Model Curriculum

QP Name:	**Tunnel Safety Supervisor**
QP Code:	**ICE/CON/Q0601**
Version:	**1.0**
NSQF Level:	**5**
Model Curriculum Version:	**1.0**

Integrated Council for Entrepreneurship and Skilling (ICES)
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Training Parameters

Sector	Construction		
Sub-Sector	Real Estate and Infrastructure Construction		
Occupation	Safety Works		
Country	India		
NSQF Level	5		
Aligned to NCO/ISCO/ISIC Code	NCO-2015/3257.0600		
Minimum Educational Qualification and Experience	**S. No.**	**Academic/Skill Qualification (with Specialization - if applicable)**	**Required Experience (with Specialization - if applicable)**
	1	Completed 2nd year of UG (UG Diploma) (B.E. / B.Tech in Civil Engineering)	4 years of Relevant Industry Experience
	OR		
	2	12th Grade Pass	5 years of Relevant Industry Experience
	OR		
	3	10th Grade Pass	6 years of Relevant Industry Experience
	OR		
	4	Previous relevant Qualification of NSQF Level 4.5	1.5 years of Relevant Industry Experience
	OR		
	5	Previous relevant Qualification of NSQF Level 3.5	1.5 years of relevant experience
Pre-Requisite License or Training	Not Applicable		
Minimum Job Entry Age	As per Govt. Norms		
Last Reviewed On	07-10-2025		
Next Review Date	07-10-2028		
NSQC Approval Date	07-10-2025		
QP Version	1.0		
Model Curriculum Creation Date	07-10-2025		
Model Curriculum Valid Up to Date	07-10-2028		
Model Curriculum Version	1.0		
Minimum Duration of the Course	510 Hours		
Maximum Duration of the Course	510 Hours		

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:

- Supervise tunnel works in compliance with statutory, project and organizational safety requirements.
- Implement tunnel safety management systems and permit-to-work procedures.
- Identify tunnelling hazards and apply structured risk control measures.
- Supervise tunnel ventilation systems and maintain safe atmospheric conditions.
- Monitor hazardous gases, dust, noise and occupational hygiene parameters.
- Coordinate emergency preparedness, evacuation and tunnel rescue operations.
- Supervise ground support installation and excavation face safety.
- Monitor geotechnical indicators and initiate corrective safety actions.
- Enforce safe practices during TBM, NATM, drill-and-blast and mechanised tunnelling.
- Control plant, equipment and mobile machinery safety in confined tunnel spaces.
- Enforce PPE usage and worker safety compliance.
- Conduct safety inspections, toolbox talks and workforce briefings.
- Investigate incidents and near-misses and implement corrective actions.
- Maintain safety documentation, registers and statutory records.
- Demonstrate professional communication, leadership and ethical conduct on site..

Compulsory Modules:

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

NOS and Module Details	Theory Duration (in Hours)	Practical Duration (in Hours)	On-the-Job Training Duration (Mandatory) (in Hours)	On-the-Job Training Duration (Recommended) (in Hours)	Total Duration (in Hours)
ICE/CON/N0601: Implement Tunnel Site Safety Management System NOS Version: 1.0 NSQF Level: 5	**15:00**	**65:00**	**10:00**	**00:00**	**90:00**
Module 1: Introduction to Tunnel Safety Supervisor Role	05:00	00:00	00:00	00:00	05:00
Module 2: Tunnel Safety Management Systems	10:00	65:00	10:00	00:00	85:00
ICE/CON/N0602: Conduct Hazard Identification, Risk Assessment & Control for Tunnelling NOS Version: 1.0 NSQF Level: 5	**15:00**	**35:00**	**10:00**	**00:00**	**60:00**
Module 3: Hazard Identification & Risk Control in Tunnelling	15:00	35:00	10:00	00:00	60:00
ICE/CON/N0603: Manage Ventilation, Gas Monitoring and Occupational Hygiene in Tunnels NOS Version: 1.0 NSQF Level: 5	**15:00**	**65:00**	**10:00**	**00:00**	**90:00**
Module 4: Ventilation, Gas Monitoring & Occupational Hygiene	15:00	65:00	10:00	00:00	90:00
ICE/CON/N0604: Emergency Preparedness, Rescue & Evacuation in Tunnel Works NOS Version: 1.0 NSQF Level: 5	**10:00**	**10:00**	**10:00**	**00:00**	**30:00**
Module 5: Emergency Preparedness, Rescue & Evacuation	10:00	10:00	10:00	00:00	30:00

