

### National Occupational Standards

**Sector:** Building and Construction

**Occupation:** Road Construction Inspector

**MQF Level:** 3

**Units:**

- RCI301: Apply Occupational Health and Safety during Work-Practices
- RCI302: Systems, Equipment, Materials, Testing and Components
- RCI303: Reading of Drawings, Setting Out and Calculations
- RCI304: Site Inspections and Supervision
- RCI305: Reporting and Coordination

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**RCI301: Apply Occupational Health and Safety during Work-Practices**

This unit is about being able to use safe procedures and safe work practices. The persons carrying out this work must possess the necessary knowledge and skills to ensure that their actions do not create health and safety risks to themselves and others, identify risks and hazards associated within the working environment, tools and equipment and materials and substances used.

**Performance Criteria**

The candidate must have the necessary knowledge and skills to:

1. Carry out safe working practices to prevent hazards and to ensure the safety of oneself, workers, and members of the public.
2. Carry out safe working practices when using appropriate equipment and materials to prevent damages to work areas and injuries to oneself and 3<sup>rd</sup> parties.
3. Ensure that any formwork and/or scaffolding is safe to use.
4. Ensure the correct setting up safety barriers around a work environment hazard to protect site workers and members of the public.
5. Ensure that all personnel use protective clothing and safety equipment according to specifications issued by manufacturers and know the whereabouts of first-aid equipment.
6. Ensure the usage, handling, and storage of materials hazardous to health is done in a safe manner.
7. Identify the potential risk to cover the job for any potential danger to cover the job assigned and the working area, including environmental risk.
8. Ensure that all fire safety systems are in place.
9. Ensure that any electrical systems have been secured/disabled.
10. Ensure that all detection has been carried out and marked by the service entities.
11. Inspect and assist in any overhead and underground barrier services and foundations during and after construction for structural quality, structural integrity, safety and conformity to specifications and safety practices.
12. Issue notices of safety violations and follows-up on remedial measures required in case of safety violations reported.
13. Evaluate sites for cleanliness including waste disposal and vermin control.

**Required Knowledge**

The Level 3 Road Construction Inspector must know and explain:

1. The roles and responsibilities of themselves and others under the Health and Safety Act.
2. The health and safety risks associated with their role which includes tools, construction vehicles, materials and equipment used and working practices and procedures.
3. Good practice and integrity of bridges, roads, buildings, and foundations, overhead and underground services.
4. The environmental risks such as deficient air and water quality.
5. The fire safety system requirements and the risks associated with them.
6. The potential hazardous material commonly found at the workplace.
7. The procedures for dealing with potential hazardous material in the place of work.
8. The health concerns associated with the workplace and safe practices for different ongoing work practices on site.

9. The hazards and potential hazards at the place of work (such as electricity, slippery and uneven surfaces, dust and fumes, handling and transporting, contaminants and irritants, fire, heights, improper use of tools and equipment).
10. The importance of being alert to the presence of hazards in the place of work.
11. The responsible persons to whom to report health and safety matters or any other occurring hazards.
12. The emergency procedures in the place of work.
13. The first aid facilities that exist within the work area.
14. The correct procedure to make use of barricades, industrial hurdles, and warning signs including specific temporary traffic management arrangements to contain the work sites.
15. The safety procedures when using scaffold platforms.
16. The necessary safety precautions including the use of protective clothing and equipment for a range of applications including situations when helping other sector trade persons.
17. The methods used for protecting customers' property.
18. When it is required to close domestic water services from the main water supply; switch off electrical supply.
19. Any toxic effect from materials commonly used at construction sites.
20. The preventative and remedial actions to be taken in the case of exposure to materials hazardous to health.
21. The waste disposal and vermin control procedures.

#### **Required Skills**

The Level 3 Road Construction Inspector must be able to:

1. Identify which health and safety procedures are relevant to the working environment.
2. Seek expert assistance when help is needed.
3. Ensure compliance with duties and obligations as defined by the Occupational Health and Safety Act 2000 and recent amendments.
4. Follow workplace policies and employers' instructions for the safe use and maintenance of tools and equipment.
5. Control health and safety hazards within the job responsibility.
6. Report any hazards which may present risk to relevant persons.
7. Follow correct procedures in the event of injuries to themselves or others.
8. Take remedial action where work methods are not in line with control measures noted and identified from risk assessment.
9. Ensure adherence to work production and installation processes as agreed with the employer.
10. Ensure that the necessary skills to erect, use and dismantle access equipment (at height less than 2m) are applied.
11. Read, interpret, and install warning signs and set up safety barriers around working areas.
12. Equip oneself with the appropriate protective clothing and safety equipment.
13. Use and store materials hazardous to health in a safe manner.
14. Monitor the workplace and maintain good housekeeping whilst keeping it free from hazards.
15. Communicate complex information regarding unfamiliar and unpredictable situations to colleagues and supervisors.
16. Advocate appropriate health and safety procedures.
17. Have the skills to observe and monitor site situations and materials to determine compliance with safety standards.

