

Objective, Learning Outcomes, Modules, Assessments and Material List

**ASSISTANT BAR BENDER & STEEL FIXER:**

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| <b>Submitted to:-<br/>Bihar Skill Development Mission, Labour<br/>Resources Department, GoB</b> | <b>Submitted By:-<br/>Simplex Infrastructures Ltd</b> |
|   | <b>Session :<br/>01</b>                               |

Course name: Assistant Bar Bender & Steel Fixer

- Course Id- Aligned to CON/Q0202
- Candidate Eligibility: 18 years of Age
- Course Duration: 254 Hours

**CONTACT DETAILS OF THE BODY SUBMITTING THE QUALIFICATION FILE**

**Name and address of submitting body:**

**Consortium Led by Simplex Infrastructures Ltd**

**Name and contact details of individual dealing with the submission**

**Name** : Ritesh Khanna  
**Position in the organization** : Director  
**Tel number(s) (Mobile no.)** : 8904597597  
**Website** : [www.indiavision.co](http://www.indiavision.co)  
**E-mail address** : [ritesh.khanna@indiavisionrealty.in](mailto:ritesh.khanna@indiavisionrealty.in)

## List of documents submitted in support of the Qualifications File

1. Curriculum Document

### SUMMARY

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| <b>Qualification Title</b>                                   | <b>Certificate in Assistant Bar Bender &amp; Steel Fixer</b>   |
| <b>Qualification Code</b>                                    | <b>CON/Q0102</b>   |
| <b>Nature and purpose of the qualification</b>               | <b>Nature</b><br><br><b>254 Hours (32 days) Certificate Course for Assistant Bar Bender &amp; Steel Fixer</b><br><br><b>Purpose</b><br><br>Assistant bar bender and steel fixer is responsible for identification, handling and use of tools and tackles, materials and equipment. The responsibilities also include reading and understanding reinforcement bar details from hand sketches and bar bending schedule, performing cutting, threading and manual bending of rebar and fabricating, placing and fixing of reinforcement bar at the desired location using correct ties within specified time and tolerance. |
| <b>Body/bodies which will award the qualification</b>        | <b>Consortium Led by Simplex and BSDM</b>  |
| <b>Occupation(s) to which the qualification gives access</b> | <b>Bar Bender &amp; Steel Fixer</b>  |
| <b>Entry requirements and / or recommendations</b>           | <b>5<sup>th</sup> Standard Pass</b>  |

**1. OBJECTIVE OF THE COURSE: -**

This person at the end of the program should be able identify, handle and use material, tools and equipment, cutting and manual bending of rebar, fabricating, placing and fixing of rebar under instruction and close supervision

**2. LEARNING OUTCOMES :-**

1. Read and understand reinforcement bar detail from hand sketches
2. Use and maintain materials, tools, and equipment relevant to reinforcement works
3. Perform cutting and manual bending of rebar for simple shapes
4. Assist in fabrication, placing and fixing of rebar for pre fabricated and in-situ RCC Structures
5. Erect and dismantle temporary scaffold up to 3.6 m height
6. Work effectively in a team to deliver desired results at the workplace
7. Work according to personal health, safety and environment protocol at construction site

**3. MODULE- 254 Hours (32 Days) (CERTIFICATE PROGRAM IN ASSISTANT BAR BENDER & STEEL FIXER)**

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| <b>DURATION :- 32 DAYS</b>  |   |
| <b><u>CERTIFICATE PROGRAM IN ASSISTANT BAR BENDER &amp; STEEL FIXER</u></b> |   |
| <b>MODULE CODE &amp; NAMES</b>  |   |
| <b>1</b>  | <b>Code :- CON/N0204</b><br><b>Module :-</b> Read and understand reinforcement bar detail from hand sketches  |
| <b>RATIONALE &amp; OBJECTIVE OF THE MODULES</b>                             | This unit describes the skills and knowledge required to be proficient in reading and understanding reinforcement bar details from hand sketches  |
| <b>MODULE COMPETENCE</b>  | The user/individual on the job should know and understand: <ul style="list-style-type: none"><li>• Read and understand rebar details from hand sketches</li><li>• Identify diameter, cutting length, number and shape of rebar from hand sketch</li><li>• Identify cover for rebar from hand sketch</li><li>• Read spacing detail for stirrups, main and secondary rebar, bar chairs, spacer bar from hand sketch</li><li>• Calculate cutting length of rebar for stirrups, hanger bar and chairs</li></ul> |