ICE/CON/N0605: Manage Ground Support, Excavation Face Safety and Rockfall Controls NOS Version: 1.0 NSQF Level: 5	**10:00**	**40:00**	**10:00**	**00:00**	**60:00**
Module 6: Ground Support, Excavation & Rockfall Safety	10:00	40:00	10:00	00:00	60:00
ICE/CON/N0606: Manage Plant, TBM, Mechanical & Blasting Safety in Tunnelling NOS Version: 1.0 NSQF Level: 5	**15:00**	**65:00**	**10:00**	**00:00**	**90:00**
Module 7: Plant, TBM, Blasting & Mechanical Safety	15:00	65:00	10:00	00:00	90:00
ICE/CON/N9901: Implement Safe Work Practices and Environmental Stewardship at Construction Sites NOS Version: 1.0 NSQF Level: 4	**10:00**	**20:00**	**00:00**	**00:00**	**30:00**
Module 8: Workplace Safety and Health Compliance	05:00	10:00	00:00	00:00	15:00
Module 9: Environmental Protection and Emergency Preparedness	05:00	10:00	00:00	00:00	15:00
DGT/VSQ/N0102: Employability Skills (60 Hours) NOS Version: 1.0 NSQF Level: 4	**60:00**	**00:00**	**00:00**	**00:00**	**60:00**
Module 10: Employability Skills (60 Hours)	60:00	00:00	00:00	00:00	60:00
Total Duration	**150:00**	**300:00**	**60:00**	**00:00**	**510:00**

Module Details

Module 1: Introduction to Tunnel Safety Supervisor Role

Mapped to ICE/CON/N0601, v1.0

Terminal Outcomes:

- Explain the role, responsibilities and authority of a Tunnel Safety Supervisor.
- Identify major tunnelling methods and associated safety risks.
- Interpret the structure of the Qualification Pack and NOSs.
- Explain legal and statutory obligations related to tunnel safety.
- Recognize professional and ethical expectations of the role.

Duration: 05:00	**Duration: 00:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Describe the scope of tunnelling projects (road, rail, metro, hydropower). • Explain the functions of TBM, NATM and drill-and-blast methods. • Interpret basic tunnel safety regulations and standards. • Explain employer, supervisor and worker safety responsibilities. • Describe interfaces between safety, engineering and construction teams. • Explain safety culture and leadership concepts. • Identify career pathways and skill progression.	
Classroom Aids	
Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films	
Tools, Equipment and Other Requirements	
Tunnel drawings and method statement samples	

Module 2: Tunnel Safety Management Systems

Mapped to ICE/CON/N0601, v1.0

Terminal Outcomes:

- Implement tunnel safety management plans at site level.
- Enforce permit-to-work systems for tunnelling activities.
- Conduct routine tunnel safety inspections.
- Supervise contractor and workforce safety compliance.
- Maintain safety documentation and reports.
- Conduct safety briefings and toolbox talks.

Duration: 10:00	**Duration: 65:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain components of a Tunnel Safety Management Plan (TSMP). • Describe permit-to-work systems and approvals. • Explain safety inspection and audit processes. • Describe contractor safety management requirements. • Explain incident reporting and escalation procedures. • Describe safety KPIs and monitoring mechanisms. • Explain statutory compliance requirements.	• Conduct tunnel safety inspections using checklists. • Issue and control confined space and hot work permits. • Record safety observations and non-conformances. • Conduct toolbox talks and safety briefings. • Verify PPE compliance at site. • Prepare daily and weekly safety reports. • Follow up on corrective and preventive actions.
Classroom Aids	
Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films	
Tools, Equipment and Other Requirements	
Safety inspection checklists, Permit-to-work formats, PPE sets, Toolbox talk boards, Safety signage and barricades, Registers and logbooks	

Module 3: Hazard Identification & Risk Control in Tunnelling

Mapped to ICE/CON/N0602, v1.0

Terminal Outcomes:

- Identify tunnelling-specific hazards.
- Conduct structured risk assessments.
- Implement hierarchy of hazard controls.
- Manage changes in ground and work conditions.
- Supervise high-risk tunnelling activities.
- Review and update risk control measures.

Duration: 15:00	**Duration: 35:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Describe typical tunnelling hazards. • Explain risk assessment techniques (JSA, HAZID). • Explain hierarchy of controls. • Describe change management in tunnelling. • Explain high-risk work classifications. • Explain interface risks in tunnels. • Describe legal duties of safety supervisors.	• Prepare job safety analyses for tunnel tasks. • Identify unsafe acts and unsafe conditions. • Implement engineering and administrative controls. • Establish exclusion zones. • Stop unsafe work and escalate hazards. • Conduct pre-task safety briefings. • Update risk assessment documents.
Classroom Aids	
Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films	
Tools, Equipment and Other Requirements	
Risk assessment and JSA formats, Measuring tape, Hazard signage, Barricade tape, PPE, Digital tablet / clipboard	

Module 4: Ventilation, Gas Monitoring & Occupational Hygiene

Mapped to ICE/CON/N0603, v1.0

Terminal Outcomes:

- Supervise tunnel ventilation systems.
- Monitor tunnel atmospheric conditions.
- Respond to gas alarms and exceedances.
- Control dust, noise and diesel exhaust exposure.
- Ensure correct use of respiratory protection.
- Maintain ventilation and monitoring records.

