

Assessment Evidence Guide

For

“Steel Fixer/ Erector Supervisor”

Level-4

(Summative Assessment)

Paper-1



**National Vocational & Technical
Training Commission**

Instruction Sheet for the Candidate

Title of Qualification: National Vocational Certificate Level 4 in Steel Fixer & Erector (Steel Fixer/Erector Supervisor)	CS Code:	Level: 4	Version: 01
Competency Standard Title: Plan and Supervise Work Manage Safety at Construction Site Perform 2D Engineering Drawings using CAD Software Prepare Bar Bending Schedule Fabricate Steel Reinforcement for Box Culverts/Bridges Perform Basic Green Skills for Steel Fixing	Assessment Date (DD/MM/YY): Assessment Time: 5hrs.		

Candidate Details	Name: Registration/Roll Number:
Guidance for Candidate	<p>To meet this standard, you are required to complete the following within the given time frame (for practical demonstration & assessment):</p> <p style="text-align: center;">Assessment Task 1: Candidate is required to perform fabrication of pier and pier cap in prototype bridge assigned by assessor.</p> <p>And complete:</p> <ol style="list-style-type: none"> 2. Knowledge assessment test (Written or Oral) 3. Portfolios at the time of assessment (if any)

<p>Minimum Evidence Required</p>	<p>During a practical assessment, under observation by an assessor, you will complete:</p> <p>Assessment Task 1</p> <p>Performance Criteria 1: Select type of steel as per site conditions.</p> <p>Performance Criteria 2: Select appropriate binding materials for the steel fixing components.</p> <p>Performance Criteria 3: Prepare workplace for task</p> <p>Performance Criteria 4: Collect required equipment</p> <p>Performance Criteria 5: Plan task sequences for optimum efficiency</p> <p>Performance Criteria 6: Use PPE and apply safe work practices</p> <p>Performance Criteria 7: Identify sizes and diameter of pier and pier cap and their location.</p> <p>Performance Criteria 8: Determine length and dia of main vertical rebars, diameter of spiral ties.</p> <p>Performance Criteria 9: Prepare spiral ties of required dia.</p> <p>Performance Criteria 10: Cut the vertical main rebars for piers and pier cap as per bar bending schedule.</p> <p>Performance Criteria 11: Make the bundle of prepared rebars and mark the bar code using tag for reference.</p> <p>Performance Criteria 12: Bind the pier reinforcement with spiral ties, having round concrete spacers, with dowels bars on pile cap.</p> <p>Performance Criteria 13: Bend the stirrups as per bending dimension</p> <p>Performance Criteria 14: Bind the bottom and top rebars with stirrups in the pier cap mold.</p> <p>Performance Criteria 15: Fix concrete spacer in bottom, sides of pier cap Insert dowel bars on pier cap</p> <p>Performance Criteria 16: Identify nature of emergency</p> <p>Performance Criteria 17: Select lifting equipment accordingly</p> <p>Performance Criteria 18: Assemble the lifting equipment</p>
	<p>Portfolios required at the time of assessment (if any) for</p>

- Report about emergency response activity & first aid treatments
- Folder/file includes evidence of Bar Bending Schedule
- Folder/file includes evidence of pile foundation, winged wall, transom, abutment and deck slab for bridge
- Folder/file includes evidence of 2D Engineering Drawings using CAD Software

Performance Criteria 1: Perform first aid treatment for a bone fracture.

Performance Criteria 2: Perform first aid treatment for a accidental bleeding.

Performance Criteria 3: Perform first aid treatment in simulated condition for eye injury.

Performance Criteria 4: Perform first aid treatment for a electrical shock

Performance Criteria 5: Identify nature of emergency.

- Raise fire alarm.
- Control fire by fire extinguishers (if possible).
- Evacuate the workplace.
- Follow the emergency plan.

Performance Criteria 6: Gather in assembly point.

