



Model Curriculum

QP Name: Tower Technician

QP Code: TEL/Q4100

QP Version: 2.0

NSQF Level: 4

Model Curriculum Version: 1.0

Telecom Sector Skill Council
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Training Parameters

Sector	Telecom
Sub-Sector	Passive Infrastructure
Occupation	Operation and Maintenance – Passive Infrastructure
Country	India
NSQF Level	4
Aligned to NCO/ISCO/ISIC Code	NCO-2015/7422.3001
Minimum Educational Qualification and Experience	Class 12 th OR Class 10 th + ITI OR Diploma (Science/Electronics/Telecom/IT and other relevant fields)
Minimum Level of Education for Training in School	10 th Class
Pre-Requisite License or Training	NA
Minimum Job Entry Age	17 Years
Last Reviewed On	30/12/2021
Next Review Date	30/12/2024
NSQC Approval Date	30/12/2021
QP Version	2.0
Model Curriculum Creation Date	30/09/2021
Model Curriculum Valid Up to Date	30/12/2024
Model Curriculum Version	1.0
Minimum Duration of the Course	480 Hours, 0 Minutes
Maximum Duration of the Course	480 Hours, 0 Minutes

Program Overview

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

Training Outcomes

At the end of the program, the learner will be able to:

- Perform preventive and corrective maintenance at the tower
- Manage site operation and site administration
- Optimize resources, work efficiently and adhere to safety standards
- Interact effectively with others while being sensitive of gender and persons with disabilities

Compulsory Modules

The table lists the modules, their duration and mode of delivery.

NOS and Module Details	Theory Duration	Practical Duration	On-the-Job Training Duration (Mandatory)	On-the-Job Training Duration (Recommended)	Total Duration
Bridge Module(s)	04:00	00:00	00:00	00:00	04:00
Module 1: Role and Responsibilities of a Tower Technician	04:00	00:00	00:00	00:00	04:00
TEL/N4138– Maintain the Tower Site and Report Periodically NOS Version No. 1.0 NSQF Level 4	60:00	82:00	60:00	00:00	202:00
Module 2: Preventive and Corrective Maintenance at the Tower	60:00	82:00	60:00	00:00	202:00
TEL/N4139– Manage Site Operation Safely and Hygienically NOS Version No. 1.0 NSQF Level 4	54:00	80:00	60:00	00:00	194:00
Module 3: Manage Safe and Hygiene Site Operation	54:00	80:00	60:00	00:00	194:00
TEL/N9101- Organize Work and Resources as Per Health and Safety Standard NOS Version No. 1.0 NSQF Level 4	16:00	24:00	00:00	00:00	40:00
Module 4: Plan Work Effectively, Optimise Resources and Implement Safety Practices	16:00	24:00	00:00	00:00	40:00
TEL/N9102 – Interact effectively with Team Members and Customers NOS Version No. 1.0	16:00	24:00	00:00	00:00	40:00



Module 5: Communication and Interpersonal Skills	16:00	24:00	00:00	00:00	40:00
Total Duration	150:00	210:00	120:00	00:00	480:00

Module Details

Module 1: Role and Responsibilities of a Tower Technician

Bridge Module

Terminal Outcomes:

- Describe the role and responsibilities of a Tower Technician
- Explain the scope of work for a Tower technician

Duration: 04:00	Duration: 00:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Discuss the size and scope of the Telecom industry and Passive infrastructure sub-sector • Outline the course objectives and outcomes • Identify the roles and responsibilities of a Tower Technician • Discuss the career progression of a Tower Technician in the Telecom industry • Explain the basics of telecom and the terminologies used in the work process 	
Classroom Aids	
Whiteboard, Markers, Duster, Projector, Laptop, Presentation	
Tools, Equipment and Other Requirements	
NA	

Module 2: Preventive and Corrective Maintenance at the Tower

Mapped to TEL/N4138 v 1.0

Terminal Outcomes:

- Perform preventive and corrective maintenance activities
- Complete the documentation process Outcome 3

Duration: 60:00	Duration: 82:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Discuss the functions of various electrical/electronic components and tools/equipment used at the tower site • Discuss the importance and implications of maintenance activities at the tower site • Describe fault analysis procedures and safety measures for different tools and mechanical equipment • Distinguish between preventive and corrective maintenance • Explain the processes of preventive maintenance and corrective maintenance • Interpret the standard operating procedures while performing preventive and corrective maintenance and the escalation matrix • Discuss commonly occurring hazards while handling the battery bank, AC (access concentrator), DG (diesel generator), PIU (power interface unit), SMPS (switched mode power supply), shelter, etc. at the tower site; along with related/appropriate precautions to avoid them • List the do's and don'ts while installing a DG (Diesel Generator) and avoid common mistakes that occur during the process 	<ul style="list-style-type: none"> • Identify different tools and equipment required for preventive and corrective maintenance activities at the tower • Perform discharge tests and equalization charging to remove the faulty cell from the battery bank • Demonstrate Boost charging of the cell • Inspect the Battery Bank, Diesel Generator, Air Conditioner, PIU (Power Interface Unit), and SMPS (Switched Mode Power Supply) to analyse for premature ageing and faults • Perform the preventive and corrective maintenance of a DG, AC, PIU, SMPS, Tower and shelter • Analyse the site uptime and compare with the site downtime • Demonstrate the analyses and repair of recurring faults at the site • Identify and fill requisite checklists for corrective and preventive maintenance • Draft a report to escalate any faults or issues to the supervisor/authority
Classroom Aids	
Training kit (Trainer guide, Presentations), Whiteboard, Markers, Duster, Computer, Projector, Participant Handbook	
Tools, Equipment and Other Requirements	
PIU, PMU, Battery Bank, AC Unit, SMPS, DG set, Tester, Multi-meter, Electrical tools, Megger, Service Level Agreement, Related SOPs, etc.	