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|   | <ul style="list-style-type: none"> <li>• Calculate cutting length of rebar for simple shapes</li> </ul>   |
| <b>2</b>  | <p><b>Code :- CON/N0215</b></p> <p><b>Module :-</b> Use and maintain materials, tools and equipment relevant to reinforcement works</p>   |
| <b>RATIONALE &amp; OBJECTIVE OF THE MODULES</b> | This unit describes the skills and knowledge required to use and maintain materials, tools and equipment relevant to reinforcement works under instructions and close supervision   |
| <b>MODULE COMPETENCE</b>                        | <p>The user/individual on the job should know and understand:</p> <ul style="list-style-type: none"> <li>• Use materials such as binding wire, bar connecting coupler, thread protection cap, hand tools and power tools</li> <li>• Use bending machine for rebar bending using different types of bushes and other accessories under supervision</li> <li>• Use different types of slings, shackles and lifting belts for lifting and shifting of rebar</li> </ul>   |
| <b>3</b>  | <p><b>Code :- CON/N0216</b></p> <p><b>Module :-</b> Perform cutting and manual bending of rebar for simple shapes</p>   |
| <b>RATIONALE &amp; OBJECTIVE OF THE MODULES</b> | This unit describes the skills and knowledge required to perform cutting and manually bend rebar for simpler shapes under continuous instructions and close supervision.  |
| <b>MODULE COMPETENCE</b>                        | <p>The user/individual on the job should know and understand:</p> <ul style="list-style-type: none"> <li>• Select type of rebar as per instruction</li> <li>• Select hand tool or power tool for cutting of rebar as per the requirement</li> <li>• Use measurement tape and mark cutting length on rebar as per instruction</li> <li>• Straighten rebar using appropriate tools before bending if required</li> <li>• Mark on rebar, use lever or pipe of suitable diameter for bending of rebar</li> <li>• Mark on bending bench for making stirrups, chairs, hanger bars</li> <li>• Bend bars to required shape and angle manually as per criteria laid down on code sheets</li> </ul> |
| <b>4</b>  | <p><b>Code :- CON/N0217</b></p> <p><b>Module :-</b> Assist in fabrication, placing and fixing of rebar for pre-fabricated and in-situ R.C.C structures</p>  |

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| <b>RATIONALE &amp; OBJECTIVE OF THE MODULES</b> | This unit describes the skills and knowledge required to fabricate, place and fix reinforcement for pre-fabricated and in-situ R.C.C structures such as column, beam, slab, wall, footing and provide necessary assistance under instruction and close supervision  |
| <b>MODULE COMPETENCE</b>                        | <p>The user/individual on the job should know and understand:</p> <ul style="list-style-type: none"> <li>• Follow correct method for insertion/ fixing of rebar as per the types of structure (column, beam, slab and wall)</li> <li>• Place and fix rebar on its positions as per marking and instructions</li> <li>• Maintain uniform spacing between the bars, stirrups, links as per marking and instructions</li> <li>• Tie reinforcement with approved binding wires and use ties such as hairpin tie, ring hairpin tie, ring slash tie, crown tie as per instructions</li> <li>• Place and tie cover blocks at regular interval</li> <li>• Place and fix spacer bars to maintain proper gap between double layer rebar as per instruction</li> <li>• Place and fix chairs at specified spacing to maintain correct thickness in case of slab reinforcement</li> <li>• Follow sequence of tying for different types of pre-fabricated and in-situ R.C.C structures</li> </ul> |
| <b>5</b>  | <p><b>Code :- CON/N0101</b></p> <p><b>Module :-</b> Erect and dismantle temporary scaffold up to 3.6 meter height</p>   |
| <b>RATIONALE &amp; OBJECTIVE OF THE MODULES</b> | This unit describes the skills and knowledge required to erect and dismantle 3.6 meter temporary scaffold   |
| <b>MODULE COMPETENCE</b>                        | <p>The user/individual on the job needs to know and understand:</p> <ul style="list-style-type: none"> <li>• Level area where scaffold need to be erected and check for ground compactness if required</li> <li>• Place base plates and sole boards on the ground as per markings and instructions PC5. use proper components and follow standard procedure for erecting temporary scaffold up to 3.6m.</li> <li>• Fix walk-boards, guard rails, toe-boards and other components on working platform</li> <li>• Follow standard procedure for dismantling of temporary scaffold up to 3.6m.</li> </ul>  |
| <b>6</b>  | <b>Code :- CON/N8001</b>  |

