



# Model Curriculum

**QP Name: Helper – Construction Laboratory & Field Technician**

**QP Code: CON/Q0402**

**QP Version: 2.0**

**NSQF Level: 4**

**Model Curriculum Version: 1.0**

Construction Skill Development Council of India | Construction Skill Development Council of India (CSDCCI), CPB – 103 & 104, Block-4B, DLF corporate Park, Phase – III, MG Road Gurugram – 122002  
Near Guru Dronacharya Metro Station



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## Training Parameters

<b>Sector</b>	Construction Skill Development Council of India
<b>Sub-Sector</b>	Real Estate and Infrastructure Construction
<b>Occupation</b>	Quality Assurance & Quality Control
<b>Country</b>	India
<b>NSQF Level</b>	4
<b>Aligned to NCO/ISCO/ISIC Code</b>	NCO-2004/3111.10
<b>Minimum Educational Qualification and Experience</b>	10th Standard Pass
<b>Pre-Requisite License or Training</b>	NA
<b>Minimum Job Entry Age</b>	18 Years
<b>Last Reviewed On</b>	02/01/2020
<b>Next Review Date</b>	02/01/2024
<b>NSQC Approval Date</b>	
<b>QP Version</b>	Version number 2.0
<b>Model Curriculum Creation Date</b>	21/01/2020
<b>Model Curriculum Valid Up to Date</b>	02/01/2024
<b>Model Curriculum Version</b>	Version number 1.0
<b>Minimum Duration of the Course</b>	400 hrs
<b>Maximum Duration of the Course</b>	400 hrs

## Program Overview

### Training Outcomes

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

- Select, operate and maintain test instruments & equipment for construction material testing
- Carry out testing of cement, concrete, brick, block and aggregate
- Carry out testing of soil and bitumen in field and site laboratory
- Work effectively in a team to deliver desired results at the workplace
- Plan and organize work to meet expected outcomes
- Work according to personal health, safety and environment protocol at construction 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	Practical Duration	On-the-Job Training Duration (Mandatory)	On-the-Job Training Duration (Recommended)	Total Duration
<i>Bridge Module</i>	4:00 hrs	0	--	--	<b>4:00 hrs</b>
<b>CON/N0404</b> <i>Select, operate and maintain test instruments &amp; equipment for construction material testing</i> NOS Version No. 1.2 NSQF Level 4	<b>12:00 hrs</b>	<b>32:00 hrs</b>	--	--	<b>44:00 hrs</b>
CON/N0405 <i>Carry out testing of cement, concrete, bricks and aggregate</i> NOS Version No. 1.2 NSQF Level 4	32:00 hrs	104:00 hrs	--	--	<b>136:00 hrs</b>
<b>CON/N0406</b> <i>Select, operate and maintain test instruments &amp; equipment for construction material testing</i> NOS Version No. 1.2 NSQF Level 4	<b>40:00 hrs</b>	<b>104:00 hrs</b>	--	--	<b>144:00 hrs</b>
CON/N8001 <i>Work effectively in a team to deliver desired results at the workplace</i> NOS Version No.1.1 NSQF Level 4	08:00 hrs	12:00 hrs	--	--	<b>20:00 hrs</b>
<b>CON/N8002</b> <i>Plan and organize work to meet expected outcomes</i> NOS Version No.1.0 NSQF Level 4	<b>08:00 hrs</b>	<b>08:00 hrs</b>	--	--	<b>16:00 hrs</b>
CON/N9001 <i>Work according to personal health, safety</i>	16:00 hrs	16:00 hrs	--	--	<b>32:00 hrs</b>



<i>and environment protocol at construction site NOS Version No.1.4 NSQF Level 4</i>					
<b>Total Duration</b>	<b>124:00 hrs</b>	<b>276:00 hrs</b>	--		<b>400:00 hrs</b>



# Module Details

## Module 1: Bridge Module: Introduction to Construction laboratory and field technician job role

### Terminal Outcomes:

- Explain the role and responsibilities of construction laboratory and field technician.
- Identify the functions of construction laboratory and field technician.
- Identify the career progression for the construction laboratory and field technician.

