Model Curriculum

QP Name: Chargehand Shuttering Carpenter

Elective 1: Conventional Formwork
Elective 2: System Formwork

QP Code: CON/Q3002

QP Version: 2.0

NSQF Level: 3.5

Model Curriculum Version: 2.0

Construction Skill Development Council of India|| Tower 4B, DLF Corporate Park, 201&, 202 4B, Mehrauli-Gurgaon Rd, DLF Phase 3, Gurugram, Haryana 122002

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Training Parameters

Sector	**Construction**
Sub-Sector	Real Estate and Infrastructure Construction
Occupation	Shuttering Carpentry
Country	India
NSQF Level	3.5
Aligned to NCO/ISCO/ISIC Code	NCO-2015/9313.9900
Minimum Educational Qualification and Experience	11th Grade pass OR Completed 1st year of 3-year diploma after 10th OR 10th-grade pass and pursuing continuous schooling OR 8th Grade pass with 3-year relevant experience OR Previous relevant Qualification of NSQF Level 2.5 with 3-year relevant experience OR Previous relevant Qualification of NSQF Level 3 with 1.5-year relevant experience
Pre-Requisite License or Training	NA
Minimum Job Entry Age	18 Years
Last Reviewed On	31/03/2022
Next Review Date	31/03/2025
NSQC Approval Date	31/03/2022
QP Version	2.0
Model Curriculum Creation Date	31/03/2022
Model Curriculum Valid Up to Date	31/03/2025

Model Curriculum Version	2.0
Minimum Duration of the Course	480 hours
Maximum Duration of the Course	810 hours
Rationalization Date	18/04/2024

Program Overview

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

Training Outcomes

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

- Explain the basics of the construction sector.
- Explain the difference between conventional formwork and system formwork.
- Demonstrate how to assemble system formwork for complex RCC structures, e.g. staircase, ramps, inclined structures, etc.
- Demonstrate how to dismantle the erected system formwork after the casting for the complex RCC structures.
- Explain how to interpret shop drawings and other drawings, e.g. plan, elevation and sectional drawings, for assembling precast and form finished structures.
- Demonstrate the assembling and dismantling of moulds/ frames for precast structures.
- Demonstrate the assembling and dismantling of formwork for form-finished structures.
- Explain how to interpret assembling/ shop drawings and work method statement for the installation of the jumpform system.
- Demonstrate the assembling and dismantling of the jumpform system as per the standard procedure.
- Provide support to co-workers, superiors and subordinates within the team and across interfacing teams to ensure the effective execution of assigned tasks.
- Demonstrate practices sensitive to disabilities (physical, mental, intellectual or sensory impairment), cultural diversity and gender neutrality.
- Demonstrate prioritizing of work activities to achieve the desired productivity.
- Demonstrate organizing of resources as per the work plan before commencement of work.
- Explain how to identify and minimize the relevant hazards at construction sites.
- Demonstrate the use of relevant PPE for false ceiling and drywall installation works.
- Demonstrate the safe disposal of waste at construction sites.
- Demonstrate the activities to check the spread of infection as per medical/ organizational guidelines.
- Explain how to interpret drawings, schedules and work method statements to carry out the shuttering for heavy civil construction work
- Ensure the assembling and dismantling of conventional formwork for heavy civil construction work using steel beams, channel sections/ truss and steel shuttering sheets
- Show how to conduct appropriate checks on the erected formwork to determine its quality concerning the line, level and alignment.

Compulsory Modules

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

NOS and Module Details	Theory Duration (Hrs.)	Practical Duration (Hrs.)	On-the-Job Training Duration (Mandatory) (Hrs.)	On-the-Job Training Duration (Recommended) (Hrs.)	Total Duration (Hrs.)
CON/N8001: Work effectively in a team to deliver desired results at the workplace **NOS Version- 12.0** **NSQF Level- 4**	**35:00**	**25:00**	**00:00**	**00:00**	**60:00**
Module 1: Introduction to the Construction Sector	10:00	00:00	00:00	00:00	10:00
Module 2: Introduction to Shuttering Carpentry - Conventional and System Formwork	20:00	00:00	00:00	00:00	20:00
Module 3: Work according to personal health, safety and environment protocols at the construction site	05:00	25:00	00:00	00:00	30:00
CON/N8002: Plan and organize work to meet expected outcomes **NOS Version- 9.0** **NSQF Level- 4**	**05:00**	**25:00**	**00:00**	**00:00**	**30:00**
Module 4: Plan and organize work to meet expected outcomes	05:00	25:00	00:00	00:00	30:00
CON/N9001: Work according to personal health, safety and environment protocols at the construction site **NOS Version- 10.0** **NSQF Level- 4**	**05:00**	**25:00**	**00:00**	**00:00**	**30:00**
Module 5: Follow safety norms as defined by the organization, adopt healthy and safe work practices	05:00	25:00	00:00	00:00	30:00
DGT/VSQ/N0101: Employability Skills **NOS Version- 1.0** **NSQF Level- 2**	**30:00**	**00:00**	**00:00**	**00:00**	**30:00**

