



Model Curriculum

QP Name: Telecom Tower Site Maintenance Technician

QP Code: TEL/Q4100

Version: 5.0

NSQF Level: 4.0

Model Curriculum Version: 5.0

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Training Parameters

Sector	Telecom
Sub-Sector	Passive Infrastructure
Occupation	Operations and Maintenance - Passive Infrastructure
Country	India
NSQF Level	4.0
Aligned to NCO/ISCO/ISIC Code	NCO-2015/7422.3001
Minimum Educational Qualification and Experience	12th grade Pass OR Completed 2nd year of the 3-year diploma after 10th in Electronics and Communication Engineering/ Electrical Engineering/ Telecommunication Engineering OR 10th Grade Pass with 3-years of experience in the operations and maintenance of passive infrastructure OR Previous relevant Qualification of NSQF Level 3 with 3 Years of experience in the operations and maintenance of passive infrastructure OR Previous relevant Qualification of NSQF Level 3.5 with 1.5 Years of experience in the operations and maintenance of passive infrastructure
Pre-Requisite License or Training	NA
Minimum Job Entry Age	NA
Last Reviewed On	08-05-2025
Next Review Date	30-04-2028
NSQC Approval Date	08-05-2025
QP Version	5.0
Model Curriculum Creation Date	13-03-2025
Model Curriculum Valid Up to Date	30-04-2028
Model Curriculum Version	5.0
Minimum Duration of the Course	510 Hours

Maximum Duration of the Course	510 Hours
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Program Overview

This section summarises the end objectives of the program along with its duration.

Training Outcomes

At the end of the program, the learner should have acquired the listed knowledge and skills to:

- Explain how to maintain tower site and report periodically.
- Describe the process of managing site operation safely and hygienically.
- Discuss the importance of following sustainability practices in telecom infrastructure management.
- Discuss the Employability and Entrepreneurship Skills.

Compulsory Modules

The table lists the modules and their duration corresponding to the Compulsory NOS of the QP.

NOS and Module Details	Theory Duration (Hours)	Practical Duration (Hours)	On-the-Job Training Duration (Mandatory) (Hours)	On-the-Job Training Duration (Recommended) (Hours)	Total Duration (Hours)
TEL/N4138: Maintain tower site and report periodically NOS Version No.: 3.0 NSQF Level: 4.0	60:00	120:00	60:00	00:00	240:00
Module 1: Introduction to the sector and the job role of a Telecom Tower Site Maintenance Technician	05:00	00:00	00:00	00:00	05:00
Module 2: Maintaining Telecom Tower Site and Periodic Reporting	55:00	120:00	60:00	00:00	235:00
TEL/N4139: Manage site operation safely and hygienically NOS Version No.: 3.0 NSQF Level: 4.0	50:00	70:00	90:00	00:00	210:00
Module 3: Managing Telecom Site Operations Safely and Hygienically	50:00	70:00	90:00	00:00	210:00
TEL/N9109: Follow sustainable practices in telecom infrastructure management NOS Version No.: 1.0 NSQF Level: 4.0	10:00	20:00	00:00	00:00	30:00
Module 4: Sustainability Practices in Telecom Infrastructure Management	10:00	20:00	00:00	00:00	30:00

DGT/VSQ/N0101: Employability Skills (30 Hours) NOS Version No.: 1.0 NSQF Level: 2	30:00	00:00	00:00	00:00	30:00
Module 5: Employability Skills (30 Hours)	30:00	00:00	00:00	00:00	30:00
Total Duration	150:00	210:00	150:00	00:00	510:00

Module Details

Module 1: Introduction to the sector and the job role of a Telecom Tower Site Maintenance Technician

Mapped to TEL/N4138, v3.0

Terminal Outcomes:

- Explain the importance of Telecom Sector.
- Discuss the roles and responsibilities of a Telecom Tower Site Maintenance Technician.