<b>Duration:</b> 08:00	<b>Duration:</b> 00:00
<b>Theory – Key Learning Outcomes</b>	<b>Practical – Key Learning Outcomes</b>
<ul style="list-style-type: none"> <li>• Describe functions of construction laboratory and field technician.</li> <li>• Discuss major responsibilities of construction laboratory and field technician.</li> <li>• Explain tasks performed construction laboratory and field technician.</li> <li>• Define expected personal attributes from construction laboratory and field technician.</li> <li>• Discuss future possible progression and career development opportunities for construction laboratory and field technician.</li> </ul>	
<b>Classroom Aids:</b>	
Classroom of 30 students capacity, Black/White board, Projector/LED Monitor, Computer, Registers Trade specific charts and other teaching aids	
<b>Tools, Equipment and Other Requirements</b>	
NA	



## Module 2: Select, operate and maintain test instruments & equipment for construction material testing

### Mapped to NOS/N0404

#### Terminal Outcomes:

- Identify the tools, apparatus and equipment required for testing of cement, concrete, brick, aggregate, soil and bitumen.
- Demonstrate use of tools, apparatus and equipment required for testing of cement, concrete, brick, aggregate, soil and bitumen.
- Demonstrate operation of compression testing machine.

<b>Duration: 12:00</b>	<b>Duration: 32:00</b>
<b>Theory – Key Learning Outcomes</b>	<b>Practical – Key Learning Outcomes</b>
<ul style="list-style-type: none"> <li>• Explain basic principles of measurement, geometry and arithmetic calculation.</li> <li>• List all types of tools, instruments and equipment used for cement testing such as IS sieves, Vicat apparatus, Le-Chatelier apparatus, Le-Chatelier flask and cube moulds etc.</li> <li>• List all types of tools, instruments and equipment used for concrete testing such as cube moulds/ cylindrical moulds, slump cone apparatus, compacting factor test apparatus, Flow table test apparatus, Vee Bee test apparatus etc.</li> <li>• List all types of tools, instruments and equipment used for fine aggregate testing such as IS sieve, pycnometer, cylindrical metal container, oven, weighing balance etc.</li> <li>• List all types of tools, instruments and equipment used for coarse aggregate testing such as IS sieve, flakiness gauge, elongation gauge, crushing value apparatus, impact value apparatus, abrasion value apparatus etc.</li> <li>• List all types of tools, instruments and equipment used for soil testing such as IS sieves, compaction test apparatus, rapid moisture content meter apparatus, Casagrande’s device, mechanical sieve shaker, heating oven, core cutting test apparatus etc.</li> <li>• List all types of tools, instruments and equipment used for bitumen testing such as centrifuge extractor, thermometer, specific gravity bottle, penetrometer, bitumen compactor, flash and fire point test apparatus, Marshall stability test apparatus etc.</li> <li>• Explain importance of periodical calibration of testing tools, apparatus, instruments and equipment.</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstrate cleaning &amp; lubrication of instrument, apparatus &amp; equipment.as per manufactures specification.</li> <li>• Demonstrate checking &amp; calibration of instrument prior to testing as per standards.</li> <li>• Select appropriate tools, instruments and equipment/ apparatus for cement testing like IS sieves, Vicat apparatus, Le-Chatelier apparatus, Le-Chatelier flask and cube moulds.</li> <li>• Demonstrate the use of tools, instrument/ apparatus for cement testing like IS sieves, Vicat apparatus, Le-Chatelier apparatus, Le-Chatelier flask and cube moulds as per standard operating procedure.</li> <li>• Select appropriate tools, instruments and equipment/ apparatus for concrete test like concrete cube moulds/ cylindrical moulds, slump cone apparatus, compacting factor test apparatus, Flow table test apparatus, Vee Bee test apparatus.</li> <li>• Demonstrate the use of tools, instruments and equipment/ apparatus for concrete test like concrete cube moulds/ cylindrical moulds, slump cone apparatus, compacting factor test apparatus, Flow table test apparatus, Vee Bee test apparatus as per standard operating procedure.</li> <li>• Select appropriate tools, instruments and equipment/ apparatus for testing of fine aggregate like IS sieve, pycnometer, cylindrical metal container, oven, weighing balance.</li> <li>• Demonstrate the use of tools, instruments and equipment/ apparatus for testing of fine aggregate like IS sieve, pycnometer, cylindrical metal container, oven, weighing balance as per standard operating procedure.</li> </ul>