Module 6: Employability Skills	30:00	00:00	00:00	00:00	30:00
Total Duration	**75:00**	**75:00**	**00:00**	**00:00**	**150:00**

Elective Modules

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

Elective 1: Conventional Formwork

NOS and Module Details	Theory Duration (Hrs.)	Practical Duration (Hrs.)	On-the-Job Training Duration (Mandatory) (Hrs.)	On-the-Job Training Duration (Recommended) (Hrs.)	Total Duration (Hrs.)
CON/N0319: Erect and dismantle conventional formwork for heavy civil construction works **NOS Version - 3.0** **NSQF Level - 3.5**	**75:00**	**225:00**	**30:00**	**00:00**	**330:00**
Module 7: Erect and dismantle conventional formwork for heavy civil construction works	75:00	225:00	30:00	00:00	330:00
Total Duration	**75:00**	**225:00**	**30:00**	**00:00**	**330:00**

Elective 2: System Formwork

NOS and Module Details	Theory Duration (Hrs.)	Practical Duration (Hrs.)	On-the-Job Training Duration (Mandatory) (Hrs.)	On-the-Job Training Duration (Recommended) (Hrs.)	Total Duration (Hrs.)
CON/N0316 - Assemble & dismantle system formwork for complex RCC structure **NOS Version - 4.0** **NSQF Level - 3.5**	**30:00**	**90:00**	**30:00**	**00:00**	**150:00**
Module 8: Assemble and dismantle system formwork for complex RCC structures	30:00	90:00	30:00	00:00	150:00
CON/N0317: Assemble & dismantle system formwork for Pre-cast	**30:00**	**60:00**	**00:00**	**00:00**	**90:00**

segments & form finished RCC structures NOS Version - 3.0 NSQF Level - 3.5					
Module 9: Assemble and dismantle system formwork for pre-cast segments and form finished RCC structures	30:00	60:00	00:00	00:00	90:00
CON/N0318: Erect & dismantle jump form system NOS Version - 3.0 NSQF Level - 3.5	**30:00**	**60:00**	**00:00**	**00:00**	**90:00**
Module 10: Erect and dismantle the jump form system	30:00	60:00	00:00	00:00	90:00
Total Duration	**90:00**	**210:00**	**30:00**	**00:00**	**330:00**

Module Details

Module 1: Introduction to the Construction Sector

Bridge Module, Mapped to CON/N8001, v12.0

Terminal Outcomes:

- Discuss the basics of the construction sector.

Duration: 10:00	Duration: 00:00
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Discuss the history of construction sector and its significance in the economy. • Describe the size and scope of the construction industry and its sub-sectors. • List various stakeholders involved in the construction industry, such as contractors, architects, engineers, suppliers, and regulatory bodies. • Discuss the construction project lifecycle including its different phases. • Explain the properties and applications of different construction materials. • Explain the basics of legal and regulatory framework that governs the construction industry, e.g. building codes, permits, and environmental regulations. • Discuss the basics of emerging construction technologies, such as Building Information Modeling (BIM) and digital tools used for project management and collaboration. • List different career paths available within the construction sector, e.g. design, engineering, management, etc.	
Classroom Aids:	
Black/Whiteboard, Projector/LED Monitor, Computer, Trade -specific charts and other teaching aids	
Tools, Equipment and Other Requirements	
N/A	

Module 2: Introduction to Shuttering Carpentry - Conventional and System Formwork

Bridge Module, Mapped to CON/N8001, v12.0

Terminal Outcomes:

- Explain the role and responsibilities of a Chargehand Shuttering Carpenter.
- Differentiate between system formwork and conventional formwork.
- Discuss the career progression of the Chargehand Shuttering Carpenter.