Duration (in hours): 05:00	Duration (in hours): 00:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
• Explain the significance of the telecom sector in daily activities and business operations. • Elucidate the key skills and technical expertise required for a Telecom Tower Site Maintenance Technician to diagnose and fix hardware and software issues. • Discuss the challenges faced in telecom tower site maintenance activities. • Determine the impact of regular tower site maintenance on telecom operations and customer satisfaction. • Discuss the roles and responsibilities of a Telecom Tower Site Maintenance Technician in maintaining high service standards and ensuring seamless telecom operations.	
Classroom Aids	
Training Kit - Facilitator's Guide, Participant's Handbook, Presentations and Software, Whiteboard, Marker, Projector, Laptop, Video Films	
Tools, Equipment and Other Requirements	
Nil	

Module 2: Maintaining Telecom Tower Site and Periodic Reporting

Mapped to TEL/N4138, v3.0

Terminal Outcomes:

- Explain the importance of performing preventive maintenance at a telecom tower site.
- Elucidate the steps involved in the corrective maintenance of equipment at a telecom tower site.
- Discuss the significance of monitoring site power and energy efficiency in telecom operations.
- Describe the process of preparing and submitting reports for telecom tower site maintenance.

Duration (in hours): 55:00	Duration (in hours): 120:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
• Explain the components of telecom power systems, including solar, wind, and hybrid energy sources. • Elucidate the different battery technologies, such as lead-acid, lithium-ion, and solid-state batteries, along with their maintenance requirements. • Discuss the principles of predictive maintenance and fault analytics for early issue detection in power and cooling systems. • Describe the use of remote monitoring and management systems for energy tracking, alarm detection, and asset health monitoring. • Explain how fault diagnosis using data analytics can improve telecom site maintenance. • Discuss the importance of maintaining an inventory of spare parts for power and maintenance activities. • Explain the standard safety procedures for electrical and mechanical maintenance at telecom sites. • Discuss telecom site infrastructure, including shelters, tower structures, and power distribution. • Describe the documentation standards for telecom site maintenance, including digital reporting practices.	• Demonstrate how to inspect, clean, and maintain solar panels, wind turbines, and hybrid power systems. • Show how to test, service, and maintain battery banks, including lead-acid, lithium-ion, and solid-state batteries. • Demonstrate how to monitor, calibrate, and troubleshoot power interface units (PIU), SMPS, Diesel Generators (DG), and air conditioning systems. • Show how to perform load balancing and ensure efficient energy distribution at the site. • Demonstrate how to inspect and rectify faults in grounding systems to ensure electrical safety. • Show how to conduct preventive maintenance on telecom enclosures, cable connections, and environmental control units. • Demonstrate the use of remote monitoring tools to track site condition, analyze downtime, and predict failures using data analytics. • Show how to identify, troubleshoot, and repair site faults, including power failures, hardware malfunctions, and faulty power components like batteries, rectifiers, and fuses.

	• Demonstrate how to restore connectivity by addressing transmission failures and alarm-triggered events. • Show how to perform emergency repairs on alternative power sources to maintain site uptime. • Demonstrate how to track, analyze, and optimize energy consumption, including identifying inefficiencies in battery charging cycles and rectifying power losses. • Show how to ensure regulatory compliance in energy management and site operations. • Show how to document preventive and corrective maintenance tasks in telecom reporting systems and maintain records of site power logs, energy audits, and operational performance. • Demonstrate how to report issues such as fuel consumption, security breaches, or material theft to the supervisor. • Show how to use digital reporting tools to submit real-time site updates, alarm escalations, and maintenance logs.
Classroom Aids	
Training Kit - Facilitator's Guide, Participant's Handbook, Presentations and Software, Whiteboard, Marker, Projector, Laptop, Video Films	
Tools, Equipment and Other Requirements	
SMPS, Power Distribution Panel/Power Management Unit, Fire Extinguishers, Earth Pits, DG set, Battery Banks, Air Conditioning Unit	

Module 3: Managing Telecom Site Operations Safely and Hygienically

Mapped to TEL/N4139, v3.0

Terminal Outcomes:

- Describe the key practices involved in ensuring regular site upkeep.
- Explain the importance of maintaining safety and hygiene at a telecom site.
- Discuss the role of alarms and infrastructure sensors in telecom site monitoring.
- Elucidate the essential aspects of overseeing site administration effectively.