<ul style="list-style-type: none"> <li>• Explain various checks to determine working condition of testing tools, apparatus, instruments and equipment.</li> <li>• Explain working of compression testing machine for testing of cement, concrete, bricks and aggregate.</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstrate operation of compressing testing machine as per standard operating procedure for cement/concrete cubes, brick sample &amp; determine crushing value of coarse aggregate.</li> <li>• Select appropriate tools, instruments and equipment/ apparatus for testing of coarse aggregate like IS sieve, flakiness gauge, elongation gauge, crushing value apparatus, impact value apparatus, abrasion value apparatus.</li> <li>• Demonstrate the use of tools, instruments and equipment/ apparatus for testing of testing of coarse aggregate like IS sieve, flakiness gauge, elongation gauge, crushing value apparatus, impact value apparatus, abrasion value apparatus as per standard operating procedure.</li> <li>• Select appropriate tools, instruments and equipment/ apparatus for field testing of soil like IS sieves, compaction test apparatus, rapid moisture content meter apparatus, Casagrande's device, mechanical sieve shaker, heating oven, core cutting test apparatus.</li> <li>• Demonstrate the use of tools, instruments and equipment/ apparatus for field testing of soil like IS sieves, compaction test apparatus, rapid moisture content meter apparatus, Casagrande's device, mechanical sieve shaker, heating oven, core cutting test apparatus as per standard operating procedure.</li> <li>• Select appropriate tools, instruments and equipment/ apparatus for testing of bitumen like IS sieves, use centrifuge extractor, thermometer, specific gravity bottle, penetrometer, bitumen compactor, flash and fire point test apparatus, Marshall stability test apparatus.</li> <li>• Demonstrate the use of tools, instruments and equipment/ apparatus for testing of bitumen like IS sieves, use centrifuge extractor, thermometer, specific gravity bottle, penetrometer, bitumen compactor, flash and fire point test apparatus, Marshall stability test apparatus as per standard operating procedure.</li> <li>• Demonstrate Maintenance &amp; upkeep of all relevant tools, instruments, apparatus &amp; equipment.</li> </ul>
<p><b>Classroom Aids:</b></p>	
<p>Classroom of 30 students capacity, Black/White board, Projector/LED Monitor, Computer, Registers Trade specific charts and other teaching aids</p>	
<p><b>Tools, Equipment and Other Requirements</b></p>	
<p>Trowel , Sampling accessories for field density test of soil , Dishes , Weighing balance</p>	





Weighing dishes , Enameled trays, Desiccators, Thermometers, Vernier calipers, Stopwatch, Straight edge , measuring tape, Vicat apparatus, Le-Chatelier apparatus, Le-Chatelier flask, cube moulds, Vibration machine, Standard cement cube moulds, Gauging trowel, Standard sieves for Fine aggregate tests, Standard sieves for coarse , aggregate test, Pycnometer, calibrated volume measure for density test, , tamping rod , Brushes, Funnels, Graduated glass measuring cylinders , Concrete table vibrator, Slump cone Apparatus, compacting factor test apparatus, Flow table test apparatus, Vee Bee test apparatus, Compression testing machine , Casagrande apparatus, Plastic limit test apparatus , Shrinkage limit test apparatus, Compaction test apparatus, Permeability test apparatus, cylindrical metal container, heating oven, IS sieve, flakiness gauge, elongation gauge, crushing value apparatus, impact tester, abrasion value apparatus, rapid moisture content meter apparatus, mechanical sieve shaker, specific gravity bottle, bitumen compactor, flash and fire point test apparatus, Marshall stability test apparatus, Measuring Tape , Metal- Tri-Square , Spirit level , Steel scale, ,Safety Helmets , Safety goggles, Hand gloves , 'Safety Shoes (Assorted size), Safety Apron, Ear Plug, Lab coat  
Nose mask, Face mask, Board of Safety instructions



## Module 3: Carry out testing of cement, concrete, brick, block and aggregate

### Mapped to NOS/N0405

#### Terminal Outcomes:

- Demonstrate testing of cement, concrete, brick, block and aggregate samples.
- Demonstrate sample preparation of cement, concrete, brick, block and aggregate..
- Demonstrate the tagging / labelling/ numbering of collected material samples.
- Demonstrate disposal of tested material samples.