Duration: 15:00	**Duration: 65:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain principles of tunnel ventilation. • Describe hazardous gases in tunnels. • Explain occupational exposure limits. • Describe gas monitoring instruments. • Explain dust and noise control methods. • Explain respiratory protective equipment selection. • Describe emergency ventilation procedures	• Operate portable gas detectors. • Interpret gas and oxygen readings. • Supervise ventilation fans and ducting. • Initiate evacuation on alarm conditions. • Monitor dust and noise levels. • Maintain calibration and monitoring logs. • Enforce RPE usage and fit checks.
Classroom Aids	
Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films	
Tools, Equipment and Other Requirements	
Multi-gas detectors, Single gas detectors, Ventilation fans, Ventilation ducting, Anemometer, Dust monitor, Noise dosimeter, Respirators and fit-test kits	

Module 5: Emergency Preparedness, Rescue & Evacuation

Mapped to ICE/CON/N0604, v1.0

Terminal Outcomes:

- Implement tunnel emergency response plans.
- Coordinate evacuation and rescue operations.
- Supervise confined space rescue activities.
- Liaise with emergency response agencies.
- Conduct emergency drills.
- Review and improve emergency preparedness systems.

Duration: 10:00	**Duration: 10:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Describe tunnel emergency scenarios. • Explain emergency response planning. • Describe rescue equipment and systems. • Explain emergency communication protocols. • Explain first aid and casualty handling. • Describe statutory emergency requirements. • Explain post-incident review processes.	• Conduct tunnel evacuation drills. • Use breathing apparatus safely. • Deploy rescue stretchers and harnesses. • Coordinate emergency communications. • Account for all personnel during emergencies. • Inspect rescue equipment readiness. • Document emergency drills and incidents.
Classroom Aids	
Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films	
Tools, Equipment and Other Requirements	
SCBA sets, Rescue stretchers, Tripod rescue system, Rescue harnesses, Emergency alarm systems, Walkie-talkies, First aid kits, Fire extinguishers	

Module 6: Ground Support, Excavation & Rockfall Safety

Mapped to ICE/CON/N0605, v1.0

Terminal Outcomes:

- Supervise ground support installation.
- Monitor excavation face stability.
- Identify signs of unstable ground.
- Control access to face and exclusion zones.
- Monitor geotechnical indicators.
- Implement corrective actions for instability.

Duration: 10:00	**Duration: 40:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain ground support systems. • Describe excavation face hazards. • Explain rockfall and collapse mechanisms. • Describe geotechnical instrumentation. • Explain quality checks for ground support. • Describe temporary works safety. • Explain emergency response for ground failure.	• Inspect rock bolts, mesh and shotcrete. • Use scaling bars safely. • Enforce face access controls. • Monitor convergence indicators. • Record ground condition observations. • Stop work on detecting instability. • Coordinate remedial ground support.
Classroom Aids	
Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films	
Tools, Equipment and Other Requirements	
Scaling bars, Torque wrench, Rock bolt and mesh samples, Crack gauges, Convergence measuring tapes, Inspection hammers, Barricades and signage	

Module 7: Plant, TBM, Blasting & Mechanical Safety

Mapped to ICE/CON/N0605, v1.0

Terminal Outcomes:

- Supervise tunnel plant and equipment safely.
- Enforce TBM safety procedures.
- Implement blasting safety protocols.
- Apply LOTO procedures during maintenance.
- Manage mobile plant interactions.
- Investigate plant-related incidents.

Duration: 15:00	**Duration: 65:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Describe tunnel plant hazards. • Explain TBM safety systems. • Explain blasting safety regulations. • Explain LOTO principles. • Describe tunnel traffic management. • Explain plant inspection requirements. • Explain incident investigation methods.	• Conduct plant safety inspections. • Implement lockout-tagout procedures. • Supervise blasting exclusion zones. • Monitor TBM maintenance safety. • Enforce vehicle movement controls. • Maintain plant safety logs. • Participate in incident investigations.
Classroom Aids	
Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films	
Tools, Equipment and Other Requirements	
LOTO kits, Plant inspection checklists, Blasting safety flags and sirens, Dummy explosives models, TBM safety model, Traffic signage, Spill control kits	

Module 8: Workplace Safety and Health Compliance

Mapped to ICE/CON/N9901, v1.0

Terminal Outcomes:

- Explain workplace hazards and safety measures in construction.
- Demonstrate the use of personal protective equipment (PPE) and emergency response procedures.

Duration: 05:00	**Duration: 10:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain the importance of Safety, Health and Environment (SHE) guidelines in maintaining a safe workplace. • Describe how company policies help in ensuring safety and compliance on construction sites. • Explain the correct procedure for reporting safety incidents or workplace hazards. • Describe the reporting structure for safety concerns within a construction site. • Identify the key personnel responsible for workplace safety, such as the safety officer and site engineer. • Explain the roles and responsibilities of the safety officer in maintaining site safety. • List different types of construction hazards, including chemical, physical and ergonomic risks. • Describe the potential impact of construction hazards on workers' health and safety. • Discuss the correct use of personal protective equipment (PPE) such as helmets, gloves, safety boots and harnesses. • Explain how to properly maintain PPE to ensure its effectiveness and durability.	• Show the process to identify common construction site hazards, including falling objects, slippery surfaces and electrical risks. • Demonstrate the process of evaluating potential risks associated with workplace hazards. • Show how to report identified hazards to a supervisor or safety officer using the correct reporting procedures. • Demonstrate the proper use and maintenance of personal protective equipment (PPE), including helmets, gloves, safety boots and harnesses. • Show the ability to follow safety signage and barricading instructions to avoid restricted or hazardous areas. • Demonstrate safe lifting techniques and the proper use of lifting tools to minimize strain and prevent injuries. • Demonstrate proper personal hygiene practices, including the use of clean drinking water and designated rest areas. • Show how to recognize and report health symptoms such as respiratory issues or heatstroke to the designated authority. • Demonstrate safe handling and disposal procedures for hazardous materials such as asbestos and chemicals to ensure workplace safety.
Classroom Aids	
Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films	
Tools, Equipment and Other Requirements	
Safety helmets, gloves, safety boots, safety harnesses, high-visibility vests, safety goggles, ear protection, dust masks, fire extinguishers, first aid kits, emergency response charts, barricading tape, safety cones, hazard signage, lifting belts, lifting tools such as pulleys and ropes, spill control kits, asbestos handling kits, chemical-resistant gloves, chemical spill absorbents, lockout/tagout (LOTO) kits, electrical insulating mats, hand wash stations and waste disposal bins for hazardous materials.	