Duration (in hours): 50:00	Duration (in hours): 70:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
• Explain the applicable national and international safety regulations for telecom sites and infrastructure. • Describe fire safety measures, fuel storage guidelines, electrical hazard management, and site evacuation procedures. • Discuss best practices in telecom site hygiene and maintenance. • Elucidate the use of remote monitoring tools for tracking telecom site security, power alarms, and energy efficiency. • Determine the classification of alarms, troubleshooting methods, and escalation procedures for critical failures. • Describe the functionality of security systems, including access control and surveillance cameras. • Explain telecom hardware integration with energy-efficient solutions, such as hybrid power systems. • Discuss energy audit methodologies and strategies to improve energy efficiency in telecom sites. • Elucidate site administration processes, including vendor coordination and compliance checks.	• Demonstrate how to conduct routine checks on power equipment, including solar panels, battery banks, DG sets, PIU, and SMPS, ensuring proper maintenance and hygiene. • Show how to ensure the proper functioning of civil, mechanical, and electrical infrastructure at the site, including fire safety equipment and grounding systems. • Demonstrate how to identify and clear unwanted materials to maintain a clutter-free and hygienic site, including proper waste segregation. • Show how to maintain accurate logs of equipment maintenance, power usage, fuel supply, and vendor activities for compliance and auditing. • Demonstrate how to implement and verify adherence to national and international safety standards for telecom sites (e.g., IEC, OSHA, BIS). • Show how to track site alarms, sensor data, and security alerts using remote monitoring systems, ensuring timely response to unauthorized access incidents. • Demonstrate how to ensure the proper functioning of surveillance cameras, access control systems, and alarms for preventive maintenance. • Show how to verify electricity bill readings, monitor vendor activities for contract adherence, and ensure accurate documentation of site operations.

	Demonstrate how to maintain records of safety inspections, repairs, regulatory compliance, and Service Level Agreements (SLAs).
Classroom Aids	
Training Kit - Facilitator's Guide, Participant's Handbook, Presentations and Software, Whiteboard, Marker, Projector, Laptop, Video Films	
Tools, Equipment and Other Requirements	
SMPS, Power Distribution Panel/Power Management Unit, Fire Extinguishers, Earth Pits, DG set, Battery Banks, Air Conditioning Unit	

Module 4: Sustainability Practices in Telecom Infrastructure Management

Mapped to TEL/N9109, v1.0

Terminal Outcomes:

- Discuss the significance of managing hazardous waste, adopting green energy, reducing waste, and ensuring compliance with environmental regulations in telecom infrastructure management.

Duration (in hours): 10:00	Duration (in hours): 20:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
• Explain the e-waste management rules (2022) applicable to the telecom sector. • Describe the Central Pollution Control Board (CPCB) hazardous waste disposal regulations. • Elucidate the safety standards for battery handling and disposal, including lead-acid and lithium-ion batteries. • Discuss the importance of structured cabling and cable reuse in minimizing telecom waste. • Explain the techniques for energy optimization in telecom infrastructure, such as smart cooling, LED lighting, and hybrid power systems. • Describe the role of solar energy and other renewable sources in reducing the telecom sector's carbon footprint. • Discuss green telecom practices, including fuel efficiency in DG sets and power-saving measures. • Elucidate best practices in telecom tower site waste management. • Explain the principles of water conservation and sustainable telecom site design. • Describe the importance of training telecom employees on environmental awareness and compliance.	• Demonstrate how to identify, segregate, and categorize e-waste and hazardous waste at telecom sites. • Show how to dispose of or recycle waste following the applicable e-waste management guidelines. • Demonstrate safe handling procedures for hazardous materials, including the use of protective gear. • Show how to maintain logs and records of disposed, recycled, or repurposed telecom waste. • Demonstrate how to optimize power usage through energy-efficient telecom equipment such as LED lighting and smart cooling systems. • Show how to assist in adopting solar-powered telecom towers and integrating hybrid energy systems. • Demonstrate methods to monitor and minimize fuel consumption in Diesel Generator (DG) sets through load balancing and regular maintenance. • Show how to reduce packaging waste by promoting the reuse of telecom materials and accessories. • Demonstrate the implementation of rainwater harvesting and wastewater reuse practices in telecom cooling systems.