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|   | <b>Module :-</b> Work effectively in a team to deliver desired results at the workplace   |
| <b>RATIONALE &amp; OBJECTIVE OF THE MODULES</b> | This unit describes the skills and knowledge required to work effectively within a team to achieve the desired results.   |
| <b>MODULE COMPETENCE</b>                        | The user/individual on the job needs to know and understand: <ul style="list-style-type: none"> <li>• Address the problems effectively and report if required to immediate supervisor appropriately and work cohesively as a team</li> <li>• Receive instructions clearly from superiors and respond effectively on same</li> <li>• Communicate to team members/subordinates for appropriate work technique and method</li> <li>• Sclarification and advice as per requirement and applicability</li> </ul> |
| <b>7</b>  | <b>Code :- CON/N9001</b><br><br><b>Module :-</b> Work according to personal health, safety and environment protocol at construction site  |
| <b>RATIONALE &amp; OBJECTIVE OF THE MODULES</b> | This unit covers the skill and knowledge required for an individual to work according to personal health, safety and environmental protocol at construction site  |
| <b>MODULE COMPETENCE</b>                        | The user/individual on the job should know and understand: <ul style="list-style-type: none"> <li>• Follow safety norms as defined by organization</li> <li>• Adopt healthy &amp; safe work practices</li> <li>• Implement good housekeeping practices</li> </ul>   |
| <b>MODE OF DELIVERY</b>                         | Practical and theoretical   |

| Sr. No. | Module  | Key Learning Outcomes   | Equipment Required  |
|---------|---|---|---|
| 1       | <p><b>Interpret reinforcement bar detail from hand sketches</b></p> <p><b>Theory Duration</b><br/>(hh:mm)<br/>02:00</p> <p><b>Practical Duration</b><br/>(hh:mm)<br/>36:00</p> <p><b>Corresponding NOS Code</b><br/>CON/N0214</p>               | <ul style="list-style-type: none"> <li>List different systems of linear measurement</li> <li>Apply the basic knowledge of units, measurement and arithmetic calculation relevant to bar bending work</li> <li>Describe the different types of reinforcement bars, their grade and standard size</li> <li>Determine diameter, cutting length, cover, number and shape of reinforcement bars from hand sketch</li> <li>Determine spacing details for stirrups, chairs, space bars etc. by interpreting hand sketches relevant to bar bending works.</li> </ul>  |   |
| 2       | <p><b>Use materials, tools, and equipment relevant to reinforcement works</b></p> <p><b>Theory Duration</b><br/>(hh:mm)<br/>02:00</p> <p><b>Practical Duration</b><br/>(hh:mm)<br/>36:00</p> <p><b>Corresponding NOS Code</b><br/>CON/N0215</p> | <ul style="list-style-type: none"> <li>Classify the reinforcement bar with respect to their grade and size.</li> <li>Differentiate binding wires based on materials and thickness</li> <li>Identify the different types of hand tools and power tools used for steel reinforcement works.</li> <li>Demonstrate the use of hand tools for cutting rebars.</li> <li>Demonstrate the use of power tools like circular cutting machine (handheld and table mounted) and shearing machine for cutting rebar.</li> <li>Describe the process adopted for care and maintenance of hand and power tools used in bar bending works.</li> <li>Demonstrate the use of threading machine for marking threads on reinforcement bars.</li> </ul> | <ul style="list-style-type: none"> <li>Chisel</li> <li>Hammer</li> <li>Bar tying hook</li> <li>Bending lever</li> <li>Gauge measure</li> <li>Podger Spanner</li> <li>Hack saw blade and frame</li> <li>Steel scale</li> <li>Try Scale</li> <li>Spirit level</li> <li>Plumb bob</li> <li>Measurement tape</li> <li>Cutting machine</li> <li>Bending machine</li> </ul> |

