

QUALIFICATIONS PACK - OCCUPATIONAL STANDARDS FOR TELECOM INDUSTRY

What are Occupational Standards(OS)?

- OS describe what individuals need to do, know and understand in order to carry out a particular job role or function
- OS are performance standards that individuals must achieve when carrying out functions in the workplace, together with specifications of the underpinning knowledge and understanding

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Introduction

Qualifications Pack- Optical Fibre Splicer

SECTOR: TELECOM

SUB-SECTOR: Network Managed Services

OCCUPATION: Network Operations & Maintenance – Optical

REFERENCE ID: TEL/Q6400

ALIGNED TO: NCO-2015/7422.0802

Brief Job Description: Optical fibre splicer is responsible for ensuring efficient splicing of the optical fibre cables and supports in optical fibre installation and in carrying out fibre testing using OTDR and power meter.

Personal Attributes: This job requires the individual to work in field set-up and be able to handle pressure situations. He should have basic written and oral communication skills and should be able to apply practical judgement to successfully perform the assigned responsibilities.

Qualifications Pack For Optical Fibre Splicer

Job Details	Qualifications Pack Code	TEL/Q6400		
	Job Role	Optical Fibre Splicer		
	Credits NSQF	TBD	Version number	1.0
	Sector	Telecom	Drafted on	17/06/13
	Sub-sector	Network Managed Services	Last reviewed on	26/05/17
	Occupation	Network Operations & Maintenance – Optical	Next review date	26/12/20
	NSQC Clearance on	18/06/2015		

Job Role	Optical Fiber Splicer
Role Description	Optical fibre splicer is responsible for ensuring efficient splicing of the optical fibre cables and supports in optical fibre installation and in carrying out fibre testing using OTDR and power meter.
NSQF level	3
Minimum Educational Qualifications*	Class VIII
Maximum Educational Qualifications*	ITI/ Diploma/ Bachelor in Technology (any field)
Training (Suggested but not mandatory)	<ol style="list-style-type: none"> 1. Training on Soft Skills (mandatory for Class VIII to XII) 2. Technical training on standard splicing process for both underground and overhead cables, Interpreting the color coding to avoid cross fiber (mandatory for all) 3. Training on fibre testing using OTDR meter and power testing(mandatory for all)
Minimum Job Entry Age	14 Years
Experience	NA
Applicable National Occupational Standards (NOS)	<p>(Click to open the below hyperlinks)</p> <p>Compulsory:</p> <ol style="list-style-type: none"> 1. TEL/N6400 (Undertake splicing of optical fiber) 2. TEL/N6401 (Installation & Commissioning of Optical fiber cables (OFC)) <p>Optional: N.A.</p>
Performance Criteria	As described in the relevant OS units

Qualifications Pack For Optical Fibre Splicer
Definitions

Keywords /Terms	Description
Sector	Sector is a conglomeration of different business operations having similar businesses and interests. It may also be defined as a distinct subset of the economy whose components share similar characteristics and interests.
Sub-sector	Sub-sector is derived from a further breakdown based on the characteristics and interests of its components.
Occupation	Occupation is a set of job roles, which perform similar/related set of functions in an industry.
Function	Function is an activity necessary for achieving the key purpose of the sector, occupation, or area of work, which can be carried out by a person or a group of persons. Functions are identified through functional analysis and form the basis of OS.
Job Role	Job role defines a unique set of functions that together form a unique employment opportunity in an organization.
OS	OS specify the standards of performance an individual must achieve when carrying out a function in the workplace, together with the knowledge and understanding they need to meet that standard consistently. Occupational Standards are applicable both in the Indian and global contexts.
Performance Criteria	Performance Criteria are statements that together specify the standard of performance required when carrying out a task.
NOS	NOS are Occupational Standards which apply uniquely in the Indian context.
Qualifications Pack Code	Qualifications Pack Code is a unique reference code that identifies a qualifications pack.
Qualifications Pack	Qualifications Pack comprises the set of OS, together with the educational, training and other criteria required to perform a job role. A Qualifications Pack is assigned a unique qualification pack code.
Unit Code	Unit Code is a unique identifier for an Occupational Standard, which is denoted by an 'N'.
Unit Title	Unit Title gives a clear overall statement about what the incumbent should be able to do.
Description	Description gives a short summary of the unit content. This would be helpful to anyone searching on a database to verify that this is the appropriate OS they are looking for.
Knowledge and Understanding	Knowledge and Understanding are statements which together specify the technical, generic, professional and organizational specific knowledge that an individual needs in order to perform to the required standard.
Organizational Context	Organizational Context includes the way the organization is structured and how it operates, including the extent of operative knowledge managers have of their relevant areas of responsibility.
Technical Knowledge	Technical Knowledge is the specific knowledge needed to accomplish specific designated responsibilities.
Core Skills or Generic Skills	Core Skills or Generic Skills are a group of skills that are key to learning and working in today's world. These skills are typically needed in any work environment. In the context of the OS, these include communication related skills that are applicable to most job roles.