Duration: 20:00	**Duration: 00:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Discuss the fundamentals of shuttering carpentry and its role in construction projects. • List different tools, materials, and equipment used in shuttering carpentry. • Discuss the difference between conventional formwork and system formwork. • Explain the responsibilities of a Shuttering Carpenter with reference to conventional formwork, and system formwork. • List different tools and equipment used for conventional formwork and system formwork. • Explain the quality control requirements applicable to conventional formwork and system formwork. • Discuss the common challenges experienced in conventional formwork and system formwork, along with appropriate solutions. • Explain the appropriate safety measures concerning shuttering carpentry. • Discucss different career progression opportunities available to a Shuttering Carpenter in conventional formwork, and system formwork.	
Classroom Aids:	
Black/Whiteboard, Projector/LED Monitor, Computer, Trade-specific charts and other teaching aids	
Tools, Equipment and Other Requirements	
N/A	

Module 3: Work effectively in a team to deliver desired results at the workplace

Mapped to CON/N8001, v12.0

Terminal Outcomes:

- Explain the importance of interacting and communicating in an effective manner.
- Elucidate ways to support co-workers to execute the project requirements.
- Elucidate ways to practice inclusion at workplace.

Duration: 05:00	Duration: 25:00
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Elucidate own roles and responsibilities. • Explain the importance of effective communication. • Elucidate the consequence of poor teamwork on project outcomes, timelines, safety at the construction site, etc. • Explain different modes of communication used at workplace. • Explain the importance of creating healthy and cooperative work environment among the gangs of workers. • Elucidate applicable techniques of work, properties of materials used, tools and tackles used, safety standards that co-workers might need as per the requirement. • Explain the importance of proper and effective communication and the expected adverse effects in case of failure relating to quality, timeliness, safety, risks at the construction project site. • Explain the importance and need of supporting co-workers facing problems for the smooth functioning of work. • Discuss the fundamental concept of gender equality.	• Demonstrate how to pass on work related information/ requirement clearly to the team members. • Show how to report any unresolved problem to the supervisor immediately. • Demonstrate ways to hand over the required material, tools, tackles, equipment and work fronts timely to interfacing teams. • Demonstrate ways to work together with co-workers in a synchronized manner. • Demonstrate effective implementation of gender neutral practices at workplace. • Demonstrate ways to address discriminatory and offensive behaviour in a professional manner as per organizational policy.

• Explain how to recognise and be sensitive to issues of disability, culture and gender. • Discuss legislation, policies, and procedures relating to gender sensitivity and cultural diversity including their impact on the area of operation.	
Classroom Aids:	
Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films	
Tools, Equipment and Other Requirements	
N/A	

Module 4: Plan and Organize Work to meet Expected Outcomes

Mapped to CON/N8002, v9.0

Terminal Outcomes:

- Elucidate ways to plan and prepare for work.
- Explain the importance of organising required resources as per work plan.
- Explain the importance of completing work as per the plan.

Duration: 05:00	**Duration: 25:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain the importance of proper housekeeping including safe waste disposal. • Discuss policies, procedures and work targets set by superiors. • Explain how to identify work activities that need to be planned and organized. • Explain how to determine the task requirements. • Explain how to determine the quality requirements related to the task. • Elucidate how to undertake all aspect of planning and organizing the task, including interpretation of task, reading drawing/schedules, arranging resources, reporting problems etc. • Explain how to implement the planned activities.	• Demonstrate ways to determine the work requirements corresponding to task (drawings/schedules/instructions/methodology), safety, tools and equipment prior to commencement of task. • Show how to prepare the work areas in coordination with team members. • Demonstrate the procedures for organizing the required materials, tools and tackles required for the task. • Demonstrate how to use resources in an optimum manner to avoid any unnecessary wastage. • Demonstrate the practices to use tools, tackles and equipment carefully to avoid damage. • Show how to clean and organise the workplace after completion of task.
Classroom Aids	
Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films	
Tools, Equipment and Other Requirements	
NA	

Module 5: Work according to Personal Health, Safety and Environment Protocols at the Construction Site

Mapped to NOS CON/N9001 v10.0

Terminal Outcomes:

- Explain the importance of following safety norms as defined by the organization.
- Explain the need to adopt healthy & safe work practices.
- Describe the process of implementing good housekeeping and environment protection process and activities.
- Explain the importance of following infection control guidelines as per applicability.