	• Show how to promote structured cabling to reduce cable waste and optimize resource utilization. • Demonstrate compliance with Central Pollution Control Board (CPCB) guidelines for telecom site waste disposal. • Show how to assist in conducting periodic environmental audits to ensure sustainability compliance. • Demonstrate effective methods to guide co-workers on eco-friendly practices and waste management policies at telecom sites.
Classroom Aids	
Training Kit - Facilitator's Guide, Participant's Handbook, Presentations and Software, Whiteboard, Marker, Projector, Laptop, Video Films	
Tools, Equipment and Other Requirements	
SMPS, Power Distribution Panel/Power Management Unit, Fire Extinguishers, Earth Pits, DG set, Battery Banks, Air Conditioning Unit	

Module 5: Employability Skills (30 Hours)

Mapped to DGT/VSQ/N0101, v1.0

Duration: 30:00 Hours

Key Learning Outcomes

Introduction to Employability Skills Duration: 1 Hour

After completing this programme, participants will be able to:

1. Discuss the importance of Employability Skills in meeting the job requirements

Constitutional values - Citizenship Duration: 1 Hour

2. Explain constitutional values, civic rights, duties, citizenship, responsibility towards society etc. that are required to be followed to become a responsible citizen.
3. Show how to practice different environmentally sustainable practices

Becoming a Professional in the 21st Century Duration: 1 Hour

4. Discuss 21st-century skills.
5. Display a positive attitude, self-motivation, problem-solving, time management skills and continuous learning mindset in different situations.

Basic English Skills Duration: 2 Hours

6. Use appropriate basic English sentences/phrases while speaking

Communication Skills Duration: 4 Hours

7. Demonstrate how to communicate in a well-mannered way with others.
8. Demonstrate working with others in a team

Diversity & Inclusion Duration: 1 Hour

9. Show how to conduct oneself appropriately with all genders and PwD
10. Discuss the significance of reporting sexual harassment issues in time

Financial and Legal Literacy Duration: 4 Hours

11. Discuss the significance of using financial products and services safely and securely.
12. Explain the importance of managing expenses, income, and savings.
13. Explain the significance of approaching the concerned authorities in time for any exploitation as per legal rights and laws

Essential Digital Skills Duration: 3 Hours

14. Show how to operate digital devices and use the associated applications and features, safely and securely
15. Discuss the significance of using the internet for browsing, and accessing social media platforms, safely and securely

Entrepreneurship Duration: 7 Hours

16. Discuss the need for identifying opportunities for potential business, sources for arranging money and potential legal and financial challenges

Customer Service Duration: 4 Hours

17. Differentiate between types of customers

18. Explain the significance of identifying customer needs and addressing them

19. Discuss the significance of maintaining hygiene and dressing appropriately

Getting ready for Apprenticeship & Jobs Duration: 2 Hours

20. Create a biodata

21. Use various sources to search and apply for jobs

22. Discuss the significance of dressing up neatly and maintaining hygiene for an interview

23. Discuss how to search and register for apprenticeship opportunities

Module 6: On-the-Job Training

Mapped to Telecom Tower Site Maintenance Technician

Mandatory Duration: 150:00	Recommended Duration: 00:00
Location: On-Site	
Terminal Outcomes • Demonstrate how to perform preventive maintenance at a telecom tower site. • Show how to carry out corrective maintenance of equipment at a telecom tower site. • Demonstrate how to monitor site power and energy efficiency in telecom operations. • Show how to prepare and submit reports for telecom tower site maintenance. • Demonstrate key practices for ensuring regular tower site upkeep. • Show how to maintain safety and hygiene at a telecom site. • Demonstrate how to use alarms and infrastructure sensors for telecom site monitoring. • Show how to oversee site administration effectively. • Demonstrate how to manage hazardous waste, adopt green energy, reduce waste, and ensure compliance with environmental regulations in telecom infrastructure management.	

Annexure

Trainer Requirements

Trainer Prerequisites						
Minimum Educational Qualification	Specialisation	Relevant Industry Experience		Training Experience		Remarks
		Years	Specialization	Years	Specialization	
Graduate	Electronics and Communication /Telecom/ Information Technology/ Computer Science and other relevant fields	6	Tower Maintenance			

Trainer Certification	
Domain Certification	Platform Certification
Certified for Job Role: “Telecom Tower Site Maintenance Technician” mapped to QP: “TEL/Q4100, v5.0”. Minimum accepted score is 80%.	Recommended that the Trainer is certified for the Job Role: “Trainer (VET and Skills)”, mapped to the Qualification Pack: “MEP/Q2601, v3.0”. The minimum accepted score as per MEPSC guidelines is 80%.