Qualifications Pack For Optical Fibre Splicer

Acronyms

Keywords /Terms	Description
IP	Internet Protocol
MUX	Multiplexer
OHS	Organizational Health & Safety
OTDR	Optical Time Domain Reflectometer
RCC Pipes	Reinforced Cement Concrete
SHE	Safety, Health & Environment
TDM	Time Division Multiplexing



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National Occupational Standard



Overview

This unit is about carrying out efficient optical splicing and test its effectiveness

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Undertake splicing of optical fiber

National Occupational Standard	Unit Code	TEL/N6400
	Unit Title (Task)	Undertake splicing of optical fiber
	Description	The role involves carrying out efficient optical splicing and testing its effectiveness through OTDR and power meter tests
	Scope	<p>This unit/task covers the following:</p> <ul style="list-style-type: none"> • Preparing cable for splicing • Carrying out splicing operations • Testing effectiveness of the splice through OTDR and power meter tests • Closing the activity and documenting the test results
	Performance Criteria (PC) w.r.t. the Scope	
	Element	Criteria
	Prepare cable for splicing operations	<p>To be competent, the user/individual on the job must be able to:</p> <p>PC1. verify that cable is installed as per the installation plan and visually inspect cable for signs of sheath damage</p> <p>PC2. ensure minimum bend ratios are maintained according to manufacturer's specifications to prevent cable damage and signal degradation</p> <p>PC3. ensure cable is placed on stable jointing pit</p> <p>PC4. secure cable according to safe industry practice to avoid cable and sheath damage</p> <p>PC5. identify the appropriate fibers to be joined based on color coding, and sequence</p> <p>PC6. identify appropriate place for the joint chamber location</p>
	Ensure availability of tools and spares	<p>To be competent, the user/individual on the job must be able to:</p> <p>PC1. ensure availability of test equipments like OTDR and Power meter for carrying out optical tests</p> <p>PC2. ensure availability of optical equipments like spool, joint closure, connectors, splicer and cleaver</p> <p>PC3. ensure that faulty equipments are sent to logistics team for repair and replacement</p> <p>PC4. ensure availability of OF joint kits, Pigtails, patchcords, FDF, 0dB connector, protection sleeves, heat shrinks</p> <p>PC5. ensure continuous power supply at site for the splicing operation by use of portable generators or standby heavy duty batteries</p> <p>PC6. ensure availability of RCC joint chambers with covers as per specifications</p> <p>PC7. ensure availability of sand for filling the chambers</p> <p>PC8. ensure availability of one spare cable drum for emergency replacement of laid cables</p>

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Undertake splicing of optical fiber

<p>Perform splicing operations</p>	<p>To be competent, the user/individual on the job must be able to:</p> <p>PC1. ensure clean environment for splicing operations</p> <p>PC2. ensure cables are stripped off their protective coating, at areas where splicing has to be performed as per the standard process</p> <p>PC3. ensure the fiber ends are cleaved with a precision cleaver and are inspected with magnifier to ensure appropriateness</p> <p>PC4. in case of fusion splicing - Insert fibers strand to the fusion machine in accordance to product/equipment specifications</p> <p>PC5. in case of mechanical splice, align the fibers together by a precision made sleeve and place the prepared fiber in mechanical splicing kit</p> <p>PC6. verify the spliced fiber for appropriate splicing in the magnifier window</p> <p>PC7. ensure appropriate splice protectors like heat shrink splice protectors are utilized to protect the splice</p>
<p>Test effectiveness and Perform Joint closure</p>	<p>To be competent, the user/individual on the job must be able to:</p> <p>PC1. test the fiber joint with OTDR to confirm conformance to design requirements</p> <p>PC2. ensure optical losses - reflectance, return and insertion are within the defined specifications/ limits</p> <p>PC3. ensure sealing of Joint closure through heat shrinking/ multi diameter seals/ mechanical seals as appropriate</p> <p>PC4. ensure FRP - Fiber reinforced plastic is used to strengthen the joint as required</p> <p>PC5. test the fiber at both ends for instances of cross fiber using power source and power meter tests and ensure their elimination</p> <p>PC6. ensure joint is placed in the chamber properly</p> <p>PC7. ensure spare cable (loop) is coiled appropriately and placed inside the joint</p> <p>PC8. ensure that sand is filled in the chamber to the brim and the chamber covers are placed properly</p> <p>PC9. ensure that Joint indicator is planted 1 meter behind the chamber location (away from road)</p> <p>PC10. ensure that the indicator is painted proper colour (for example yellow for joint)</p>
<p>Health and Safety</p>	<p>To be competent, the user/individual on the job must be able to:</p> <p>PC1. ensure appropriate disposal of the cut fibers, sleeves and cable pieces</p> <p>PC2. ensure compliance with site risk control, OHS, environmental and quality requirements as per company's norms</p> <p>PC3. ensure that work is carried out in accordance to the level of competence and legal requirements</p> <p>PC4. ensure that sites are assessed for health and safety risk as per company's guidelines prior to commencement of work</p> <p>PC5. ensure compliance to health and safety guidelines by optical splicer and installation labor workers</p> <p>PC6. ensure that Personal protection equipments like helmets, knee pads, safety boots, safety glasses and trench guards are appropriately used as required</p> <p>PC7. ensure environmental conditions and hazards like Earth Potential Rise (EPR)</p>