| Sr. No. | Module   | Key Learning Outcomes  | Equipment Required  |
|---------|--|--|---|
|         |  | <ul style="list-style-type: none"> <li>• Demonstrate the use of bar bending machine.</li> <li>• Explain use of lifting gears and equipment used in reinforcement work</li> <li>• Demonstrate the use of slings, shackles and lifting belts for lifting and shifting of rebar</li> <li>• State the importance of maintaining proper body postures while using hand and power tools</li> </ul>   | <ul style="list-style-type: none"> <li>• Reinforcement bar tying machine</li> <li>• Lifting appliance (Sling, Shackle, Belts)</li> <li>• Safety Helmet</li> <li>• Safety goggles</li> <li>• Safety shoes</li> <li>• Safety belt</li> <li>• Ear plugs</li> <li>• Reflective jackets</li> <li>• Dust mask</li> </ul>  |
| 3       | <p><b>Cut reinforcement bars and bend them manually in simple shapes</b></p> <p><b>Theory Duration</b><br/>(hh:mm)<br/>06:00</p> <p><b>Practical Duration</b><br/>(hh:mm)<br/>40:00</p> <p><b>Corresponding NOS Code</b><br/>CON/N0216</p> | <ul style="list-style-type: none"> <li>• Explain the procedure of measuring, marking and cutting of reinforcement bars into simple shapes.</li> <li>• List the types of stirrups, chairs and hanger bar</li> <li>• Describe tolerance limit for cutting and bending of the reinforcement bar</li> <li>• Explain the importance of maintaining proper body posture while cutting and bending reinforcement bars</li> <li>• Demonstrate marking and cutting of rebar to the specified length using appropriate hand cutting tools.</li> <li>• Demonstrate marking and cutting of rebar to the specified length using appropriate power cutting tools.</li> <li>• Demonstrate bending of reinforcement bar to the specified shape and angle using lever/ pipe.</li> <li>• Apply basic ergonomic principles while cutting and bending of the reinforcement bars</li> <li>• Demonstrate the procedure of making stirrups, chairs and hanger bars</li> </ul> | <ul style="list-style-type: none"> <li>• Hack saw</li> <li>• Rail piece</li> <li>• Pointed chisel</li> <li>• Sledge hammer</li> <li>• Bending lever</li> <li>• Pin plate</li> <li>• Working bench</li> <li>• Measuring Instruments</li> <li>• Measurement tape</li> <li>• Cutting machine</li> <li>• Bending machine</li> <li>• Steel cutting blade</li> <li>• Reinforcement bar tying machine</li> <li>• Lifting appliance (Sling, Shackle, Belts)</li> <li>• Safety Helmet</li> <li>• Safety goggles</li> <li>• Safety shoes</li> <li>• Safety belt</li> <li>• Reflective jackets</li> <li>• Dust mask</li> </ul> |
| 4       | <p><b>Fabricate, place and fix reinforcement bar for pre- fabricated and in-situ RCC Structures</b></p> <p><b>Theory Duration</b></p>  | <ul style="list-style-type: none"> <li>• List the different types of ties (Slash tie, ring slash tie, hair-pin tie, ring hair- pin tie, crown tie, lap tie) used in bar bending works</li> </ul>   | <ul style="list-style-type: none"> <li>• Hack saw</li> <li>• Rail piece</li> <li>• Pointed chisel</li> <li>• Sledge hammer</li> <li>• Bending lever</li> </ul>  |