Module 9: Environmental Protection and Emergency Preparedness

Mapped to ICE/CON/N9901, v1.0

Terminal Outcomes:

- Describe sustainable construction practices and waste management techniques.
- Explain emergency preparedness measures for fire, chemical spills and natural disasters.

Duration: 05:00	**Duration: 10:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain the importance of first aid in construction site safety. • Describe basic first aid procedures for common workplace injuries such as cuts, burns and fractures. • Identify the steps to take in case of a fire emergency. • Explain how to use fire extinguishers and other firefighting equipment. • Describe the role of emergency response teams in handling accidents and fires. • Explain the importance of environmental regulations in construction work. • Describe dust control measures used to minimize air pollution on construction sites. • Discuss proper waste disposal techniques for hazardous and non-hazardous materials. • Identify water conservation methods used in construction activities. • Explain the impact of poor environmental practices on health and safety. • Describe the correct procedures for handling and using construction tools safely. • List the common hand tools and power tools used in interior finishing work. • Explain the risks associated with improper use of construction equipment. • Describe safety precautions to follow while using hand tools and power tools. • Discuss the importance of regular maintenance and inspection of tools to prevent accidents.	• Demonstrate the correct way to prevent spills of construction materials and chemicals. • Show how to properly segregate biodegradable and non-biodegradable waste for recycling and disposal. • Demonstrate water conservation practices while performing construction activities. • Show how to follow energy-saving protocols at a construction site. • Identify emergency alarms and evacuation routes at a construction site. • Demonstrate the correct use of firefighting equipment, such as fire extinguishers and sand buckets. • Show how to assist in basic first aid procedures for minor injuries. • Demonstrate the correct method for performing CPR in an emergency.
Classroom Aids	
Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films	
Tools, Equipment and Other Requirements	
First aid kits, gloves, fire extinguishers (ABC, CO_2, foam), sand buckets, fire blankets, emergency alarm systems, evacuation maps, color-coded waste bins, spill control kits, dust suppression tools such as water sprayers and dust nets, hand tools ,power tools	

Module 10: Employability Skills (60 Hours)

Mapped to DGT/VSQ/N0102, v1.0

Duration (in hours): 60:00

Key Learning Outcomes

After completing this programme, participants will be able to:

Introduction to Employability Skills :

1. Discuss the Employability Skills required for jobs in various industries.
2. List different learning and employability-related GOI and private portals and their usage.

Constitutional values - Citizenship :

3. Explain the constitutional values, including civic rights and duties, citizenship, responsibility towards society and personal values and ethics such as honesty, integrity, caring and respecting others that are required to become a responsible citizen.
4. Show how to practice different environmentally sustainable practices.

Becoming a Professional in the 21st Century :

5. Discuss the importance of relevant 21st-century skills.
6. Exhibit 21st-century skills like Self-Awareness, Behavior Skills, time management, critical and adaptive thinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn etc. in personal or professional life.
7. Elucidate the appropriate code of conduct.

Basic English Skills :

8. Show how to use basic English sentences for everyday conversation in different contexts, in person and over the telephone.
9. Read and interpret text written in basic English.
10. Write a short note/paragraph / letter/e -mail using basic English.

Career Development & Goal Setting :

11. Discuss the difference between job and career.
12. Create a career development plan with well-defined short- and long-term goals.

Communication Skills :

13. Elucidate the importance of communication and professional communication.
14. Explain the importance of following verbal and non-verbal communication etiquette in various settings.
15. Elucidate the process of interacting with reporting superiors regarding job order, work output requirements, targets, performance indicators and incentives.
16. Discuss how effective coordination ensures the timely completion of tasks in accordance with quality standards.
17. Describe the steps involved in ensuring the timely resolution of problems, complaints and delays through coordination with relevant personnel and superiors.
18. Determine the role of active communication and respect in achieving a smooth workflow and resolving work standards and quality-related concerns with personnel and superiors.
19. Explain the significance of maintaining appropriate documentation concerning completed work schedules as per organizational requirements.
20. Elucidate the importance of prioritizing teamwork and supporting team members in achieving shared goals.