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Undertake splicing of optical fiber

	<p>are considered while carrying out the work</p> <p>PC8. ensure escalation of safety incidents to relevant authorities as per guidelines</p>
Report & Record	<p>To be competent, the user/individual on the job must be able to:</p> <p>PC1. ensure appropriate cable marking and Installation of chamber & route marker for direction and route identification</p> <p>PC2. ensure preparation of jointing record for future reference</p> <p>PC3. ensure that documents that are required to be updated are identified</p> <p>PC4. ensure completion of OTDR register showing complete record of jointing tests</p> <p>PC5. ensure that documents are available to all appropriate authorities to inspect</p>
Knowledge and Understanding (K)	
A. Organizational Context (Knowledge of the company / organization and its processes)	<p>The user/individual on the job needs to know and understand:</p> <p>KA1. risk and impact of not following defined procedures/work instructions</p> <p>KA2. escalation matrix for reporting identified incidents, troubles and/ or emergencies e.g. system failures ,fire and power failures</p> <p>KA3. types of documentation in organization and importance of the same</p> <p>KA4. records to be maintained and implications of non-maintenance of the same</p> <p>KA5. knowledge of spare management and repair & return process for faulty equipments</p> <p>KA6. SHE and OHS guidelines and regulations as per company's norms</p> <p>KA7. personal protection equipments like helmets, knee pads, safety boots, safety glasses and trench guards that are required to be used</p> <p>KA8. first aid requirements in case of electrical shocks, cuts, fall and other common injuries</p> <p>KA9. electrical and chemical, environmental related hazards and precautionary measures</p> <p>KA10. usage of fire safety equipments</p>
B. Technical Knowledge	<p>The user/individual on the job needs to know and understand:</p> <p>KB1. principles of optical transport media and OFC communication</p> <p>KB2. knowledge of Optical fiber characteristics like refraction, polarization, attenuation, dispersion</p> <p>KB3. bands in optical fibre and their usability, loss characteristics</p> <p>KB4. signal strength and quality KPIs – design values and margins</p> <p>KB5. functionality of optical equipments like cleaver, mechanical and fusion splicing kit, protection sleeves, fiber stripper, fiber reinforced plaster during splicing and jointing</p> <p>KB6. functionality of optical test equipments like OTDR and power meter</p> <p>KB7. optimal values of OTDR, Power meter and light meter test results</p> <p>KB8. utility of As made route diagrams</p> <p>KB9. standard trenching, cable laying, pit preparation, splicing, jointing, blowing and back-filling process for installation of OFC cables</p> <p>KB10. different types of OFC connectors based on the type of equipments</p>

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Undertake splicing of optical fiber

	<p>KB11. standard process and need for performing duct integrity tests like air tightness tests and kink free tests</p>
<p>Skills (S)</p>	
<p>A. Core Skills/ Generic Skills</p>	<p>Basic Reading & Writing Skills</p>
	<p>The user/ individual on the job needs to know and understand how to:</p> <p>SA1. fill up appropriate technical forms, activity logs in required format of the company</p> <p>SA2. maintain proper records as per given format</p> <p>SA3. read and understand manuals, work orders, health and safety instructions, memos, reports etc.</p> <p>SA4. construct simple sentences and express ideas clearly through written communication</p>
	<p>Communication Skills</p>
	<p>The user/ individual on the job needs to know and understand how to:</p> <p>SA5. liaise and coordinate with third party vendors</p> <p>SA6. communicate with supervisor and peers</p> <p>SA7. communicate in the local language</p>
	<p>Other Skills</p> <p>The user/individual on the job needs to know and understand how to:</p> <p>SA8. interpret test reports, as made route diagrams and other numerical data</p> <p>SA9. create and maintain effective working relationships and team environment</p> <p>SA10. maintain security of site records and other confidential data</p> <p>SA11. work in teams and take initiatives</p> <p>SA12. execute tasks in a high-pressure environment</p> <p>SA13. be flexible and accept changes in job requirements, schedules, or work environments</p>
<p>B. Professional Skills</p>	<p>Equipment operating Skills</p>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB1. operate fusion splicing machine: manual, automatic or handheld</p> <p>SB2. utilize appropriate optical splicing equipments like cleaver, mechanical and fusion splicing machine, protection sleeves, fiber stripper, fiber reinforced plaster, joint closure, heat shrink splice protectors</p> <p>SB3. operate splice sleeve heaters (within the machine and external to the splicing machine)</p> <p>SB4. operate optical test equipments like OTDR and power meter</p> <p>SB5. utilize fiber spool where appropriate while carrying out OTDR tests</p>
	<p>OFC splicing and splice testing skills</p>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB6. splice in both indoor and outdoor environment</p> <p>SB7. utilize appropriate fiber like single mode and multi mode optical fibre based on</p>