| Sr. No. | Module  | Key Learning Outcomes  | Equipment Required  |
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|         | (hh:mm)<br>16:00<br><b>Practical Duration</b><br>(hh:mm)<br>62:00<br><b>Corresponding NOS Code</b><br>CON/N0217   | <ul style="list-style-type: none"> <li>• Describe the sequence for tying of reinforcement bar in case of in-situ and pre-fabricated cages</li> <li>• Explain the importance of lapping and staggering of reinforcement bars</li> <li>• Describe the standard method of staggering of reinforcement bars.</li> <li>• Explain use of chairs, hanger bar, spacer bar and cover blocks</li> <li>• Demonstrate placing and fixing of chairs as per requirement for the slab reinforcement.</li> <li>• Describe insertion and fixing sequence for footing, column, wall, beam and slab</li> <li>• Demonstrate insertion and fixing of rebar for column, slab, beam and wall.</li> <li>• Demonstrate fixing ties using hair pin tie, ring hair pin tie, slash tie, ring slash tie and crown tie.</li> <li>• Demonstrate marking, placing, fixing and tying of stirrups for column, beam, wall &amp; slab as per the specified spacing.</li> </ul> | <ul style="list-style-type: none"> <li>• Pin plate</li> <li>• Working bench</li> <li>• Binding hook</li> <li>• Measurement tape</li> <li>• Chalk piece</li> <li>• Cutting machine</li> <li>• Bending machine</li> <li>• M.S, TOR steel, TMT steel Binding wires</li> <li>• Steel cutting blade</li> <li>• Mechanical coupler</li> <li>• Cover blocks</li> <li>• Wooden planks</li> <li>• Reinforcement bar tying machine</li> <li>• Lifting appliance (Sling, Shackle, Belts)</li> <li>• Safety Helmet</li> <li>• Safety goggles</li> <li>• Safety shoes</li> <li>• Safety belt</li> <li>• Reflective jackets</li> <li>• Dust mask</li> </ul> |
| 5       | <b>Erect and dismantle temporary scaffold up to 3.6-meter height</b><br><br><b>Theory Duration</b><br>(hh:mm)<br>02:00<br><br><b>Practical Duration</b><br>(hh:mm)<br>30:00<br><br><b>Corresponding NOS Code</b><br>CON/N0101 | <ul style="list-style-type: none"> <li>• Explain scaffolding and its purpose</li> <li>• List the common materials and tools used for erection of scaffolding (pipe, cup lock (vertical and ledgers), H- frames, bamboo and balli</li> <li>• List the functions of different hand tools like hammer, spanner, pulleys, hooks, ropes, etc., used for erection/ dismantling of scaffolds</li> <li>• List the visual checks to be carried out on the scaffolding components to ascertain their usability</li> <li>• Identify different components of a temporary scaffolding such as base, toe board, guard rails, platform, walkways, ladder and so on</li> <li>• Explain the functions of materials, components and accessories used in scaffolding</li> <li>• Demonstrate preparation of scaffolding base</li> </ul>  | <ul style="list-style-type: none"> <li>• Hammer</li> <li>• Spanner (set)</li> <li>• Wrench</li> <li>• Pulley</li> <li>• Rope</li> <li>• Nuts and bolts</li> <li>• Measuring tape</li> <li>• Spirit level</li> <li>• Plumb-bob</li> <li>• Mason's line</li> <li>• Helmet</li> <li>• Safety shoes</li> <li>• Safety belt</li> <li>• Reflective jackets</li> </ul>   |