Duration: 05:00	**Duration: 25:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Describe the reporting procedures in cases of breaches or hazards for site safety, accidents, and emergency situations as per guidelines. • Explain different types of safety hazards at construction sites. • Discuss basic ergonomic principles as per applicability. • Describe the procedure for responding to accidents and other emergencies at the site. • Explain the importance of handling tools, equipment, and materials as per applicable norms. • Explain the effect of construction material on health and environments as per applicability. • Describe various environmental protection methods as per applicability. • Explain the storage requirement of waste including non-combustible scrap material and debris, combustible scrap material and debris, general construction waste and trash (non-toxic, non-hazardous), any other hazardous	• Demonstrate how to follow emergency and evacuation procedures in case of accidents, fires, and natural calamities. • Show how to operate different types of fire extinguishers corresponding to various types of fires as per EHS guidelines. • Demonstrate the use of appropriate Personal Protective Equipment (PPE) as per work requirements for Head Protection, Ear Protection, Fall Protection, Foot Protection, Face and Eye Protection, Hand and Body Protection, and Respiratory Protection (if required). • Demonstrate how to check and install all safety equipment as per standard guidelines. • Show how to collect, segregate and deposit construction waste into appropriate containers based on their toxicity or hazardous nature. • Show how to clean and disinfect all materials, tools and supplies before and after use.

wastes and any other flammable wastes at the appropriate location. • Explain how to use hazardous material in a safe and appropriate manner as per applicability. • Explain types of fire. • Describe the procedure of operating different types of fire extinguishers. • State safety relevant to tools, tackles, and equipment as per applicability. • List housekeeping activities relevant to task. • Elucidate ways of transmission of infection • Explain the ways to manage infectious risks at the workplace. • Describe different methods of cleaning, disinfection, sterilization, and sanitization. • List the symptoms of infection like fever, cough, redness, swelling, and inflammation.	

Classroom Aids:
Black/Whiteboard, marker, Projector/LED Monitor, Computer, Trade specific charts, Safety tags, Safety Notice board, registers and other teaching aids
Tools, Equipment and Other Requirements
Leather Hand Gloves, Jumpsuit, Wire brush, Hand and Leg guard leather, Safety goggles, Nose mask, Ear protection, Fire extinguishers, Sand buckets Flashback arrestors, Welding helmet, Welding glass, Fire Extinguisher, Fire prevention kit, First Aid box, Safety tags, Safety Notice board

Module 6: Employability Skills (30 Hours)

Mapped to DGT/VSQ/N0101, v1.0

Duration: 30:00

Key Learning Outcomes

Introduction to Employability Skills Duration: 1 Hour

After completing this programme, participants will be able to:

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

Constitutional values - Citizenship Duration: 1 Hour

2. Explain constitutional values, civic rights, duties, citizenship, responsibility towards society etc. that are required to be followed to become a responsible citizen.

3. Show how to practice different environmentally sustainable practices

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

4. Discuss 21st-century skills.

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

Basic English Skills Duration: 2 Hours

6. Use appropriate basic English sentences/phrases while speaking

Communication Skills Duration: 4 Hours

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

8. Demonstrate working with others in a team

Diversity & Inclusion Duration: 1 Hour

9. Show how to conduct oneself appropriately with all genders and PwD

10. Discuss the significance of reporting sexual harassment issues in time

Financial and Legal Literacy Duration: 4 Hours

11. Discuss the significance of using financial products and services safely and securely.

12. Explain the importance of managing expenses, income, and savings.

13. Explain the significance of approaching the concerned authorities in time for any exploitation as per legal rights and laws

Essential Digital Skills Duration: 3 Hours

14. Show how to operate digital devices and use the associated applications and features, safely and securely

15. Discuss the significance of using the internet for browsing, and accessing social media platforms, safely and securely

Entrepreneurship Duration: 7 Hours

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

Customer Service Duration: 4 Hours

17. Differentiate between types of customers

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

19. Discuss the significance of maintaining hygiene and dressing appropriately

Getting Ready for Apprenticeship & Jobs Duration: 2 Hours

20. Create a biodata

21. Use various sources to search and apply for jobs

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

23. Discuss how to search and register for apprenticeship opportunities

Module 7: Erect and dismantle conventional formwork for heavy civil construction works

Mapped to CON/N0319, v3.0

Terminal Outcome:

- Explain how to interpret drawings, schedules and work method statements to carry out the shuttering work (conventional formwork) for heavy civil construction work.
- Demonstrate the assembling and dismantling of conventional formwork for heavy civil construction work using steel beams, channel sections/ truss and steel shuttering sheets
- Demonstrate the appropriate checks on the erected formwork to determine its quality concerning the line, level and alignment.