Diversity & Inclusion :

21. Describe the recommended practices for preventing sexual harassment, physical and verbal abuse and the objectification of women in the workplace.
22. Discuss the appropriate safety precautions to follow while utilizing transportation facilities and during night trips, particularly concerning women's safety.
23. Elucidate the process for escalating issues related to abuse and sexual harassment in the

workplace according to the POSH Act and organizational procedures.

24. Determine how to effectively educate co-workers on women's rights and the importance of showing respect to all genders, including persons with disabilities.

Financial and Legal Literacy :

25. Outline the importance of selecting the right financial institution, product and service.
26. Overview how to carry out offline and online financial transactions, safely and securely.
27. List the common components of salary and compute income, expenditure, taxes, investments etc.
28. Discuss the legal rights, laws and aids.
29. Elucidate the purchase, inspection, indenting and recordkeeping procedure for stores.

Essential Digital Skills :

30. Describe the role of digital technology in today's life.
31. Overview how to operate digital devices and use the associated applications and features, safely and securely.
32. Discuss the significance of displaying responsible online behaviour while browsing, using various social media platforms, e-mails, etc., safely and securely.
33. Create sample word documents, excel sheets and presentations using basic features.
34. utilize virtual collaboration tools to work effectively.

Entrepreneurship :

35. Explain the types of entrepreneurships and enterprises.
36. Discuss how to identify opportunities for potential business, sources of funding and associated financial and legal risks with its mitigation plan.
37. Describe the 4Ps of Marketing-Product, Price, Place and Promotion and apply them as per requirement.
38. Create a sample business plan, for the selected business opportunity.
39. Describe the best practices for leading teams.
40. Explain the 5S Standards and their implementation for organize the workplace and create a productive work environment.
41. Explain how to manage clients, contractors, subordinates and labourers.

Customer Service :

42. Explain the importance of implementing appropriate hygiene, grooming standards and professional dress code at work to cater to different types of customers.
43. Elucidate the significance of practicing and encouraging active listening for effective communication with both customers and co-workers.
44. Discuss the methods used to ensure effective probing of customers to identify their needs and expectations.
45. Describe the strategies for maintaining effective communication with customers, keeping them informed regarding any issues and developments involving them.
46. Determine the steps involved in identifying and addressing customer dissatisfaction and complaints promptly and effectively.
47. Explain the importance of being fair and firm with staff to achieve work objectives and describe leave and attendance management.
48. Explain the importance of upskilling self and staff for continuous improvement.

Getting Ready for apprenticeship & Jobs :

49. Create a professional Curriculum Vitae (CV)
50. Use various offline and online job search sources such as employment exchanges, recruitment agencies and job portals respectively.
51. Discuss the significance of maintaining hygiene and confidence during an interview.
52. Elucidate how to give a personal introduction and present oneself.
53. Perform a mock interview.
54. List the steps for searching and registering for apprenticeship opportunities.

On-the-Job Training

Mapped to Tunnel Safety Supervisor, v 1.0

All the On-the-Job Training Program must be conducted only at On-Site of relevant Industry. The details mentioned below are NOS wise Terminal Outcomes of OJT Period.

ICE/CON/N0601	**Implement Tunnel Site Safety Management System**
Mandatory OJT duration (in Hours)	**10:00**
Terminal Outcomes:	
During the OJT period, the candidate will be able to: • Implement the approved Tunnel Safety Management Plan at an active tunnel site. • Enforce permit-to-work systems for confined space, hot work and high-risk activities. • Conduct routine tunnel safety inspections and record findings accurately. • Verify compliance of workforce and contractors with site safety rules and SOPs. • Conduct toolbox talks addressing task-specific tunnel safety risks. • Monitor PPE usage and take corrective action for non-compliance. • Maintain safety registers, inspection logs and statutory documentation. • Report unsafe conditions and escalate safety concerns through defined channels. • Coordinate with engineers and site managers to close safety non-conformances.	
ICE/CON/N0602	**Conduct Hazard Identification, Risk Assessment & Control for Tunnelling**
Mandatory OJT duration (in Hours)	**10:00**
Terminal Outcomes:	
During the OJT period, the candidate will be able to: • Identify tunnelling-specific hazards at excavation face, access routes and work zones. • Conduct job safety analysis (JSA) for tunnel construction activities. • Apply risk assessment techniques to evaluate severity and likelihood of hazards. • Implement hierarchy of controls to mitigate identified risks. • Establish and monitor exclusion zones in high-risk tunnel areas. • Supervise high-risk activities such as blasting, scaling and heavy lifting. • Stop unsafe work and initiate corrective safety actions when required. • Review and update risk control measures based on changing ground conditions. • Communicate hazards and controls effectively to the tunnel workforce.	

ICE/CON/N0603	**Manage Ventilation, Gas Monitoring and Occupational Hygiene in Tunnels**
Mandatory OJT duration (in Hours)	**10:00**

Terminal Outcomes:

During the OJT period, the candidate will be able to:

- Supervise tunnel ventilation systems to maintain safe airflow conditions.
- Operate portable gas detectors to monitor oxygen levels and hazardous gases.
- Interpret gas monitoring data and identify unsafe atmospheric conditions.
- Initiate evacuation procedures upon detection of alarm conditions.
- Monitor dust, noise and diesel exhaust exposure in tunnel work zones.
- Enforce correct selection and use of respiratory protective equipment (RPE).
- Maintain calibration and inspection records of gas monitoring instruments.
- Coordinate corrective actions to restore safe tunnel atmospheric conditions.
- Report ventilation and occupational hygiene non-conformances.