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	<p>specific requirements</p> <p>SB8. lay duct using specially designed dispensers</p> <p>SB9. carry out both fusion and mechanical splicing in a manner ensuring minimum reflectance loss, optical return loss, insertion loss</p> <p>SB10. utilize appropriate optical test equipments like OTDR, power meter based on test requirements</p> <p>SB11. perform OTDR test as per standard process and summarize OTDR reports for records and review</p> <p>SB12. perform Power meter tests as per standard process and identify instances of cross-fibres</p> <p>SB13. appropriately mark/ tag cables to identify direction and route</p> <p>SB14. install and operate Installation Termination joint boxes (TJBs)</p> <p>SB15. install and operate the Fiber Distribution Frames (FDFs) with different types of 0dB connectors</p> <p>SB16. organized laying of Pigtails and patch cords and terminating them in TJB/ FDF etc.</p>
	<p>Technical interpretation Skills</p>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB17. identify appropriate cables for splicing based on sequence or color coding</p> <p>SB18. interpret As made documents and perform update based on actual cable routes, joints</p> <p>SB19. interpret OTDR and power meter test results to identify and localize faults and/ or measure optical losses</p>

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Undertake splicing of optical fiber

NOS Version Control

NOS Code	TEL /N6400		
Credits NSQF	TBD	Version number	1.0
Industry	Telecom	Drafted on	17/06/13
Industry Sub-sector	Network Managed Services	Last reviewed on	26/05/17
		Next review date	26/12/20



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National Occupational Standard



Overview

This unit is about supporting the Optical technician in installation and commissioning of optical fiber cables as per route plan

National Occupational Standard	Unit Code	TEL/N6401
	Unit Title (Task)	Installation & Commissioning of Optical fiber cables (OFC)
	Description	This unit is about supporting the Optical technician in installation and commissioning of optical fiber cables as per route plan. It involves coordinating activities like trenching and laying of cables and carrying out splicing of cables.
	Scope	<p>This unit/task covers the following:</p> <ul style="list-style-type: none"> • Co-ordinating trenching, laying, jointing and blowing of cables • Carrying out splicing of cables • Closing the activity and documenting the test results
Performance Criteria(PC) w.r.t. the Scope		
	Element	Performance Criteria
	Carry out route Inspection	<p>To be competent, the user/individual on the job must be able to</p> <p>PC1. obtain OFC route plan from the planning team or the supervisors as per which OFC has to be laid</p> <p>PC2. verify the proposed route to ensure that bend ratios meet manufacturer's specifications and industry standards</p> <p>PC3. ensure that site is made safe and secure for cable installation in coordination with labour workers</p>
	Arrange for tools and spares	<p>To be competent, the user/individual on the job must be able to:</p> <p>PC1. ensure availability of test equipments like OTDR and Power meter for carrying out optical tests</p> <p>PC2. ensure availability of all required trenching, cable laying, pipe laying, OFC laying and splicing equipments and spares for timely completion of installation activity</p> <p>PC3. ensure that faulty equipments are sent to logistics team for repair and replacement</p>
	Coordinate trenching, cable laying, jointing and cable blowing activities	<p>To be competent, the user/individual on the job must be able to:</p> <p>PC1. ensure cable drum is placed near site location and test cable on drum for optical continuity</p> <p>PC2. ensure trenching is carried out by labour workers as per the detailed route plan requirements and site terrain</p> <p>PC3. ensure use of specially designed dispensers to place the ducts in the trench as straight as possible</p> <p>PC4. ensure pipe/ ducts are placed at lower appropriate depths as per the laying standards after approval from competent personnel</p> <p>PC5. ensure that ducts are free from twists, collapsed portions and that all such</p>

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Installation & Commissioning of Optical fiber cables(OFC)