Module 3: Manage Safe and Hygiene Site Operation

Mapped to TEL/N4139 v 1.0

Terminal Outcomes:

- Manage Site Operation and site administration
- Maintain safety and hygiene at the site

Duration: 54:00	Duration: 80:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Distinguish between various features and functions of different power equipment. Understand three phase electric power supply and methods to measure it • Outline the fundamentals of electric wiring • Understand the functioning of NOC (Network Operational Centre) and TOC (Telecom Operations Control) • Describe various methods for monitoring civil and mechanical installation at the tower site • Identify and describe the components and various aspects of distribution panel • Discuss various types of alarms and the procedures to examine them • Explain the functionalities and working of the sensors deployed on the site • Adhere to the standards and follow the check list while performing inspection of the site/regular site visit • Identify and interpret various floor markings, shadow board display and labels • State the importance of certifying the service vendors for quality work in time 	<ul style="list-style-type: none"> • Demonstrate using and maintaining various power equipment • Perform electric wiring • Demonstrate an inspection of all the civil and mechanical installations at the site • Show multiple techniques to identify the faulty alarms and take corrective measures • Perform the maintenance of AC (Access Concentrator), DG (Distributed generation), PIU (Power interface unit), SMPS (Switch Mode Power Supply) and battery bank • Demonstrate, as to how reading of the electricity bill can be captured and perform measuring and recording the fuel consumption • Perform various site management activities • Record all test readings and document the results/findings in proper formats
Classroom Aids	
Training kit (Trainer guide, Presentations), Whiteboard, Markers, Duster, Computer, Projector, Participant Handbook	
Tools, Equipment and Other Requirements	
PIU, PMU, SPSM Battery Bank, AC Unit, Tester, multi meter and electrical tools, Megger	

Module 4: Plan Work Effectively, Optimise Resources and Implement Safety Practices

Mapped to TEL/N9101 v 1.0

Terminal Outcomes:

- Explain how to plan work effectively, implement safety practices and optimise use of resources.

Duration: 16:00	Duration: 24:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • List the recent skills and technologies prevalent in the telecom industry. • Discuss the commonly occurring problems with their causes and solutions. • State the importance of keeping the workplace clean, safe and tidy. • List different types of hazards and the procedure to report it to the supervisor. • List the precautionary steps one needs to follow while handling hazardous materials. • State the importance of participating in fire drills and other safety workshops. • Discuss the significance of conforming to basic hygiene practices such as washing hands, using alcohol-based hand sanitizers. • List the different methods of cleaning, disinfection, sanitization, etc. • Discuss the importance of self-quarantine or self-isolation. • Explain the path of disease transmission. • Discuss organizational hygiene and sanitation guidelines and ways of reporting breaches/gaps, if any. • Explain the ways to optimize usage of resources. • Discuss various methods of waste management and disposal. • List the different categories of waste for the purpose of segregation. • Differentiate between recyclable and non-recyclable waste. • State the importance of using appropriate color dustbins for different types of waste. • Discuss the common sources of pollution and ways to minimize it. 	<ul style="list-style-type: none"> • Prepare a time schedule to complete the tasks on the given time. • Demonstrate the use of safety equipment such as goggles, gloves, ear plugs, shoes, etc. • Demonstrate the correct postures while working and handling hazardous materials at the workplace. • Demonstrate how to evacuate the workplace in case of an emergency. • Show how to sanitize and disinfect one's work area regularly. • Demonstrate the correct way of washing hands using soap and water. • Demonstrate the correct way of sanitizing hands using alcohol-based hand rubs. • Display the correct way of wearing and removing PPE such as face masks, hand gloves, face shields, PPE suits, etc. • Demonstrate warning labels, symbols and other related signages. • Perform basic checks to identify any spills and leaks and that need to be plugged /Stopped. • Demonstrate different disposal techniques depending upon different types of waste. • Employ different ways to clean and check if equipment/machines are functioning as per requirements and report malfunctioning, if observed. • Demonstrate ways for efficient utilization of material and water.
Classroom Aids	
White board/ black board marker / chalk, Duster, Computer or Laptop attached to LCD projector	
Tools, Equipment and Other Requirements	