ICE/CON/N0604	**Emergency Preparedness, Rescue & Evacuation in Tunnel Works**
Mandatory OJT duration (in Hours)	**10:00**

Terminal Outcomes:

During the OJT period, the candidate will be able to:

- Implement the tunnel emergency response plan during drills or real incidents.
- Coordinate safe evacuation of personnel from tunnel work areas.
- Supervise confined space rescue operations using approved procedures.
- Use and monitor readiness of emergency rescue equipment.
- Coordinate emergency communications with site teams and response agencies.
- Assist in casualty handling and first aid during emergency situations.
- Account for personnel during emergency roll calls.
- Participate in emergency drills and post-drill evaluations.
- Document emergency incidents, drills and corrective actions.

ICE/CON/N0605	**Manage Ground Support, Excavation Face Safety and Rockfall Controls**
Mandatory OJT duration (in Hours)	**10:00**

Terminal Outcomes:

During the OJT period, the candidate will be able to:

- Supervise installation of ground support systems such as rock bolts, mesh and shotcrete.
- Inspect excavation face conditions for signs of instability.
- Identify rockfall, collapse or convergence risks in tunnel sections.
- Control access to excavation face and enforce exclusion zones.
- Monitor geotechnical indicators and convergence measurements.
- Use scaling tools to remove loose rock under supervision.
- Stop work and escalate concerns upon detecting unstable ground conditions.
- Coordinate remedial ground support and stabilization measures.
- Maintain ground condition and support inspection records.

ICE/CON/N0606	**Manage Plant, TBM, Mechanical & Blasting Safety in Tunnelling**
Mandatory OJT duration (in Hours)	**10:00**
Terminal Outcomes:	
During the OJT period, the candidate will be able to: • Conduct safety inspections of tunnel plant, equipment and machinery. • Enforce safety procedures during TBM operations and maintenance. • Implement blasting safety protocols and exclusion zones. • Apply lockout–tagout (LOTO) procedures during equipment maintenance. • Supervise movement of mobile plant in confined tunnel spaces. • Monitor compliance with tunnel traffic management plans. • Identify mechanical and electrical hazards in tunnelling operations. • Participate in investigation of plant-related incidents or near-misses. • Maintain plant safety inspection and incident records.	

Annexure

Trainer Requirements

Minimum Educational Qualification	Specialization	Relevant Industry Experience		Preferable Training Experience	
		Years	Specialization	Years	Specialization
Post Graduation	Civil Engineering	2	Site Safety Supervision (Tunnel Work)	1	Site Safety Supervision (Tunnel Work)
OR					
Graduation	Civil Engineering	4	Site Safety Supervision (Tunnel Work)	1	Site Safety Supervision (Tunnel Work)
OR					
Diploma	Civil Engineering	6	Site Safety Supervision (Tunnel Work)	1	Site Safety Supervision (Tunnel Work)

Trainer Certification	
Domain Certification	**Platform Certification**
Recommended that the Trainer is certified for the Job Role: *"Tunnel Safety Supervisor"*, mapped to the Qualification Pack: "ICE/CON/Q0601, v1.0". The 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 is 80%.

Assessor Requirements

Minimum Educational Qualification	Specialization	Relevant Industry Experience		Preferable Training Experience	
		Years	Specialization	Years	Specialization
Post Graduation	Civil Engineering	2	Site Safety Supervision (Tunnel Work)	1	Site Safety Supervision (Tunnel Work)
OR					
Graduation	Civil Engineering	4	Site Safety Supervision (Tunnel Work)	1	Site Safety Supervision (Tunnel Work)
OR					
Diploma	Civil Engineering	6	Site Safety Supervision (Tunnel Work)	1	Site Safety Supervision (Tunnel Work)

Assessor Certification	
Domain Certification	**Platform Certification**
Recommended that the Assessor is certified for the Job Role: *"Tunnel Safety Supervisor"*, mapped to the Qualification Pack: "ICE/CON/Q0601, v1.0". The minimum accepted score is 80%.	Recommended that the Assessor is certified for the Job Role: *"Assessor (VET and skills)"*, mapped to the Qualification Pack: "MEP/Q2701, v3.0". The minimum accepted score is 80%.

Assessment Strategy

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

1. **Assessment System Overview:**

   Assessment is done through ICES affiliated Assessment Agencies. Assessors are trained & certified by ICES after Training of Assessor (ToA) program. Assessments are conducted to gauge and assess the trainee's skill and knowledge competency in the specified areas.
   The assessment will have both theory, practical and viva components as per ratio specified in each NOS for **Tunnel Safety Supervisor** job role.