Duration: 32:00	Duration: 104:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> <li>• Explain method of tagging/ numbering/ labelling to collected test sample from field or test sample in laboratory</li> <li>• Describe acceptance/ rejection criteria of cement, concrete, brick, block and aggregate test samples.</li> <li>• Explain how to physically / visually check samples of cement, concrete, brick, aggregate in field &amp; laboratory.</li> <li>• Explain standard procedure for preparing test samples for various types of cement, concrete, brick, block, aggregate test in laboratory and in field.</li> <li>• List various test required to determine the consistency, fineness, initial and final setting time, compressive strength test, soundness test, specific gravity test of cement.</li> <li>• List various test required to determine workability of concrete such as slump cone test, compacting factor, compressing strength test and vee- bee test.</li> <li>• List various test required to determine the water absorption, compressive strength and efflorescence of brick.</li> <li>• List various test required to determine water absorption, density and compressive strength of block</li> <li>• List various test required to determine the specific gravity, particle size distribution, silt content and bulking of fine aggregate.</li> <li>• List various test required to determine the specific gravity test, bulk density, gradation, flakiness and elongation index, crushing value, impact value of coarse aggregate.</li> <li>• Explain safe operation of compression testing machine for testing of cement, concrete, brick, block and aggregate.</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstrate preparation of test samples of cement, concrete, brick, block and aggregate by weighing, measuring, sieving, compacting, oven drying the required quantity of material as per standard procedure.</li> <li>• Demonstrate casting of cement cubes &amp; concrete cubes in fields and laboratory as per standard procedure for compressive strength testing of cement and concrete</li> <li>• Demonstrate testing of cement samples to determine consistency, initial and final setting, fineness, soundness, specific gravity, compressive strength test of cement as per standard test procedure.</li> <li>• Demonstrate workability test such as slump cone test, compacting factor, Vee-bee test of fresh concrete and compressive strength of hardened concrete as per standard test procedure.</li> <li>• Demonstrate testing of fine aggregate samples to determine specific gravity, particle size distribution, silt content, bulking of fine aggregate as per standard test procedure.</li> <li>• Demonstrate testing of coarse aggregate samples to determine specific gravity, bulk density, gradation, flakiness and elongation index, crushing value, impact value, abrasion value of coarse aggregate as per standard test procedure.</li> <li>• Demonstrate testing of brick samples to determine water absorption, compressive strength, efflorescence of bricks as per standard test procedure.</li> <li>• Demonstrate testing of block samples to determine water absorption, density and compressive strength of bricks as per standard test procedure.</li> </ul>



<ul style="list-style-type: none"> <li>• Discuss importance of periodical calibration of testing tools, apparatus, instruments and equipment.</li> <li>• Describe importance of disposal/reuse of tested sample in appropriate manner.</li> <li>• Discuss the importance of protection of instrument and equipment from dust and heat.</li> <li>• Discuss need of IS codes knowledge relevant to cement, concrete, brick and aggregate testing.</li> <li>• Explain how to record readings from various test apparatus.</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstrate recording of readings relevant to test in standard Performa as per applicability</li> </ul>
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**Classroom Aids:**

Classroom of 30 students capacity, Black/White board, Projector/LED Monitor, Computer, Registers Trade specific charts and other teaching aids

**Tools, Equipment and Other Requirements**

Trowel , Sampling accessories for field density test of soil , Dishes , Weighing balance  
 Weighing dishes , Enameled trays, Desiccators, Thermometers, Vernier calipers, Stopwatch, Straight edge , measuring tape, Vicat apparatus, Le-Chatelier apparatus, Le-Chatelier flask, cube moulds, Vibration machine, Standard cement cube moulds, Gauging trowel, Standard sieves for Fine aggregate tests, Standard sieves for coarse , aggregate test, Pycnometer, calibrated volume measure for density test, , tamping rod , Brushes, Funnels, Graduated glass measuring cylinders , Concrete table vibrator, Slump cone Apparatus, compacting factor test apparatus, Flow table test apparatus, Vee Bee test apparatus, Compression testing machine , Casagrande apparatus, Plastic limit test apparatus , Shrinkage limit test apparatus, Compaction test apparatus, Permeability test apparatus, cylindrical metal container, heating oven, IS sieve, flakiness gauge, elongation gauge, crushing value apparatus, impact tester, abrasion value apparatus, rapid moisture content meter apparatus, mechanical sieve shaker, specific gravity bottle, bitumen compactor, flash and fire point test apparatus, Marshall stability test apparatus, Measuring Tape , Metal- Tri-Square , Spirit level , Steel scale, ,Safety Helmets , Safety goggles, Hand gloves , ‘Safety Shoes (Assorted size), Safety Apron, Ear Plug, Lab coat  
 Nose mask, Face mask, Board of Safety instructions