| Sr. No. | Module  | Key Learning Outcomes  | Equipment Required   |
|---------|---|--|--|
|         |   | <ul style="list-style-type: none"> <li>• Explain the methods adopted for the erection of the scaffold to ensure its safety</li> <li>• Demonstrate erection of a scaffold( up to 3.6 m height )using pipes and couplers/ cup lock system/ H frame using appropriate hand tools</li> <li>• Explain various checks to be done on completion of erection of scaffolds, such as verticality check, stability check etc.</li> <li>• Demonstrate the checks required for verticality, rigidity and stability during erection of scaffold.</li> <li>• Explain the sequence and standard procedure of dismantling and stacking of scaffold</li> <li>• Demonstrate the dismantling of the erected scaffold.</li> <li>• Demonstrate the stacking of material, components, tools and accessories during erection and after dismantling.</li> </ul> |  |
| 6       | <p><b>Work effectively in a team to deliver desired results at the workplace</b></p> <p><b>Theory Duration</b><br/>(hh:mm)<br/>02:00</p> <p><b>Practical Duration</b><br/>(hh:mm)<br/>08:00</p> <p><b>Corresponding NOS Code</b><br/>CON/N8001</p>    | <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>• Interpret work sketches, formats, permits, protocols, checklists and other work-related requirements which are to be conveyed to other team members</li> <li>• Demonstrate effective reporting to seniors while performing the assigned work as per applicable organisational norms</li> <li>• Explain effects and benefits of timely actions relevant to bar bending works with examples</li> <li>• Explain importance of team work and its effects relevant to bar bending works with examples</li> <li>• Demonstrate team work skills during assigned task.</li> </ul>   |  |
| 7       | <p><b>Work according to personal health, safety and environment protocol at construction site</b></p> <p><b>Theory Duration</b><br/>(hh:mm)<br/>02:00</p> <p><b>Practical Duration</b><br/>(hh:mm)<br/>10:00</p> <p><b>Corresponding NOS Code</b></p> | <ul style="list-style-type: none"> <li>• Explain the types of hazards at the construction sites</li> <li>• Identify the hazards specific to the bar bending and steel fixing 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>• Demonstrate the operation of fire extinguisher.</li> <li>• Demonstrate different methods involved in providing first aid to the affected person.</li> <li>• Explain the importance of worker participation in safety/mock drills</li> </ul>  | <ul style="list-style-type: none"> <li>• Safety shoes</li> <li>• Safety Goggles</li> <li>• Safety Helmet</li> <li>• Tools Bag</li> <li>• Safety Belt</li> <li>• Face Mask</li> </ul> |

| Sr. No. | Module    | Key Learning Outcomes   | Equipment Required  |
|---------|-----------|---|---|
|         | CON/N9001 | <ul style="list-style-type: none"> <li>• Demonstrate the use of all Personal Protective Equipment (PPE) like helmet, safety shoe, safety belt, safe jackets and other safety equipment relevant to bar bending work.</li> <li>• Explain the reporting procedure adopted in case of emergency situations</li> <li>• Describe the standard procedure for handling, storing and stacking of material, tools, equipment and accessories</li> <li>• Explain different types of wastes produced at a construction site including their disposal method</li> <li>• Explain the purpose and importance of vertigo test at construction site</li> <li>• Demonstrate vertigo test</li> <li>• List out basic medical tests required for working at construction Site</li> <li>• Explain the types of ergonomic principles adopted while carrying out specific task at the construction</li> <li>• Explain the benefits of basic ergonomic principles used at construction sites.</li> <li>• Explain the importance of housekeeping</li> <li>• Demonstrate housekeeping practice followed after reinforcement works.</li> </ul> | <ul style="list-style-type: none"> <li>• Reflective jackets</li> <li>• Safety message boards</li> <li>• Sand buckets</li> </ul> |
|         |           | <p><b>Total Duration:</b><br/>254 hours</p> <p><b>Theory Duration:</b><br/>32:00 hours</p> <p><b>Practical Duration</b><br/>222:00 hours</p>  |   |