   During the practical task, trainees are assessed on their workmanship, quality of finished product and time management. They will be graded for all their assessments based on the approved assessment strategy which is signed off by ICES. The Assessor submits an assessment plan to ICES prior to assessments.
   The assessment plan contains the following information:

   - What will be assessed, i.e. the competency based on each NOS based on theory, practical and viva questions
   - How assessment will occur i.e. methods of assessment
   - When the assessment will occur
   - Duration of assessment
   - Where the assessment will take place i.e. context of the assessment (workplace/simulation)
   - The criteria for decision making i.e. those aspects that will guide judgments
   - Where appropriate, any supplementary criteria are used to make a judgment on the level of performance.

   ICES will be monitoring thoroughly the complete Assessment process.

2. **Testing Environment:**

   - Training partner shares the batch start date and end date, number of trainees and the job role.
   - Assessment will be fixed for a day after the end date of training. It could be next day or later. Assessment will be conducted at the training venue/test center only.
   - The knowledge/theory assessments are conducted with proper seating arrangements with enough space between the candidates to prevent mal practicing.
   - Question set for Theory and Practical will be distributed to each candidate by the Assessor.
     - Theory testing will include MCQ type questions, pictorial questions etc. which will test the trainee on his theoretical knowledge of the subject.
     - Practical assessments will be conducted in the approved test centers. The training provider will ensure adequate tools and materials are available to conduct the practical test.
     - Viva Testing will be conducted during or post to the practical assessment by the assessor concerned. This Viva Assessment is applicable to understand the outcomes from OJT attended by the concerned candidate.
   - One (1) Assessor is eligible to conduct assessments of a batch of maximum 30 candidates.

- The assessment must comprise of two components, namely:
  - Knowledge assessment (Theory and Viva assessment)
  - Skill assessment (Practical / Hands-on Skill assessment)

3. Mode of assessment

- Demonstration/Practical Performance /Skill Assessment
- Synoptic multiple-choice question test for Theory Assessment
- Viva for Knowledge Assessment (Applicable to note the outcomes from OJT only)

4. Performance/skill assessment:

- The performance/skill assessment will be conducted through demonstration/practical
- For the practical test trainees are assessed through a given task, which they have to complete correctly for them to be marked as passed.
- The assessment is conducted in a simulated working environment. Due to this fact, the assessors must note that the naturally occurring evidence of competence is unavailable or infrequent. Simulation must be undertaken in a Realistic Working Environment which provides an environment that replicates the key characteristics of the workplace in which the skill to be assessed is normally employed.

5. Knowledge Assessment:

- The knowledge assessments are conducted through Theory (written) Test and Viva Test
- Synoptic test is used for this. It is an MCQ (Multiple Choice Question) test which is prepared externally and externally marked, meaning by agency having no link with training partners.
- The Viva test will be conducted by the assessor in the oral mode considering the communication and domain understanding of skills of trainees.
- The assessment strategy, weightage and duration of assessment for **Tunnel Safety Supervisor** is summarized below

Assessment Type	Formative or Summative	Strategies	Weightage	Duration (hours)
Knowledge	Summative	MCQ	30	1 hour
Knowledge	Summative	Viva	10	1 hour
Skill	Summative	Structured practical Task	60	6 hours

6. Assessment Quality Assurance levels/Framework

- ICES has developed assessment criteria framework for each Qualification pack as per National Occupational Standards. The criteria framework includes weightages/marks for each criterion under knowledge and skill. The criteria ensure quality assurance as they ensure valid, consistent and fair assessments at all locations. Issued to the affiliated Assessment body. The Assessment Body develops questions based on ICES's approved assessment criteria.
- The training partner will intimate the time of arrival of the assessor and time of leaving the venue. Random spot checks/audit may be conducted by ICES to monitor assessment.
- Continuous Monitoring through virtual and In-person mode are conducted to ensure the assessment is conducted as per stipulated process
- Process and Technical audit of assessment batches by quality team are conducted to avoid errors in assessment process
- A well -defined comprehensive framework of NON-COMPLIANCE MATRIX is defined and implemented to identify the non-compliance made by assessor and AA and punitive actions are taken correspondingly.

- The capacity building sessions are conducted regularly for assessors and assessment agencies to update them about best practices in assessment

7. Types of evidence or evidence-gathering protocol:

- Evidence in the form of answer sheets in case of knowledge assessments (Theory only) is collected.
- For Practical and Viva assessments videos and photographs are prepared as evidence. These are submitted by the assessor to the assessment agency. ICES does random checks of the same with the participant/ trainee's ID and ascertains authenticity and validity of assessments.
- Post Assessment, the evidence are uploaded by Assessor to assessment agency and further assessment agency to ICES as per stipulated TAT
- Evidence are broadly photographic and video graphics in nature (Geo-Tagged)
- Results along with evidence to be submitted to ICES by the concerning Assessment Agency in the prescribed format and on Digital Format and Physical Format (As required)
- Results to be uploaded on SIDH and other relevant portals for collective data management.