Duration: 75:00	**Duration: 225:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Discuss the types of drawings (plan, elevation and sectional drawings etc.) used for the conventional formwork. • Classify different types of plywood and timber which are used during shuttering (conventional formwork) work as per specifications and quality checks. • Discuss the use of standard tools and tackles for carrying out the shuttering work. • Explain the procedure of layout for shuttering work as per the drawing of heavy civil construction works. • Discuss the different types of conventional and system formwork. • Discuss the basics of tack welding and bolting procedures. • Discuss the standard size of formwork tools, materials and components. • Explain the sequence for assembling, dismantling and stacking formwork materials. • Discuss the safety measures to be taken during the shuttering work,	• Show how to interpret drawings, schedules and work method statements to obtain relevant details for shuttering work. • Show how to check the levels physically/ visually and the compaction of the ground surface. • Demonstrate the checks for the completion of the preparatory works before assembling the formwork (using steel beams, channel section/ truss and steel shuttering sheets). • Demonstrate how to erect/ dismantle staging using steel trestle for carrying out formwork for heavy civil construction. • Demonstrate the assembling and dismantling of conventional formwork for heavy civil construction work using steel beams, channel sections/ truss and steel shuttering sheets. • Demonstrate the checks to ensure the line, level, alignment, dimension and support of the erected formwork are within the applicable tolerance limits.

such as barricading the work area, fire protection, etc. • Explain the checks to ensure that the line, level, alignment and quality of the formwork are within the standard tolerance limit. • Explain the basics of reinforcement work, concreting, scaffolding and earthwork.	• Demonstrate the procedure for stacking and storing staging materials/ shuttering materials.

Classroom Aids:

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

Tools, Equipment and Other Requirements

Claw Hammer, Handsaw, Tenon saw, Iron Jack Planner , Wooden Marking Gauge , Wooden Mortise Gauge, Spirit Level , Tri-Square, Auger , Steel Measuring Tape, Farmer Chisel , Farmer Chisel , Mortise Chisel , Cutting Player, Screw Driver 10", Marking Knife / Scribe , Wooden Mallet, Oil Stone (Rough / Smooth), Center Punch , Bench Vice, Hacksaw Frame with blade, Triangle file - 6mm (Medium) , Half Round File & Rasp cut file, Drill Bit, Plumb Bob, Ring Spanner , Double End Spanner, Screw Spanner 12" LM, Carpenter Working Table, Nail Bar, Measuring tape, Spirit level, Water level tube, Plumb-bob, Mason's line, Lifting appliance (Sling, Shackle, Belts), Safety Helmet, Safety goggles, Safety shoes, Safety belt, Cotton gloves, Ear plugs , Reflective jackets, Dust mask, Fire Prevention kit, Conventional formwork for Footing, column, wall, beam, slab, Conventional scaffolding components (set)/bamboo, bellies, pipe & coupler scaffold components , 40 NB pipes, Swivel coupler, Fixed clamp, Steel walkways, Aluminum/ GI ladder, Safety net, Tying thread

Module 8: Assemble and Dismantle System Formwork for Complex RCC structures

Mapped to CON/N0316, v4.0

Terminal Outcome:

- Explain how to interpret drawings, schedules and work method statements to perform shuttering work.
- Demonstrate how to assemble system formwork for complex RCC structures.
- Demonstrate how to dismantle the erected system formwork after the casting for complex RCC structures.

Duration: 30:00	Duration: 90:00
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain the basic principles of measurement, geometry and arithmetic calculation relevant to shuttering carpenter's work. • Explain how to interpret sketches and working drawings used for shuttering work. • Discuss different types of conventional and system formwork. • State the standard size of formwork tools, materials and components. • Explain how to read drawings, schedules and work method statements relevant to shuttering work. • List different types of release agents (shuttering oil, cream emulsions, and chemical release agents) with their application. • Discuss the general tolerance for shuttering works. • Explain the concept of stripping time for removing shuttering of various RCC structural elements. • Discuss the stacking and storing of formwork components based on size, type and uses.	• Show how to prepare a sample estimate for the quantity of formwork material based on the relevant drawing. • Show how to prepare a sample estimate for the personnel required for various types of shuttering works. • Demonstrate the procedure of layout for the shuttering work by using relevant drawings. • Demonstrate assembling and dismantling of system formwork for RCC structures. • Demonstrate the use of relevant hand and power tools for shuttering carpentry. • Demonstrate the standard procedure for assembling and dismantling system formwork for RCC structures. • Show the use of lifting gears for shifting, fixing and removing heavy shutter panels. • Demonstrate the appropriate checks to ensure the line, level, alignment, dimension and right angle of the erected formwork are within the applicable tolerance limits. • Demonstrate the repair of formwork components.