	<p>portions are rectified by using appropriate couplers</p> <p>PC6. ensure proper uncoiling of PLB ducts</p> <p>PC7. ensure duct joints are airtight to ensure smooth cable blowing using cable blowing machines</p> <p>PC8. ensure cable blowing/ jetting is carried out using rodder as per standard process</p> <p>PC9. ensure availability of additional cable length (loop) at jointing locations, for future use in case of failures</p> <p>PC10. ensure that ends of ducts are closed with End Plugs to avoid ingress of mud, water or dust</p> <p>PC11. ensure that entire length of the duct is cleaned to remove sand, dust that may damage the optical fiber cable</p> <p>PC12. ensure that cables are appropriately prepared for Jointing based on colour and/ or sequence matching</p> <p>PC13. ensure the cables are joined/ spliced as per the standard fusion/ mechanical splicing mechanisms</p> <p>PC14. ensure use of proper protection material such as GI pipes, RCC pipes, RCC half-cut pipes etc.</p> <p>PC15. ensure use of Pushfit couplers as duct joints</p> <p>PC16. ensure installation activity is completed within the defined SLAs</p> <p>PC17. ensure timely completion of work by monitoring activities performed by the labour workers</p> <p>PC18. ensure compliance to enterprise policy while escalating instances of delays</p>
Test effectiveness & close activity	<p>To be competent, the user/individual on the job must be able to:</p> <p>PC1. ensure use of appropriate color for the route indicators and joint indicators as per standards</p> <p>PC2. ensure splices are within the quality assurance/ AT standards</p> <p>PC3. ensure backfilling and crowning in coordination with the labour workers as per standard requirements</p> <p>PC4. ensure stone marker at the jointing pit has to be provided for identification of route as well as jointing pit</p> <p>PC5. ensure appropriate cable markings as per guidelines</p> <p>PC6. clear sites from debris and other items</p>
Health and Safety	<p>To be competent, the user/individual on the job must be able to:</p> <p>PC1. ensure appropriate disposal of the cut fibers, sleeves and cable pieces</p> <p>PC2. ensure compliance with site risk control, OHS, environmental and quality requirements as per company's norms</p> <p>PC3. ensure that work is carried out in accordance to the level of competence and legal requirements</p> <p>PC4. ensure that sites are assessed for health and safety risk as per company's guidelines prior to commencement of work</p> <p>PC5. ensure that Personal protection equipments like helmets, knee pads, safety</p>

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Installation & Commissioning of Optical fiber cables(OFC)

	<p>boots, safety glasses and trench guards are appropriately used as required</p> <p>PC6. ensure adherence to emergency plans in case of safety incidents</p> <p>PC7. ensure escalation of safety incidents to relevant authorities as per guidelines/legal requirements</p>
Report & Record	<p>To be competent, the user/individual on the job must be able to:</p> <p>PC1. ensure cable id/ make and drum numbers are recorded for future fault localization</p> <p>PC2. obtain sign-off from the projects team and communicate status to NOC for cable integration</p> <p>PC3. ensure that documents are available to all appropriate authorities to inspect</p>
Knowledge and Understanding (K)	
B. Organizational Context (Knowledge of the company / organization and its processes)	<p>The user/individual on the job needs to know and understand:</p> <p>KA1. risk and impact of not following defined procedures/work instructions</p> <p>KA2. escalation matrix for reporting identified incidents, troubles and/ or emergencies e.g. system failures ,fire and power failures</p> <p>KA3. types of documentation in organization and importance of the same</p> <p>KA4. records to be maintained and implications of non-maintenance of the same</p> <p>KA5. knowledge of spare management and repair & return process for faulty equipments</p> <p>KA6. SHE and OHS guidelines and regulations as per company's norms</p> <p>KA7. personal protection equipments like helmets, knee pads, safety boots, safety glasses and trench guards that are required to be used</p> <p>KA8. first aid requirements in case of electrical shocks, cuts, fall and other common injuries</p> <p>KA9. electrical and chemical, environmental related hazards and precautionary measures</p> <p>KA10. usage of fire safety equipments</p>
B. Technical Knowledge	<p>The user/individual on the job needs to know and understand:</p> <p>KB1. principles of optical transport media and OFC communication</p> <p>KB2. knowledge of Optical fiber characteristics like refraction, polarization, attenuation, dispersion</p> <p>KB3. bands in optical fibre and their usability, loss characteristics</p> <p>KB4. signal strength and quality KPIs – design values and margins</p> <p>KB5. functionality of optical equipments like cleaver, mechanical and fusion splicing kit, protection sleeves, fiber stripper, fiber reinforced plaster during splicing and jointing</p> <p>KB6. functionality of optical test equipments like OTDR and power meter</p> <p>KB7. optimal value of KPIs for interpreting OTDR, Power meter and light meter test results</p> <p>KB8. utility of As-build route diagrams</p> <p>KB9. standard trenching, cable laying, pit preparation, splicing, jointing, blowing and</p>

