tower crane.
6. understand when it is required to ask the assistant tower crane operator to act as spotter.
7. Leave the tower crane unattended according to the proper procedures.