Assessor Requirements

Assessor Prerequisites						
Minimum Educational Qualification	Specialization	Relevant Industry Experience		Training/Assessment Experience		Remarks
		Years	Specialization	Years	Specialization	
Graduate	Electronics and Communication /Telecom/ Information Technology/ Computer Science and other relevant fields	6	Tower Maintenance			

Assessor Certification	
Domain Certification	Platform Certification
Certified for Job Role: “Telecom Tower Site Maintenance Technician” mapped to QP: “TEL/Q4100, v5.0”. Minimum accepted score is 80%.	Certified for the Job Role: “Assessor (VET and Skills)”, mapped to the Qualification Pack: “MEP/Q2701, v3.0”, with a minimum score of 80%.

Assessment Strategy

1. Assessment System Overview:

- Batches assigned to the assessment agencies for conducting the assessment on SDSM/SIP or email
- Assessment agencies send the assessment confirmation to VTP/TC looping SSC
- Assessment agency deploys the ToA certified Assessor for executing the assessment
- SSC monitors the assessment process & records

2. Testing Environment:

- Confirm that the centre is available at the same address as mentioned on SDMS or SIP
- Check the duration of the training.
- Check the Assessment Start and End time to be as 10 a.m. and 5 p.m.
- If the batch size is more than 30, then there should be 2 Assessors.
- Check that the allotted time to the candidates to complete Theory & Practical Assessment is correct.
- Check the mode of assessment—Online (TAB/Computer) or Offline (OMR/PP).
- Confirm the number of TABs on the ground are correct to execute the Assessment smoothly.
- Check the availability of the Lab Equipment for the particular Job Role.

3. Assessment Quality Assurance levels / Framework:

- Question papers created by the Subject Matter Experts (SME)
- Question papers created by the SME verified by the other subject Matter Experts
- Questions are mapped with NOS and PC
- Question papers are prepared considering that levels 1 to 3 are for the unskilled & semi-skilled individuals, and level 4 and above are for the skilled, supervisor & higher management
- Assessor must be ToA certified & trainer must be ToT Certified
- Assessment agency must follow the assessment guidelines to conduct the assessment

4. Types of evidence or evidence-gathering protocol:

- Time-stamped & geotagged reporting of the assessor from assessment location
- Center photographs with signboards and scheme specific branding
- Biometric or manual attendance sheet (stamped by TP) of the trainees during the training period
- Time-stamped & geotagged assessment (Theory + Viva + Practical) photographs & videos

5. Method of verification or validation:

- Surprise visit to the assessment location
- Random audit of the batch
- Random audit of any candidate

6. Method for assessment documentation, archiving, and access

- Hard copies of the documents are stored

- Soft copies of the documents & photographs of the assessment are uploaded / accessed from Cloud Storage
- Soft copies of the documents & photographs of the assessment are stored in the Hard Drives

The trainee will be tested for the acquired skill, knowledge and attitude through formative/summative assessment at the end of the course and as this NOS and MC is adopted across sectors and qualifications, the respective AB can conduct the assessments as per their requirements.

References

Glossary

Term	Description
Declarative Knowledge	Declarative knowledge refers to facts, concepts and principles that need to be known and/or understood in order to accomplish a task or to solve a problem.
Key Learning Outcome	Key learning outcome is the statement of what a learner needs to know, understand and be able to do in order to achieve the terminal outcomes. A set of key learning outcomes will make up the training outcomes. Training outcome is specified in terms of knowledge, understanding (theory) and skills (practical application).
OJT (M)	On-the-job training (Mandatory); trainees are mandated to complete specified hours of training on site
OJT (R)	On-the-job training (Recommended); trainees are recommended the specified hours of training on site
Procedural Knowledge	Procedural knowledge addresses how to do something, or how to perform a task. It is the ability to work, or produce a tangible work output by applying cognitive, affective, or psychomotor skills.
Training Outcome	Training outcome is a statement of what a learner will know, understand and be able to do it upon the completion of the training.
Terminal Outcome	Terminal outcome is a statement of what a learner will know, understand and be able to do upon the completion of a module. A set of terminal outcomes help to achieve the training outcome.

Acronyms and Abbreviations

Term	Description
NCVET	National Council for Vocational Education and Training
QP	Qualification Pack
MC	Model Curriculum
NSQF	National Skills Qualification Framework
NSQC	National Skills Qualification Committee
NOS	National Occupational Standards
NCO	National Classification of Occupations
ES	Employability Skills
TSSC	Telecom Sector Skill Council
TRAI	Telecom Regulatory Authority of India
PIU	Power Interface Units
DG	Diesel Generators
SMPs	Switched-Mode Power Supply
SLAs	Service Level Agreements
CPCB	Central Pollution Control Board