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Installation & Commissioning of Optical fiber cables(OFC)

	back-filling process for installation of OFC cables KB10. different types of OFC connectors based on the type of equipments
Skills (S)	
C. Core Skills/ Generic Skills	Basic Reading & Writing Skills
	The user/ individual on the job needs to know and understand how to: SA1. fill up appropriate technical forms, activity logs in required format of the company SA2. maintain proper records as per given format SA3. read and understand manuals, work orders, health and safety instructions, memos, reports etc.
	Communication Skills
	The user/ individual on the job needs to know and understand how to: SA4. liaise and coordinate with third party vendors SA5. communicate with supervisor and peers SA6. communicate in the local language
	Project Management Skills
	The user/individual on the job needs to know and understand how to: SA7. prioritize and execute tasks in a high-pressure environment and handle high pressure situations SA8. handle multiple tasks and completing them successfully within due timelines SA9. use and maintain resources efficiently and effectively SA10. be flexible and accept changes in job requirements, schedules, or work environments
	Other Skills
	The user/individual on the job needs to know and understand how to: SA11. interpret test reports, as made route diagrams and other numerical data SA12. create and maintain effective working relationships and team environment SA13. take initiatives and progressively assume increased responsibilities SA14. share knowledge with other team members and colleagues
D. Professional Skills	Equipment operating Skills
	The user/individual on the job needs to know and understand how to: SB1. utilize appropriate optical equipments like cleaver, mechanical and fusion splicing kit, protection sleeves, fiber stripper, fiber reinforced plaster during splicing and jointing SB2. operate optical test equipments like OTDR and power meter
	OFC splicing and splice testing skills
	The user/individual on the job needs to know and understand how to: SB3. utilize appropriate fiber like single mode and multi mode optical fibre based on specific requirements SB4. carry out splicing in a manner ensuring minimum reflectance loss, optical

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Installation & Commissioning of Optical fiber cables(OFC)

	<p>return loss, insertion loss</p> <p>SB5. utilize appropriate optical test equipments like OTDR, power meter based on test requirements</p> <p>SB6. perform OTDR test as per standard process and summarize OTDR reports for records and review</p> <p>SB7. perform Power meter tests as per standard process and identify instances of cross-fibres</p> <p>SB8. appropriately mark/ tag cables to identify direction and route</p> <p>SB9. utilize suitable OFC connectors are used based on the termination equipment</p>
	Technical interpretation Skills
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB10. identify appropriate cables for splicing based on sequence or color coding to avoid occurrence of instances of cross fibers</p> <p>SB11. interpret As made documents and perform update based on actual cable routes, joints</p> <p>SB12. interpret OTDR and power meter test results to identify and localize faults and/ or measure optical losses</p> <p>SB13. interpret optical link testing results to ensure link margins</p>
	Problem solving Skills
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB14. utilize appropriate tools to rectify faults</p> <p>SB15. utilize appropriate communication channels to escalate unresolved problems to relevant personnel</p>

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Installation & Commissioning of Optical fiber cables(OFC)

NOS Version Control

NOS Code	TEL /N6401		
Credits NSQF	TBD	Version number	1.0
Industry	Telecom	Drafted on	17/06/13
Industry Sub-sector	Network Managed Services	Last reviewed on	26/05/17
		Next review date	26/12/20