## Carry out testing of soil and bitumen in field and site laboratory

### Mapped to NOS/N0406

#### Terminal Outcome:

- Select appropriate test apparatus/equipment/tools for testing of soil and bitumen samples at laboratory and construction site.
- Demonstrate testing of soil and bitumen samples in laboratory and construction site.

<b>Duration: 40:00</b>	<b>Duration: 104:00</b>
<b>Theory – Key Learning Outcomes</b>	<b>Practical – Key Learning Outcomes</b>
<ul style="list-style-type: none"> <li>• Explain how to collect soil and bitumen sample from field.</li> <li>• Discuss acceptance/rejection criteria of soil and bitumen test sample</li> <li>• List various tools and equipment required for soil and bitumen testing in field and in site laboratory.</li> <li>• List various test required to determine the water content, Atterberg's limit, particle size distribution, specific gravity and compaction test of soil in laboratory.</li> <li>• List various test required to determine the bitumen content, specific gravity, ductility, penetration, softening point, flash and fire point, Marshall stability of bitumen in laboratory.</li> <li>• List various test required to determine the moisture content, dry density of soil at site.</li> <li>• List various method to determine dry density of soil such as sand replacement method and core cutting method.</li> <li>• Explain core cutting method to determine the bitumen content at site.</li> <li>• Define visual and physical checking of soil and bitumen in field and site laboratory.</li> <li>• Explain importance of repair and maintenance of tools and equipment relevant to soil and bitumen testing.</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstrate preparation of test samples of cement, concrete, brick, block and aggregate by weighing, measuring, sieving, compacting, oven drying the required quantity of material as per standard procedure.</li> <li>• Demonstrate testing of soil sample to determine water content, Atterberg's limit, particle size distribution, specific gravity and compaction of soil at laboratory as per standard test procedure.</li> <li>• Demonstrate testing of bitumen sample to determine bitumen content, specific gravity, ductility, penetration, softening point, flash and fire point, Marshall stability of bitumen as per standard test procedure.</li> <li>• Select field testing tools and accessories to perform soil and bitumen test at site.</li> <li>• Demonstrate testing of soil sample to determine rapid moisture content, dry density of soil by sand replacement method and core cutting method at site as per standard procedure</li> <li>• Demonstrate core cutting of bitumen to determine bitumen content in field as per standard test procedure</li> </ul>
<b>Classroom Aids:</b>	
Classroom of 30 students capacity, Black/White board, Projector/LED Monitor, Computer, Registers Trade specific charts and other teaching aids	
<b>Tools, Equipment and Other Requirements</b>	
Trowel , Sampling accessories for field density test of soil , Dishes , Weighing balance Weighing dishes , Enameled trays, Desiccators, Thermometers, Vernier calipers, Stopwatch, Straight edge , measuring tape, Vicat apparatus, Le-Chatelier apparatus, Le-Chatelier flask, cube moulds, Vibration machine, Standard cement cube moulds, Gauging trowel, Standard sieves for Fine aggregate tests, Standard sieves for coarse , aggregate test, Pycnometer, calibrated volume measure for density test, , tamping rod , Brushes, Funnels, Graduated glass measuring cylinders , Concrete table vibrator, Slump cone Apparatus, compacting factor test apparatus, Flow table test apparatus, Vee Bee test apparatus, Compression testing machine , Casagrande apparatus, Plastic limit test apparatus , Shrinkage limit test apparatus, Compaction test apparatus, Permeability test apparatus, cylindrical metal container, heating oven, IS sieve, flakiness gauge, elongation gauge, crushing value apparatus, impact tester, abrasion value apparatus, rapid moisture content meter apparatus, mechanical sieve shaker, specific gravity bottle, bitumen compactor, flash and fire point test apparatus, Marshall stability test apparatus, Measuring Tape ,	



Metal- Tri-Square , Spirit level , Steel scale , Safety Helmets , Safety goggles, Hand gloves , 'Safety Shoes (Assorted size), Safety Apron, Ear Plug, Lab coat  
Nose mask, Face mask, Board of Safety instructions



## Work effectively in a team to deliver desired results at the workplace

### Mapped to CON/N8001

#### Terminal Outcomes:

- Explain benefits of working in a team.
- Explain the benefits of effective communications between the teams.
- Demonstrate communication skills with co-workers & trade seniors.