• Explain the sequence of activity followed for RCC work. • Discuss the basics of reinforcement works, concreting works and scaffolding works.	
Classroom Aids:	
Black/White board, Projector/LED Monitor, Computer system, Trade specific charts and other teaching aids	
Tools, Equipment and Other Requirements	
Claw Hammer, Handsaw, Tenon saw, Iron Jack Planner , Wooden Marking Gauge , Wooden Mortise Gauge, Spirit Level , Tri-Square, Auger , Steel Measuring Tape, Farmer Chisel , Farmer Chisel , Mortise Chisel , Cutting Player, Screw Driver 10", Marking Knife / Scribe , Wooden Mallet, Oil Stone (Rough / Smooth), Centre Punch , Bench Vice, Hacksaw Frame with blade, Triangle file - 6mm (Medium) , Half Round File & Rasp cut file, Drill Bit, Plumb Bob, Ring Spanner , Double End Spanner, Screw Spanner 12" LM, Carpenter Working Table, Nail Bar, Measuring tape, Spirit level, Water level tube, dumpy level, auto level/ laser levelling machine, Plumb-bob, Mason's line, Lifting appliance (Sling, Shackle, Belts), Safety Helmet, Safety goggles, Safety shoes, Safety belt, Cotton gloves, Ear plugs , Reflective jackets, Dust mask, Fire Prevention kit, System formwork components and fixtures (for Staircase, landing, ramps, inclined structures, curved or circular structures), Hand held timber Cutting machine (Circular saw, Zig-jack saw), Drilling machine, Table mounted circular saw, planing machine	

Module 9: Assemble and Dismantle System Formwork for Pre-Cast Segments and Form Finished RCC Structures

Mapped to CON/N0317, v3.0

Terminal Outcome:

- Explain how to interpret shop drawings and other drawings for assembling precast and form finished structures.
- Demonstrate the assembling and dismantling of moulds/ frames for precast structures.
- Demonstrate the assembling and dismantling of formwork for form-finished structures.

Duration: 30:00	**Duration: 60:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Discuss the construction of pre-cast and form finished structures. • Explain the use of shop drawings and other drawings (e.g. plan, elevation and sectional drawings) for assembling precast segments moulds/frames. • Discuss the different types of tools, materials and components specific to pre-cast moulds/ frames and form finished formwork. • Discuss the sequence of activities adopted for precast construction (reinforcement work, fixing of block out, cast-in-services, assembling of components). • Describe the standard procedure adopted for assembling and dismantling moulds/frames for pre-cast segments. • Describe the standard procedure adopted for assembling and dismantling formwork for form-finished structures.	• Demonstrate the reading of shop drawings for assembling pre-cast moulds/frames for pre-cast structures. • Demonstrate the preparatory activities for assembling and dismantling precast moulds/frames and form-finished formwork. • Show assembling and dismantling of moulds/frames for pre-cast segments. • Describe the preparatory activities for assembling and dismantling of precast moulds/frames and form finished formwork. • Show the assembling and dismantling of formwork for form-finished structures.
Classroom Aids:	
Black/White board, Projector/LED Monitor, Computer system, Trade specific charts and other teaching aids	
Tools, Equipment and Other Requirements	

Claw Hammer, Handsaw, Tenon saw, Iron Jack Planner , Wooden Marking Gauge , Wooden Mortise Gauge, Spirit Level , Tri-Square, Auger , Steel Measuring Tape, Farmer Chisel , Farmer Chisel , Mortise Chisel , Cutting Player, Screw Driver 10", Marking Knife / Scribe , Wooden Mallet, Oil Stone (Rough / Smooth), Centre Punch , Bench Vice, Hacksaw Frame with blade, Triangle file - 6mm (Medium) , Half Round File & Rasp cut file, Drill Bit, Plumb Bob, Ring Spanner , Double End Spanner, Screw Spanner 12" LM, Carpenter Working Table, Nail Bar, Measuring tape, Spirit level, Water level tube, dumpy level, auto level/ laser levelling machine, Plumb-bob, Mason's line, Lifting appliance (Sling, Shackle, Belts), Safety Helmet, Safety goggles, Safety shoes, Safety belt, Cotton gloves, Ear plugs , Reflective jackets, Dust mask, Fire Prevention kit, System formwork components and fixtures , cup-lock scaffolding components (set)/ frame scaffold components, 40 NB pipes, swivel coupler, fixed clamp, steel walkways, Aluminium/ GI ladder, safety net, Hand held timber Cutting machine (Circular saw, Zig-jack saw), Drilling machine, Table mounted circular saw, planing machine

Module 10: Erect and Dismantle the Jump-form System

Mapped to CON/N0318, v3.0

Terminal Outcome:

- Explain how to interpret assembling/ shop drawings and work method statements for the installation of the jump-form system.
- Demonstrate the assembling and dismantling of the jump-form system as per the standard procedure.