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PERFORMANCE CRITERIA							
Job Role	Qualification Pack	Assessment Criteria	Total Mark (100/100)	Total of Sub-Element	Out Of	Theory	Skills Practical
1. TEL/N6400 (Undertake Splicing of Optical Fiber)	Optical Fiber Splicer TLU/N6400 Telecom	<p>1. Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. SSC will also lay down proportion of marks for Theory and Skills Practical for each PC.</p> <p>2. The assessment for the theory part will be based on knowledge bank of questions created by the SSC.</p> <p>3. Individual assessment agencies will create unique question papers for theory and skill practical part for each candidate at each examination/training center.</p> <p>4. To pass the Qualification Pack, every trainee should score a minimum of 40% in every NOS and Overall 50% pass percentage.</p> <p>5. In case of successfully passing, only certain number of NOS's, the trainee is eligible to take subsequent assessment on the balance NOS's to pass the Qualification Pack.</p> <p>6. Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/training center based on this criteria.</p>					
1. TEL/N6400 (Undertake Splicing of Optical Fiber)	Assessment Outcome	Prepare cable for splicing operations	PC1. verify that cable is installed as per the installation plan and visually inspect cable for signs of sheath damage	2	2	0	
			PC2. ensure minimum bend ratios are maintained according to manufacturer's specifications to prevent cable damage and signal degradation	5	2	3	
			PC3. ensure cable is placed on stable jointing pit	3	2	1	
			PC4. secure cable according to safe industry practice to avoid cable and sheath damage	3	0	3	
			PC5. identify the appropriate fibers to be joined based on color coding, and sequence	6	2	4	
		Ensure availability of tools and spares	PC6. identify appropriate place for the joint chamber location	4	2	2	
			PC7. clean the fibre appropriately as per company/manufacturer's	2	2	0	
			PC1. ensure availability of test equipments like OTDR and Power meter for carrying out optical tests	1	1	0	
			PC2. ensure availability of optical equipments like spool, joint closure, connectors, splicer and cleaver	1	1	0	
			PC3. ensure that faulty equipments are sent to logistics team for repair and replacement	2	1	1	
		Perform splicing operations	PC4. ensure availability of OF joint kits, Pigtail, patchcords, FDF, ODB connector, protection sleeves, heat shrinks	1	1	0	
			PC5. ensure continuous power supply at site for the splicing operation by use of portable generators or standby heavy duty batteries	1	1	0	
			PC6. ensure availability of PCC joint chambers with covers as per specifications	1	1	0	
			PC7. ensure availability of sand for filling the chambers	1	1	0	
			PC8. ensure availability of one spare cable drum for emergency replacement of laid cables	1	1	0	
		Test effectiveness and Perform Joint closure	PC9. ensure calibration status of equipments to be used (eg. splicing machine, OTDR, power meter, cleaver)	1	0	1	
			PC1. ensure clean environment for splicing operations	2	2	0	
			PC2. ensure cables are stripped off their protective coating, at areas where splicing has to be performed as per the standard process	2	2	0	
			PC3. ensure the fiber ends are cleaved with a precision cleaver and are inspected with magnifier to ensure appropriateness	6	2	4	
			PC4. in case of fusion splicing - insert fibers strand to the fusion machine in accordance to product/equipment specifications	6	2	4	
		Health and Safety	PC5. in case of mechanical splice, align the fibers together by a precision made sleeve and place the prepared fiber in mechanical splicing kit	6	2	4	
			PC6. verify the spliced fiber for appropriate splicing in the magnifier window	1	1	0	
			PC7. ensure appropriate splice protectors like heat shrink splice protectors are utilized to protect the splice	2	2	0	
			PC1. test the fiber joint with OTDR to confirm conformance to design requirements	2	2	0	
			PC2. ensure optical losses - reflectance, return and insertion are within the defined specifications/ limits	4	3	1	
Report and Records	PC3. ensure sealing of joint closure through heat shrinking/ multi diameter seals/ mechanical seals as appropriate	3	2	1			
	PC4. ensure FRP - Fiber reinforced plastic is used to strengthen the joint as required	3	2	1			
	PC5. test the fiber at both ends for instances of cross fiber using power source and power meter tests and ensure their elimination	4	2	2			
	PC6. ensure joint is placed in the chamber properly	1	0	1			
	PC7. ensure spare cable (loop) is coiled appropriately and placed inside the joint	3	1	2			
Report and Records	PC8. ensure that sand is filled in the chamber to the brim and the chamber covers are placed properly	3	2	1			
	PC9. ensure that joint indicator is placed 1 meter behind the chamber location (away from road)	1	1	0			
	PC10. ensure that the indicator is painted proper colour (for example yellow for joint)	1	1	0			
	PC1. ensure appropriate disposal of the cut fibers, sleeves and cable pieces	1	0	1			
	PC2. ensure compliance with site risk control, OHS, environmental and quality requirements as per company's norms	1	1	0			
Report and Records	PC3. ensure that work is carried out in accordance to the level of competence and legal requirements	1	1	0			
	PC4. ensure that sites are assessed for health and safety risk as per company's guidelines prior to commencement of work	2	1	1			
	PC5. ensure compliance to health and safety guidelines by optical splicer and installation labor workers	1	1	0			