8. Method of verification or validation:

- The process and technical audit of assessment batches are done by Awarding Body
- Attendance of each candidate is verified and it is ensured that only those candidates are assessed by assessors who are meeting the stipulated minimum percentage of attendance
- The result of each candidate is verified; it is verified that that result on SIP is matched with respect to summary sheet submitted by AAs
- Under detailed technical audit for sample batches, the knowledge and skill assessment results for each candidate are checked in technical aspect.
- All the evidence of batches are preserved on server of Awarding Body digital platform

9. On the Job:

- On job training (OJT), candidates undergo training and leaning at actual workplace for a fixed period of time and a certain weightage of assessment is allocated out of total skill weightage of Qualification Pack for undergoing OJT as stipulated by ICES. This OJT score and assessors' end point score are combined to arrive at final Marking/grading of trainees' skill test. The OJT score is determined by Supervisor / Engineer / other authorized head of departments of relevant industry under which candidates undergo on job training.
- The Assessment is subject to take place only after submission of OJT data (in case of STT only) approved by concerned industry and training provider.
- The Hard copy of the OJT report (on trainings, outcomes, exposures learnt and feedback certified by Supervisor / Engineer / other authorized head of departments of relevant industry) will be submitted to the Assessor by the concerned candidate on the Assessment date only, failing which the candidate may not be allowed for attending the Assessment.
- As OJT is mandatory for this QP, the TP should ensure the correct submission of all relevant reports pertaining to OJT of each trained candidate. The Assessment agency is responsible for collecting all the relevant information and submit the same to ICES in future (if required).

References

Glossary

Term	Description
Sector	Sector is a conglomeration of different business operations having similar business 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.
Job role	Job role defines a unique set of functions that together form a unique employment opportunity in an organisation.
Occupational Standards (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 (KU) they need to meet that standard consistently. Occupational Standards are applicable both in the Indian and global contexts.
Performance Criteria (PC)	Performance Criteria (PC) are statements that together specify the standard of performance required when carrying out a task.
National Occupational Standards (NOS)	NOS are occupational standards which apply uniquely in the Indian context
Qualifications Pack (QP)	QP comprises the set of OS, together with the educational, training and other criteria required to perform a job role. A QP is assigned a unique qualifications 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.
Scope	Scope is a set of statements specifying the range of variables that an individual may have to deal with in carrying out the function which have a critical impact on quality of performance required.
Knowledge and Understanding (KU)	Knowledge and Understanding (KU) are statements which together specify the technical, generic, professional and organisational specific knowledge that an individual needs in order to perform to the required standard.
Organisational Context	Organisational context includes the way the organisation 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/ Generic Skills (GS)	Core skills or Generic Skills (GS) are a group of skills that are the key to learning and working in today's world. These skills are typically needed in any work environment 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.
Electives	Electives are NOS/set of NOS that are identified by the sector as contributive to specialization in a job role. There may be multiple electives within a QP for each specialized job role. Trainees must select at least one elective for the successful completion of a QP with Electives.
Options	Options are NOS/set of NOS that are identified by the sector as additional skills. There may be multiple options within a QP. It is not mandatory to select any of the options to complete a QP with Options.

Acronyms and Abbreviations

Acronym	Description
NOS	National Occupational Standard(s)
NSQF	National Skills Qualification Framework
QP	Qualification Pack
TVET	Technical and Vocational Education and Training
MSDE	Ministry of Skill Development and Entrepreneurship
NCVET	National Council for Vocational Education and Training
NSDC	National Skill Development Corporation
ICES	Integrated Council for Entrepreneurship and Skilling (erstwhile Integrated Council for Entrepreneurship and Skilling)
AB	Awarding Body
AA	Assessment Agency
TP	Training Partner
TC	Training Centre
ITI	Industrial Training Institute
ISCO	International Standard Classification of Occupations
NCO	National Classification of Occupations
NCrF	National Credit Framework
NEP	New Education Policy
Q-File	Qualification File
MC	Model Curriculum
PC	Performance Criteria
KU	Knowledge and Understanding
GS	Generic Skills
PMKVY	Pradhan Mantri Kaushal Vikas Yojana
DDUGKY	Deen Dayal Upadhyaya Grameen Kaushalya Yojana
STT	Short Term Training
RPL	Recognition of Prior Learning
NAPS	National Apprenticeship Promotion Scheme
NQR	National Qualification Register
OJT	On the Job Training
NSQC	National Skill Qualification Committee
IS	Indian Standard
PTW	Permit to Work
JSA	Job Safety Analysis
RA	Risk Assessment

HAZID	Hazard Identification
HAZOP	Hazard and Operability Study
LOTO	Lock Out – Tag Out
SCBA	Self-Contained Breathing Apparatus
TBM	Tunnel Boring Machine
NATM	New Austrian Tunnelling Method
CO	Carbon Monoxide
H_2S	Hydrogen Sulphide
CH_4	Methane
NOx	Oxides of Nitrogen
O_2	Oxygen
RPE	Respiratory Protective Equipment
MSDS	Material Safety Data Sheet
QA	Quality Assurance
QC	Quality Control
ITP	Inspection and Test Plan
PTI	Pre-Tunnel Inspection
ERT	Emergency Response Team
ERP	Emergency Response Plan
FRC	Fibre Reinforced Concrete
PLC	Programmable Logic Controller
ISO	International Organization for Standardization
ISI	Indian Standards Institution
CPR	Cardio Pulmonary Resuscitation
FMEA	Failure Mode and Effects Analysis