Duration: 30:00	Duration: 60:00
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Discuss the specialized formwork – climbing formwork (jump form system and slip formwork). • Explain how to read the assembling/ shop drawings and work method statements for the installation of the jump form system. • Discuss the types of cranes and hydraulic jacks used for lifting of jump form system. • Explain how to identify potential hazards associated with the jump form system and the appropriate preventive measures. • Explain the use of tools, tackles, components and equipment required for the installation of the jump form system. • Explain the standard procedure for profiling formwork. • Explain the standard procedure for assembling and dismantling of jump form system.	• Demonstrate reading of assembling/ shop drawing and work method statement for installation of jump form system. • Show the preparatory activities involved in the installation of the jump form system. • Demonstrate profiling of formwork as per the required shape. • Demonstrate the assembling and dismantling of the jump form system as per the standard procedure. • Demonstrate fixing of anchor cones, ties, sleeves, shear keys, etc. • Show the use of fixtures and connections for the installation of the jump form system.
Classroom Aids:	
Black/White board, Projector/LED Monitor, Computer system, Trade specific charts and other teaching aids	
Tools, Equipment and Other Requirements	

Claw Hammer, Handsaw, Tenon saw, Iron Jack Planner , Wooden Marking Gauge , Wooden Mortise Gauge, Spirit Level , Tri-Square, Auger , Steel Measuring Tape, Farmer Chisel , Farmer Chisel , Mortise Chisel , Cutting Player, Screw Driver 10", Marking Knife / Scribe , Wooden Mallet, Oil Stone (Rough / Smooth), Center Punch , Bench Vice, Hacksaw Frame with blade, Triangle file - 6mm (Medium) , Half Round File & Rasp cut file, Drill Bit, Plumb Bob, Ring Spanner , Double End Spanner, Screw Spanner 12" LM, Carpenter Working Table, Nail Bar, Measuring tape, Spirit level, Water level tube, dumpy level, auto level/ laser levelling machine, Plumb-bob, Mason's line, Lifting appliance (Sling, Shackle, Belts), Safety Helmet, Safety goggles, Safety shoes, Safety belt, Cotton gloves, Ear plugs , Reflective jackets, Dust mask, Fire Prevention kit, System formwork components and fixtures , cup-lock scaffolding components (set)/ frame scaffold components, 40 NB pipes, swivel coupler, fixed clamp, steel walkways, Aluminum/ GI ladder, safety net, Hand held timber Cutting machine (Circular saw, Zig-jack saw), Drilling machine, Table mounted circular saw, planing machine

On-the-Job Training

Mapped to Chargehand Shuttering Carpenter, CON/Q3002, v 2.0

CON/N0319: Erect and dismantle conventional formwork for heavy civil construction works, v 3.0
Mandatory Duration: 30:00
Location: On Site
Terminal Outcomes • Show how to interpret drawings, schedules and work method statements to obtain relevant details for shuttering work. • Show how to check the levels physically/ visually and the compaction of the ground surface. • Demonstrate the checks for the completion of the preparatory works before assembling the formwork (using steel beams, channel section/ truss and steel shuttering sheets). • Demonstrate how to erect/ dismantle staging using steel trestle for carrying out formwork for heavy civil construction. • Demonstrate the assembling and dismantling of conventional formwork for heavy civil construction work using steel beams, channel sections/ truss and steel shuttering sheets. • Demonstrate the checks to ensure the line, level, alignment, dimension and support of the erected formwork are within the applicable tolerance limits. • Demonstrate the procedure for stacking and storing staging materials/ shuttering materials.
CON/N0316 - Assemble & dismantle system formwork for complex RCC structure, v 4.0
Mandatory Duration: 30:00
Location: On Site
Terminal Outcomes • Show how to prepare a sample estimate for the quantity of formwork material based on the relevant drawing. • Show how to prepare a sample estimate for the personnel required for various types of shuttering works. • Demonstrate the procedure of layout for the shuttering work by using relevant drawings. • Demonstrate assembling and dismantling of system formwork for RCC structures. • Demonstrate the use of relevant hand and power tools for shuttering carpentry. • Demonstrate the standard procedure for assembling and dismantling system formwork for RCC structures. • Show the use of lifting gears for shifting, fixing and removing heavy shutter panels. • Demonstrate the appropriate checks to ensure the line, level, alignment, dimension and right angle of the erected formwork are within the applicable tolerance limits. • Demonstrate the repair of formwork components.