Performance Criteria 7: Provide first aid to the rescue person

Performance Criteria 8: Mark direction and position of rebars from the drawing

Performance Criteria 9: Calculate number of chairs and spacer bars

Performance Criteria 10: Mark size and type of cover block

Performance Criteria 11: Identify types, diameter & shape of rebars

Performance Criteria 12: Calculate cutting length of straight rebars, bent up rebars, stirrups, rings and ties of concrete structure

Performance Criteria 13: Calculate the number of each shape of rebars

Performance Criteria 14: Calculate unit length weight for each dia. of bar

Performance Criteria 15: Calculate the total length of each type of rebars

Performance Criteria 16: Identify sizes of piles and its location

Performance Criteria 17: Measure and mark the required cut length of spiral tie bar

Performance Criteria 18: Bind the pile reinforcement with spiral at specified distance

Performance Criteria 19: Identify length, width and depth of pile cap and its location.

Performance Criteria 20: Bend the stirrups as per bending dimension

Performance Criteria 21: Make the bundle of prepared stirrups and rebars and mark the bar code by using tag for reference.

Performance Criteria 22: Bind the bottom and top bars with stirrups in the pile cap mold.

Performance Criteria 23: Fix concrete spacer in bottom, sides of pile cap.

Performance Criteria 24: Insert dowel bars on pile cap

Performance Criteria 25: Bind/assembled wing wall bars and abutment bars with dowel on pile cap as per bar bending schedule.

Performance Criteria 26: Fix concrete spacer in sides, of wing wall and abutment.

Performance Criteria 27: Bend the end hooks of bars as per bending dimension

Performance Criteria 28: Spread the rebars and distribution bars for slab in two direction

Performance Criteria 29: Put all stirrups in bottom and top bars of the beam

Performance Criteria 30: Bind the stirrups with bottom and top bars

Performance Criteria 31: Bind curtails bars with in the top and bottom bars

Performance Criteria 32: Put all stirrups in bottom and top rebars of the transom

Performance Criteria 33: Put extra rebars at the top of the transom

	<p>Performance Criteria 34: Bind the stirrups with bottom and top rebars</p> <p>Performance Criteria 35: Bind curtailed rebars with in the top and bottom rebars</p> <p>Performance Criteria 36: Spread the rebars for transom</p> <p>Performance Criteria 37: Bind rebars with one another with binding wire</p> <p>Performance Criteria 38: Add spacer according to bar bending schedule</p> <p>Performance Criteria 39: Create different 2D shapes with given measurements.</p> <p>Performance Criteria 40: Develop 2D Drawing with given project specification and measurements.</p> <p>Performance Criteria 41: Plot drawing on scale according to required size & orientation.</p>
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Observation Checklist

Assessment Task 1		Description of Assessment Task 1		
		Candidate is required to perform fabrication of pier in bridge cap according to size given by assessor.		
During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1.	Select type of steel as per site conditions.			
2.	Select appropriate binding materials for the steel fixing components.			
3.	Prepare workplace for task			
4.	Collect required equipment			
5.	Plan task sequences for optimum efficiency			
6.	Use PPE and apply safe work practices			
7.	Identify sizes and diameter of pier and pier cap and their location.			
8.	Determine length and dia of main vertical rebars, diameter of spiral ties.			
9.	Prepare spiral ties of required dia.			
10.	Cut the vertical main rebars for piers and pier cap as per bar bending schedule.			
11.	Make the bundle of prepared rebars and mark the bar code using tag for reference.			
12.	Bind the pier reinforcement with spiral ties, having round concrete spacers, with dowels bars on pile cap.			
13.	Bend the stirrups as per bending dimension			
14.	Bind the bottom and top rebars with stirrups in the pier cap mold.			
15.	Fix concrete spacer in bottom, sides of pier cap			
16.	Insert dowel bars on pier cap			
Competent <input type="checkbox"/>		Not Yet Competent <input type="checkbox"/>		