	PC6. ensure that Personal protection equipments like helmets, knee pads, safety boots, safety glasses and trench guards are appropriately used as required	1	0	1			
	PC7. ensure environmental conditions and hazards like Earth Potential Rise (EPR) are considered while carrying out the work	2	0	2			
Report and Records	PC8. ensure escalation of safety incidents to relevant authorities as per guidelines	1	1	0			
	PC1. ensure appropriate cable marking and installation of chamber & route marker for direction and route identification	1	1	0			
	PC2. ensure preparation of jointing record for future reference	1	1	0			
	PC3. ensure that documents that are required to be updated are identified	1	1	0			
	PC4. ensure completion of OTDR register showing complete record of jointing tests	1	1	0			
Report and Records	PC5. ensure that documents are available to all appropriate authorities to inspect	1	1	0			
	100	59	41				
	2. TEL/N6401 (Installation & Commissioning of Optical fiber cables (OFC) - Optical NOS)	Assessment Outcome	Carry out route inspection	PC1. obtain OFC route plan from the planning team or the supervisors as per which OFC has to be laid	3	3	0
				PC2. verify the proposed route to ensure that bend ratios meet manufacturer's specifications and industry standards	4	2	2
				PC3. ensure that site is made safe and secure for cable installation in coordination with labour workers	3	3	0
Arrange for tools and spares			PC1. ensure availability of test equipments like OTDR and Power meter for carrying out optical tests	2	2	0	
			PC2. ensure availability of all required trenching, cable laying, pipe laying, OFC laying and splicing equipments and spares for timely completion of installation activity	2	2	0	
			PC3. ensure that faulty equipments are sent to logistics team for repair and replacement	1	1	0	
Coordinate trenching, cable laying, jointing and cable blowing activities			PC4. ensure cable drum is placed near site location and test cable on drum for optical continuity	2	2	0	
			PC5. ensure trenching is carried out by labour workers as per the detailed route plan requirements and site terrain	3	0	3	
			PC6. ensure use of specially designed dispensers to place the ducts in the trench as straight as possible	2	2	0	
			PC7. ensure pipe/ ducts are placed at lower appropriate depths as per the laying standards after approval from competent personnel	5	2	3	
			PC8. ensure that ducts are free from twists, collapsed portions and that all such portions are rectified by using appropriate couplers	4	2	2	
Test effectiveness & close activity			PC9. ensure proper uncoiling of P/B ducts	3	1	2	
			PC10. ensure duct joints are airtight to ensure smooth cable blowing using cable blowing machines	5	2	3	
			PC11. ensure cable blowing/ jetting is carried out using rodder as per standard process	3	0	3	
			PC12. ensure availability of additional cable length (loop) at jointing locations, for future use in case of failures	5	2	3	
			PC13. ensure that ends of ducts are closed with End Plugs to avoid ingress of mud, water or dust	4	1	3	
Health and Safety			PC14. ensure that entire length of the duct is cleaned to remove sand, dust that may damage the optical fiber cable	2	0	2	
			PC15. ensure that cables are appropriately prepared for jointing based on colour and/ or sequence matching	4	2	2	
			PC16. ensure the cables are joined/ spliced as per the standard fusion/ mechanical splicing mechanisms	2	0	2	
			PC17. ensure use of proper protection material such as GI pipes, RCC pipes, RCC half-cut pipes etc.	3	1	2	
			PC18. ensure use of Pushfit couplers as duct joints	1	1	0	
Reports and Record			PC19. ensure installation activity is completed within the defined SLAs	1	1	0	
			PC20. ensure timely completion of work by monitoring activities performed by the labour workers	1	1	0	
			PC21. ensure use of appropriate color for the route indicators and joint indicators as per standards	3	1	2	
			PC22. ensure splices are within the quality assurance/ AT standards	2	2	0	
	PC23. ensure backfilling and crowning in coordination with the labour workers as per standard requirements	3	1	2			
Reports and Record	PC24. ensure stone marker at the jointing pit has to be provided for identification of route as well as jointing pit	2	0	2			
	PC25. ensure appropriate cable markings as per guidelines	2	0	2			
	PC26. clear sites from debris and other items	3	1	2			
	PC27. ensure appropriate disposal of the cut fibers, sleeves and cable pieces	3	2	1			
	PC28. ensure compliance with site risk control, OHS, environmental and quality requirements as per company's norms	2	2	0			
Reports and Record	PC29. ensure that work is carried out in accordance to the level of competence and legal requirements	2	2	0			
	PC30. ensure that sites are assessed for health and safety risk as per company's guidelines prior to commencement of work	2	2	0			
	PC31. ensure that Personal protection equipments like helmets, knee pads, safety boots, safety glasses and trench guards are appropriately used as required	2	2	0			
	PC32. ensure adherence to emergency plans in case of safety incidents	2	0	2			
	PC33. ensure escalation of safety incidents to relevant authorities as per guidelines/legal requirements	2	0	2			
Reports and Record	PC34. ensure cable id/ make and drum numbers are recorded for future fault location	2	2	0			
	PC35. obtain sign-off from the projects team and communicate status to NDC for cable integration	2	2	0			
	PC36. ensure cable id/ make and drum numbers are recorded for future fault location	1	1	0			
	PC37. ensure that documents are available to all appropriate authorities to inspect	1	1	0			
	100	53	47				