Personal Protection Equipment: Safety glasses, Head protection, Rubber gloves, Safety footwear, Warning signs and tapes, Fire extinguisher and First aid kit

Module 5: Communication and Interpersonal Skills

Mapped to TEL/N9102 v 1.0

Terminal Outcomes:

- Discuss how to communicate effectively and develop interpersonal skills
- Explain the importance of developing sensitivity towards differently abled people

Duration: 16:00	Duration: 24:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Discuss the importance of following the standard operating procedures of the company w.r.t. priority, confidentiality and security • Outline the organizational structure to receive work instruction and report issues to the supervisor • Discuss the importance of having timely discussions with all genders to avoid repeated errors • State the importance of co-ordinating and resolving conflicts with the team members to achieve smooth workflow • Discuss about the different types of disabilities with their respective issues • State the work ethics, workplace etiquettes as well as standards and guidelines for all genders and PwD • List health and safety requirements for persons with disability • Describe the rights, duties and benefits available at workplace for person with disability • Explain the process of recruiting people with disability for a specific job • Discuss the specific ways to help people with disability to overcome the challenges 	<ul style="list-style-type: none"> • Use different modes of communication as per requirement and need • Prepare a sample report of the commonly occurring errors and their solutions • Use inclusive language irrespective of the gender/ disability of the person • Demonstrate appropriate behaviour towards all genders and differently abled people • Prepare a list of institutes and government schemes that help PwD in overcoming challenges • Demonstrate the ideal behaviour with a PwD in an organization
Classroom Aids	
Whiteboard and Markers, Chart paper and sketch pens, LCD Projector and Laptop for presentations	
Tools, Equipment and Other Requirements Sample of escalation matrix, organisation structure	

Module 6: On-the-Job Training Mapped to Tower Technician

Mandatory Duration: 120:00	Recommended Duration: 00:00
Location: On-Site	
Terminal Outcomes	
<ol style="list-style-type: none"> 1. Use the tools and equipment required for preventive and corrective maintenance activities at the tower. 2. Conduct discharge tests and equalization checks for faulty cell in the battery bank. 3. Perform the steps to boost charge the cell. 4. Inspect the Battery Bank, Diesel Generator, Air Conditioner, PIU (Power Interface Unit), and SMPS (Switched Mode Power Supply) to find faults, if any and rectify these. 5. Demonstrate how to conduct preventive and corrective maintenance of a DG, AC, PIU, SMPS, Tower and shelter. 6. Verify the site uptime and ensure that it is minimal. 7. Ensure that the site downtime is planned and minimal. 8. List the recurring faults at the site and find ways to minimize these. 9. Escalate any faults or issues to the supervisor/authority if needed. 10. Use various power equipment for maintenance activities and ensure they are cleaned and stored properly. 11. Perform inspection of all the civil and mechanical installations at the site. 12. Check and find faulty alarms and take corrective measures to rectify these. 13. Demonstrate how to read the electricity bill can be captured and fuel consumption measured and recorded. 14. Ensure that all test readings and parameters are properly recorded. 	

Annexure

Trainer Requirements

Trainer Prerequisites						
Minimum Educational Qualification	Specialization	Relevant Industry Experience		Training Experience		Remarks
		Years	Specialization	Years	Specialization	
Graduate	Science/Electronics/ Telecom/IT and other relevant field	1	Tower Maintenance	0	NA	Eligible for ToT Program

Trainer Certification	
Domain Certification	Platform Certification
Job Role: “Tower Technician NSQF Level 4” “TEL/Q4100 v2.0”, Minimum accepted score is 80%	Job Role: “Trainer”, “MEP/Q2601” v1.0, Minimum accepted score is 80%

Assessor Requirements

Assessor Pre-requisites						
Minimum Educational Qualification	Specialization	Relevant Industry Experience		Training Experience		Remarks
		Years	Specialization	Years	Specialization	
Graduate	Science/Electronics/ Telecom/IT and other relevant field	1	Tower Maintenance	0	NA	Eligible for ToA Program

Assessor Certification	
Domain Certification	Platform Certification
Job Role: "Tower Technician NSQF Level 4" "TEL/Q4100 v2.0", Minimum accepted score is 80%	Job Role: "Assessor", "MEP/Q2701" v1.0, Minimum accepted score is 80%

Assessment Strategy

This section includes the processes involved in identifying, gathering and interpreting information to evaluate the learner on the required competencies of the program.

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 level 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

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 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
QP	Qualification Pack
NSQF	National Skills Qualification Framework
NSQC	National Skills Qualification Committee
NOS	National Occupational Standards
AC	Air Conditioner
DG	Diesel Generator
PIU	Power Interface Unit
SMPS	Switch Mode Power Supply
BB	Battery Bank
IPMS	Integrated Power Management System
OPCO	Operating Company
PM	Preventive Maintenance
OPEX	Operating Expenditure
PPE	Personal Protective Equipment
RCA	Root Cause Analysis
PwD	Persons with Disabilities
CRM	Customer Relationship Management
EB	Electricity Board
RFS	Radio Frequency Services
NOC	Network Operating Centre
SRN	Service Request Number