<b>Duration:</b> 04:00	<b>Duration:</b> 20:00
<b>Theory – Key Learning Outcomes</b>	<b>Practical – Key Learning Outcomes</b>
<ul style="list-style-type: none"> <li>• Interpret work sketches, formats, permits, protocols, checklists and other work-related requirements which are to be conveyed to other team members.</li> <li>• Explain effects and benefits of timely actions relevant to laboratory and field testing work.</li> <li>• Explain importance of team work and its effects relevant to laboratory and field testing work</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstrate effective communication skills while interacting with co-workers, trade seniors and others during the assigned task.</li> <li>• Demonstrate effective reporting to seniors as per applicable organisational norms.</li> <li>• Demonstrate team work skills during assigned task.</li> </ul>
<b>Classroom Aids:</b>	
Classroom of 30 students capacity, Black/White board, Projector/LED Monitor, Computer, Registers Trade specific charts and other teaching aids	
<b>Tools, Equipment and Other Requirements</b>	
NA	



## Plan and organize work to meet expected outcomes

*Mapped to CON/N8002*

### Terminal Outcomes:

- Explain prioritizing work activities for early completion .
- Explain ways to organize desired resources for commencement of work.
- Demonstrate handling and organizing of tools and equipment.
- Demonstrate optimum utilization of resources.

<b>Duration:</b> 04:00	<b>Duration:</b> 12:00
<b>Theory – Key Learning Outcomes</b>	<b>Practical – Key Learning Outcomes</b>
<ul style="list-style-type: none"> <li>• Explain how to plan laboratory and field testing activities within defined scope and duration.</li> <li>• Explain basic concept of productivity and sequence of working.</li> <li>• Explain requisition of resources, reporting for requirement of resources orally and in written to concerned authority.</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstrate requisition of resource citing an example.</li> <li>• Demonstrate oral/ written reporting procedure to senior.</li> <li>• Demonstrate how to handle and organize laboratory and field testing tools, apparatus and equipment for testing work.</li> <li>• Demonstrate how to prioritize all works/ activities.</li> <li>• Demonstrate optimum utilization of resources citing an example.</li> </ul>
<b>Classroom Aids:</b>	
Classroom of 30 students capacity, Black/White board, Projector/LED Monitor, Computer, Registers Trade specific charts and other teaching aids	
<b>Tools, Equipment and Other Requirements</b>	
NA	



## Work according to personal health, safety and environment protocol at construction site

*Mapped to CON/N9001*

### Terminal Outcome:

- Identify various hazards at laboratory and construction site.
- Use PPE's for laboratory and field testing work.
- Perform safe waste disposal at laboratory and construction site.