**RCI302: Systems, Equipment, Materials, Testing and Components**

This unit is about identifying and understanding the different materials, workmanship, equipment, and testing.

**Performance Criteria**

The candidate must have the necessary knowledge and skills to:

1. Distinguish between the different types of materials and equipment used in the road construction process and the scope for each.
2. Know the different types of testing required to be carried out on all the materials being used on site.
3. Set up, monitor, and update a temporary traffic management scheme.
4. Ensure adherence to legislation.
5. Coordinate with the contractor and testing bodies and make arrangements for sampling and testing of completed work, quality assurance testing of materials.
6. Ensure that all testing and materials meet the required quality standards.
7. Ensure that all recording, sampling, and testing has been carried out before they are covered by contractor.
8. Ensure that materials and work procedures comply with specifications and contract documents.
9. Be present during material testing and sampling including testing of services and pipework laid.
10. Review, comment and make recommendations on the construction methods, working drawings, equipment submittals and other related works.
11. Inspect and test items of plant.
12. Review existing electrical and mechanical systems on site.

**Required Knowledge**

The Level 3 Road Construction Inspector must know and explain:

1. The range of materials, products, testing, sampling procedures and work procedures applicable to the road construction process.
2. The methods and techniques to minimise wastage and to protect the environment.
3. Sound and dust mitigation measures.
4. How to safeguard the quality of work.
5. The awareness in relation to the Legislation in relation to road construction in Chapter 499.
6. The surveying instruments used.
7. How to test and sample the equipment used.
8. The regulations, standards, and systems for safety requirement of electrical, water, drainage and mechanical installations, equipment, and systems.
9. Road and civil building construction, civil engineering principles, techniques and practices and the standard specifications used in construction projects, materials, and methods.
10. The reading of drawings.

**Required Skills**

The Level 3 Road Construction Inspector must be able to:

1. Distinguish between and apply the different types of materials, products, methods, and procedures applicable to the road construction practices and procedures.
2. Distinguish between and apply a range of road construction materials.
3. Distinguish between the different types of testing and sampling equipment, construction machinery and equipment.
4. Apply procedures to minimise construction material waste and dispose construction waste as stipulated in the environmental protection act.
5. Coordinate between different parties and stakeholders.
6. Be versant with relevant engineering terminology.
7. Understand contract documents and contractual obligations.
8. Know how to use the tools of the trade including meters, measuring tools and level and surveying tools.
9. Understand the contract documents and project drawings.

**RCI303: Reading of Drawings, Setting Out and Calculations**

This unit is about understanding and applying dimensions and levels from drawings and calculating quantities in the preparation, costing, and estimation.

**Performance Criteria**

The candidate must have the necessary knowledge and skills to:

1. Read and interpret plans, construction methods and specifications and check for discrepancies.
2. Read and interpret road design and construction drawings and written instructions.
3. Verify alignments, levels, measurement of dimensions and elevation of roads, structures, and fixtures.
4. Review layout plans to ensure that they meet regulations and contract specifications.
5. Review of cost estimates, scheduling, and materials listing.
6. Monitor all procedures occurring on site.

**Required Knowledge**

The Level 3 Road Construction Inspector must know and explain:

1. The compilations of overall linear dimensions from drawings.
2. The tools, equipment, and surveying instruments used to set out levels and datum grids and testing of materials.
3. The correct procedure for setting out work systems.
4. The various construction methods and materials used.
5. The scale working drawings from plans.
6. The levelling equipment available specifically designed for installations on inclined planes.
7. How to review the layout plan and specifications for compliance.

**Required Skills**

The Level 3 Road Construction Inspector must be able to:

1. Translate drawing details to setting out of work.
2. Check with specialised levelling equipment for accuracy.
3. Translate quality specifications on actual work.
4. Measure and comprehend calculations using metric units.
5. Read, analyze, and interpret plans and specifications and comparing them with construction in progress and for construction control purposes.
6. Read and interpret plans and specifications for construction control purposes.
7. Have the skill to make decisions in accordance with construction plans and specifications.
8. Have the skill to detect discrepancies in layout plans, materials, construction methods and processes and implementing appropriate remedial actions.
9. Check and ensure good workmanship and construction methodology.

**RCI304: Site Inspections and Supervision**

This Unit is about monitoring and managing the construction site.