Annexure

Trainer Requirements

Trainer Prerequisites						
Minimum Educational Qualification	**Specialization**	**Relevant Industry Experience**		**Training Experience**		**Remarks**
		Years	***Specialization***	***Years***	***Specialization***	
B. Tech	Civil/Mechanical/ Electrical	2	Shuttering Carpentry	0	-	
Diploma	Civil/Mechanical/ Electrical	3	Shuttering Carpentry	0	-	
ITI	Civil/Mechanical/ Electrical	6	Shuttering Carpentry	0	-	
General BA/BSc./ EX-Army/ 12th	Civil/Mechanical/ Electrical	6	Shuttering Carpentry	0	-	

Trainer Certification	
Domain Certification	**Platform Certification**
Recommended that the Trainer is certified for the Job Role: "Chargehand Shuttering Carpenter", mapped to the Qualification Pack: "CON/Q3002, v2.0". 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

Assessor Prerequisites						
Minimum Educational Qualification	**Specialization**	**Relevant Industry Experience**		**Training/Assessment Experience**		**Remarks**
		Years	***Specialization***	***Years***	***Specialization***	
B. Tech	Civil/Mechanical/ Electrical	2	Shuttering Carpentry	0	-	
Diploma	Civil/Mechanical/ Electrical	5	Shuttering Carpentry	0	-	
ITI	Civil/Mechanical/ Electrical	7	Shuttering Carpentry	0	-	

Assessor Certification	
Domain Certification	**Platform Certification**
Recommended that the Assessor is certified for the Job Role: "Chargehand Shuttering Carpenter", mapped to the Qualification Pack: "CON/Q3002, v2.0". 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:

- Batches assigned to the assessment agencies for conducting the assessment on SIP
- The batch allocation Matrix prepared for each month based on previous months' performance of AAs, which determines the quantum of Assessment which can be allocated to each AA for a month
- Post allocation of assessment, Assessment agencies send the assessment confirmation to SSC
- Assessment agency deploys the ToA certified Assessor for executing the assessment
- SSC monitors the assessment process.

2. Testing Environment:

- A combination of Theory and practical/demonstration test is deployed to assess knowledge and Skill respectively of Learners.
- Assessment is conducted at Training center in in-person/offline mode
- For Skill assessment, environment is simulated to create a realistic Working Environment that should replicate the key features of the workplace. In job roles, where it is difficult to replicate the same, the OJT assessment is implemented.
- During the practical task, trainees are assessed on their workmanship, quality of finished product, time management, etc., based on the performance criteria (PC), knowledge and understanding and their professional and soft skills as specified in the qualification pack.
- Knowledge assessment is done through closed ended questions up to level 4 and from level 5 onwards, it is mixture of open ended and closed ended questions

3. Assessment Quality Assurance levels/Framework

- Assessment criteria is developed for each QP which acts as a guide for developing question set /banks
- Sample questions aligned with Assessment criteria for each QP are developed by SSC and validated by industry
- Taking reference of Assessment criteria and Sample Questions, AAs create the question bank which is further validated by SSC
- Questions are mapped to the specified assessment criteria
- It is mandatory that Assessor and Trainer must be ToA certified & ToT Certified respectively
- 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 the 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

4. Types of evidence or evidence-gathering protocol:

- Post Assessment, the evidences are uploaded by Assessor to assessment agency and further assessment agency to SSC as per stipulated TAT
- Evidences are broadly the photographic and video graphic in nature
- Assessment agencies upload the evidence on SIP and detailed evidence on SSC digital platform (ZoHO)
- Evidences are; NOS wise-Geotagged photographs and videos of Theory Test &Practical Tasks, Attendance sheet, result summary sheet, group photographs.

5. Method of verification or validation:

- The process and technical audit of assessment batches are done by SSC
- 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 are matching with respect to summary sheet submitted by AAs
- Under detailed technical audit for sample of batches, the knowledge and skill assessment results for each candidate is checked in technical aspect.
- All the evidences of batches are preserved on server of SSC digital platform

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 CSDCI. 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 of company under which candidates undergo on job training.

References

Glossary

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

Acronyms and Abbreviations

Term	Description
QP	Qualification Pack
NSQF	National Skills Qualification Framework
NSQC	National Skills Qualification Committee
NOS	National Occupational Standards
CSDCI	Construction Skill development Council of India
MCQ	Multiple Choice Question
EHS	Environment Health and Safety
RCC	Reinforced Cement Concrete