<b>Duration: 08:00</b>	<b>Duration: 16::00</b>
<p><b>Theory – Key Learning Outcomes</b></p> <ul style="list-style-type: none"> <li>• Explain the types of hazards at the construction sites and identify the hazards specific to the laboratory and field testing work.</li> <li>• Recall the safety control measures and actions to be taken under emergency situation.</li> <li>• Explain the classes of fire and types of fire extinguishers.</li> <li>• Explain the importance of participation of workers in safety drills.</li> <li>• Explain the reporting procedure to the concerned authority in case of emergency situations.</li> <li>• Describe the standard procedure for handling, storing and stacking of testing material, tools, equipment and accessories.</li> <li>• Explain different types of waste at laboratory and construction sites and their disposal method.</li> <li>• Explain the purpose and importance of vertigo test at construction site.</li> <li>• List out basic medical tests required for working at laboratory and construction site.</li> <li>• Explain the types and benefits of basic ergonomic principles, which should be adopted while carrying out specific task at the laboratory and construction sites.</li> <li>• Explain the importance of housekeeping works.</li> </ul>	<p><b>Practical – Key Learning Outcomes</b></p> <ul style="list-style-type: none"> <li>• Demonstrate the operating procedure of the fire extinguishers.</li> <li>• Demonstrate different methods involved in providing first aid to the affected person.</li> <li>• Use PPEs as per work requirements during testing of materials at laboratory and construction site.</li> <li>• Demonstrate vertigo test.</li> <li>• Demonstrate safe waste disposal practices followed at laboratory and construction site.</li> <li>• Demonstrate safe housekeeping practices.</li> </ul>
<p><b>Classroom Aids:</b></p> <p>Classroom of 30 students capacity, Black/White board, Projector/LED Monitor, Computer, Registers Trade specific charts and other teaching aids</p>	
<p><b>Tools, Equipment and Other Requirements</b></p> <p>Leather Hand Gloves, Jump suit, Wire brush, Hand &amp; Leg guards leather, Safety goggles, Nose mask, Ear protection, Fire extinguishers, Sand buckets Flashback arrestors, Welding helmet, Welding glass</p>	



# Annexure

## Trainer Requirements

Trainer Prerequisites						
Minimum Educational Qualification	Specialization	Relevant Industry Experience		Training Experience		Remarks
		Years	Specialization	Years	Specialization	
Post-Graduation	M. Tech in Civil	2	Civil Engineering	0	Civil Engineering	Since pre-requisites are for new entrant. No prior experience in training /assessors are mandatory. If someone with prior experience in requisite domain, joins, experience will be measured as relevant industry experience.
Graduation	B. Tech in Civil	2	Civil Engineering	0	Civil Engineering	
Graduation	General B.A./B.Sc	6	Working as site laboratory tester, QA/QC domain, supervisor of QA/QC	0	Working as site laboratory tester, QA/QC domain, supervisor of QA/QC	
Ex. Army	Graduation Certificate from Army	6	Working as site laboratory tester, QA/QC domain, supervisor of QA/QC	0	Working as site laboratory tester, QA/QC domain, supervisor of QA/QC	
Diploma	Diploma in Civil	3	Working as site laboratory tester, QA/QC domain, supervisor of QA/QC	0	Working as site laboratory tester, QA/QC domain, supervisor of QA/QC	
ITI Course	ITI in relevant field	6	Working as site laboratory tester, QA/QC domain, supervisor of QA/QC	0	Working as site laboratory tester, QA/QC domain, supervisor of QA/QC	
Others	12th	6	Working as site laboratory tester, QA/QC domain, supervisor of QA/QC	0	Working as site laboratory tester, QA/QC domain, supervisor of QA/QC	

Trainer Certification	
Domain Certification	Platform Certification
Trainer- 70 % in each NOS of Qualification Pack "CON/Q0101" & 80% overall.	Trainers - 70% in each NOS of Qualification Pack "MEP/Q2701" and 80% overall.

## Assessor Requirements

Assessor Prerequisites						
Minimum Educational Qualification	Specialization	Relevant Industry Experience		Training/Assessment Experience		Remarks
		Years	Specialization	Years	Specialization	
Post-Graduation	M. Tech in Civil	2	Civil Engineering	0	Civil Engineering	Since pre-requisites are for new entrant. No prior experience in training /assessors are mandatory. If someone with prior experience in requisite domain, joins, experience will be measured as relevant industry experience.
Graduation	B. Tech in Civil	2	Civil Engineering	0	Civil Engineering	
Graduation	General B.A./B.Sc	7	Working as site laboratory tester, QA/QC domain, supervisor of QA/QC	0	Working as site laboratory tester, QA/QC domain, supervisor of QA/QC	
Ex.Army	Graduation certificate from Army	7	Working as site laboratory tester, QA/QC domain, supervisor of QA/QC	0	Working as site laboratory tester, QA/QC domain, supervisor of QA/QC	
Diploma	Diploma in Civil	5	Working as site laboratory tester, QA/QC domain, supervisor of QA/QC	0	Working as site laboratory tester, QA/QC domain, supervisor of QA/QC	
ITI Course	ITI in relevant field	7	Working as site laboratory tester, QA/QC domain, supervisor of QA/QC	0	Working as site laboratory tester, QA/QC domain, supervisor of QA/QC	
Other	12th	7	Working as site laboratory tester, QA/QC domain, supervisor of QA/QC	0	Working as site laboratory tester, QA/QC domain, supervisor of QA/QC	

Assessor Certification	
Domain Certification	Platform Certification
Assessor- 70% in each NOS of Qualification Pack "CON/Q0101" & 80% overall.	Assessors- 80% in each NOS of Qualification Pack "MEP/Q2701" and overall 80%.