**Performance Criteria**

The candidate must have the necessary knowledge and skills to:

1. Ensure that inspections are performed in a timely manner and that site is appropriately monitored to ensure compliance and that works' programmes are adhered to.
2. Assist and ensure the testing of all plant and materials.
3. Inspect all components of the construction systems and activities including excavation and fill operations, water and sewer systems, retaining walls, underground structures, placement of forms for concrete, concrete mixing and pouring, asphalt paving and grading operations, structural steel, reinforced concrete, dredging, foundations, laying and compaction of sub-grade materials, masonry and timber construction, framing, pointing, lighting, landscaping, storm water and drainage systems and plastering.
4. Ensure that all temporary traffic management arrangements have been installed and maintained.
5. Monitor the complete construction process.
6. Predict potential problems.
7. Ensure the correct use of all levelling, surveying, and setting out equipment and instruments.
8. Communicate with all stakeholders and all levels in the works organisation.
9. Ensure adherence to legislation.
10. Ensure that all necessary permits have been procured.
11. Assess that works comply to all legal requirements.
12. Assess that works are being carried out according to the layout plans, specification and contract documents including Bills of Quantities.
13. Visually verify basic structural integrity of components on site.
14. Mathematically verify measurements, layout plans and construction details.
15. Prepare and submit snag list for remaining works and remedial works at Taking Over.
16. Assist with hand over of completed works.
17. Train, direct and supervise other construction inspectors.

**Required Knowledge**

The Level 3 Road Construction Inspector must know and explain:

1. The methods of use and maintenance of tools and equipment.
2. The related legislation, including Chapter 499, Motor Vehicle Regulations, Traffic Signs and Carriageway Markings Regulations.
3. The undersanding of layout plans, specification and contract documents.
4. Which materials require testing and the type and methodology of testing to be carried out.
5. The bills of quantities and ensure that works are carried out accordingly.
6. All components of the construction systems and activities including excavation and fill operations, water, and sewer systems, retaining walls, underground structures, placement of forms for concrete, concrete mixing and pouring, asphalt paving and grading operations, structural steel, reinforced concrete, dredging, foundations, laying and compaction of sub-grade materials, masonry and timber construction, framing, pointing, lighting, landscaping, storm water and drainage systems and plastering.
7. The standard specifications for the setting up of temporary traffic management systems.
8. The levelling, surveying, and setting out equipment and instruments.

9. Which permits are necessary to carry out the necessary works on site.
10. How to assess structural integrity of components on site.
11. The final project assessment for the preparation of snag lists.
12. Mathematical knowledge.

**Required Skills**

The Level 3 Road Construction Inspector must be able to:

1. Confirm that materials, tools, and equipment required are fit for their intended purpose.
2. Identify, use, clean and store the basic hand tools.
3. Read and interpret layout plans, specification, and contract documents.
4. Control the quality and laying of all materials.
5. Follow Bills of Quantities in contract documents and site measurements.
6. Check the quality of installed work against specifications.
7. Read, interpret, and convert metric linear dimensions to meters, cm, and mm.
8. Have the skill to make decisions in accordance with construction plans and specifications.
9. Have the skill to detect discrepancies in layout plans, materials, construction methods and processes and implementing appropriate remedial actions.
10. Check and ensure good workmanship and construction methodology.
11. Have the skill to ensure that all necessary testing is carried out according to correct methodology.
12. Set out and level works on site.
13. Have the skill to identify snag list components.
14. Be knowledgeable of mathematical skills.



**RCI305: Reporting and Coordination**

This Unit is about reporting and coordination responsibilities related to the role of Road Construction Inspector.

**Performance Criteria**

The candidate must have the necessary knowledge and skills to:

1. Have good communication.
2. Issue violation notices and stop-work orders until the works are fully compliant and carries out follow-up inspections.
3. Keep daily logs summarizing construction activity including photographs taken during site inspections.
4. Compile written documentation of findings on site, instructions given and decisions taken, progress, delays, weather conditions, drawings and instructions received, deliveries, health and safety issues and other significant events.
5. Compute estimates for works completed and prepare and process documentation for payments.
6. Supervise commissioning and take over.
7. Report to the site engineer any problems, issues and discrepancies that may lead to contractual or technical problems and take actions to rectify such discrepancies.
8. Monitor and update the programme of works.
9. Ensure a good level of customer service at all times and maintain a good working relationship with all stakeholders.
10. Coordinate projects with other adjacent projects of third parties in respect of reviewing all layout plans and time frames.

**Required Knowledge**

The Level 3 Road Construction Inspector must know and explain:

1. The mathematical knowledge in the application of fractions, percentages, ratios, algebra, geometry and trigonometry.
2. The regulations, legislation and works methods.
3. Report writing.
4. How to measure, quantify and prepare bills of completed works.
5. How a programme of works operates.
6. How to handle customers and third parties.
7. How to use computer databases for reporting and record keeping.
8. How to improve operations, decrease turnaround times and streamline work processes.

**Required Skills**

The Level 3 Road Construction Inspector must be able to:

1. Have mathematical skills.
2. Understand and explain regulations, legislation and works methods.
3. Compile reports.
4. Measure and quantify works carried out
5. Monitor and update a programme of works.
6. Have good communication and persuasive skills.
7. Have an eye for detail.

8. Have good organizational skills.
9. Have good project management skills.
10. Work at a height.