## Assessment strategy

### Assessment system Overview

Assessment is done through CSDCI affiliated Assessment Body. Assessors are trained & certified by CSDCI after a 10-day training of assessor's program. Assessments is conducted to gauge and assess the trainee's skill and knowledge competency in the specified areas. The assessment will have both theory and practical components in 30:70 ratio for construction laboratory and field technician 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 CSDCI. The Assessor submits an assessment plan to CSDCI 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 and practical 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 and
- Where appropriate, any supplementary criteria used to make a judgment on the level of performance.

### 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.

The knowledge/theory assessments are conducted with proper seating arrangements with enough space between the candidates to prevent copying.

Question set for theory and practical will be distributed to each candidate by the Assessor. Theory testing will include multiple choice questions, pictorial question, etc. which will test the trainee on his theoretical knowledge of the subject. The skill /practical assessments will be conducted in the approved test centers. The Assessment agency/ Assessor will ensure adequate tools and materials are available to conduct the practical test.

The theory and practical assessments will be carried out on same day. If number of candidates are more than 20, more assessors will be organized on same day to complete the assessment

The assessment has to comprise of two components, namely:

1. Knowledge assessment (theory/viva assessment)
2. Skill assessment (practical/hands-on skill assessment)



### Mode of assessment

1. Demonstration/Practical for Performance /Skill Assessment
  2. Synoptic multiple choice question test
  3. Viva
- } For Knowledge Assessment

**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.

**Knowledge Assessment:** The knowledge assessments are conducted through written test/ viva.

Synoptic test is used for this. It is an MCQ (Multiple Choice Question) test which are prepared externally and externally marked, meaning by agency having no link with training partners. The test may be conducted by the assessor in the oral mode, if required, considering the lack of reading and comprehending acumen (skills) of trainees. In such cases, the assessor will mention it on top of the MCQ submitted to CSDCI.

The assessment strategy, weightage and duration of assessment for construction laboratory and field technician is summarized below:

Assessment Type	Formative or Summative	Strategies	Weightage	Duration (hours)
Knowledge	Summative	MCQ/Viva	30	1.5
skill	Summative	Structured practical task	70	5.5

### Assessment Quality Assurance framework

CSDCI has developed assessment criteria framework for each Qualification pack as per National Occupational Standards. The criteria framework includes weightages/marks for each criteria under knowledge and skill. This criteria ensures quality assurance as it ensures valid, consistent and fair assessments at all locations. Issued to the affiliated Assessment body. The Assessment body develop questions based on CSDCI issued assessment criteria.



Evidences in the form of answer sheets in case of knowledge assessments are collected. For skill assessments videos and photographs are prepared as evidence. These are submitted by the assessor to the assessment agency. CSDCI does random checks of the same with the participant/ trainee's ID and ascertains authenticity and validity of assessments.

The training partner will intimate the time of arrival of the assessor and time of leaving the venue. Random spot checks/audit is conducted by CSDCI to monitor assessment.

### ***Methods of Validation***

Unless the trainee is registered, the person cannot undergo assessment. To further ensure that the person registered is the person appearing for assessment, id verification is carried out. Adhar card number is part of registering the candidate for training. This forms the basis of further verification during the assessment.

Assessor conducts the assessment through theory and practical questions developed in accordance with the assessment criteria and guidelines issued by CSDCI. This too is verified by random audits carried out by CSDCI.

Video of the practical session is prepared and submitted to CSDCI for verification as per demand.

Assessment agency is responsible to put details in SIP. CSDCI will also validate the data and result received from the assessment agency.

### **Method of assessment documentation and access**

The assessment agency will upload the result of assessment in the portal. The data will not be accessible for change by the assessment agency after the upload. The assessment data will be validated by CSDCI assessment team. After upload, only CSDCI can access this data.

CSDCI approves the results within a week and uploads it on SIP.