Portfolio		Description of Portfolio		
		<ul style="list-style-type: none"> ▪ Report about emergency response activity & first aid treatments ▪ Folder/file includes evidence of Bar Bending Schedule ▪ Folder/file includes evidence of pile foundation and winged wall, abutment and deck slab for bridge ▪ Folder/file includes evidence of 2D Engineering Drawings using CAD Software 		
During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1.	Perform first aid treatment for a bone fracture.			
2.	Perform first aid treatment for a accidental bleeding			
3.	Perform first aid treatment in simulated condition for eye injury.			
4.	Perform first aid treatment for a electrical shock			
5.	Identify nature of emergency. <ul style="list-style-type: none"> ▪ Raise fire alarm. ▪ Control fire by fire extinguishers (if possible). ▪ Evacuate the workplace. ▪ Follow the emergency plan. 			
6.	Gather in assembly point.			
7.	Provide first aid to the rescue person			
8.	Mark direction and position of rebars from the drawing			
9.	Calculate number of chairs and spacer bars			
10.	Mark size and type of cover block			
11.	Identify types, diameter & shape of rebars			
12.	Calculate cutting length of straight rebars , bent up rebars, stirrups, rings and ties of concrete structure			
13.	Calculate the number of each shape of rebars			
14.	Calculate unit length weight for each dia. of bar			
15.	Calculate the total length of each type of rebars			
16.	Identify sizes of piles and its location			
17.	Measure and mark the required cut length of spiral tie bar			
18.	Bind the pile reinforcement with spiral at specified distance			
19.	Identify length, width and depth of pile cap and its location.			
20.	Bend the stirrups as per bending dimension			
21.	Make the bundle of prepared stirrups and rebars and mark the bar code by using tag for reference.			
22.	Bind the bottom and top bars with stirrups in the pile cap mold.			

23.	Fix concrete spacer in bottom, sides of pile cap.				
24.	Insert dowel bars on pile cap				
25.	Bind/assembled wing wall bars and abutment bars with dowel on pile cap as per bar bending schedule.				
26.	Fix concrete spacer in sides, of wingwall and abutment.				
27.	Bend the end hooks of bars as per bending dimension				
28.	Spread the rebars and distribution bars for slab in two direction				
29.	Put all stirrups in bottom and top bars of the beam				
30.	Bind the stirrups with bottom and top bars				
31.	Bind curtails bars with in the top and bottom bars				
32.	Put all stirrups in bottom and top rebars of the transom				
33.	Put extra rebars at the top of the transom				
34.	Bind the stirrups with bottom and top rebars				
35.	Bind curtailed rebars with in the top and bottom rebars				
36.	Spread the rebars for transom				
37.	Bind rebars with one another with binding wire				
38.	Add spacer according to bar bending schedule				
39.	Create different 2D shapes with given measurements.				
40.	Develop 2D Drawing with given project specification and measurements.				
41.	Plot drawing on scale according to required size & orientation.				
Competent <input type="checkbox"/>		Not Yet Competent <input type="checkbox"/>			

Question	Candidate's answer
5. Define Deck slab	
6. What are the types of safety system in foundation?	
7. Define abutment wall.	
8. Explain entry procedure for confined spaces.	
9. Enlist factors for working in confined spaces	
10. Describe reinforcement in trench/mine.	
11. Define strands?	
12. What are types of barrication?	
13. Write four basic functions of management?	
14. Define Green business?	
15. Define supply chain management?	
16. Define inventory management?	
17. Write the names of principals of communication?	

ANSWER KEY

Sr.	Answers
1.	A civil drawing, or site drawing, is a type of technical drawing that shows information about grading, landscaping, or other site details. These drawings are intended to give a clear picture of all things in a construction site to a civil engineer.
2.	A distance of concrete from outer edge to rebar without reinforcement
3.	7750 kg/m ³ to 8050 kg/m ³
4.	Pile foundation is defined as a column constructed into the ground to transmit loads to a lower level of subsoil
5.	Deck slab is a slab of concrete used to make the base for the roadway, railway, pedestrian walkway, etc. on the bridge
6.	Shielding. Shoring. Sloping
7.	An <i>abutment</i> wall is the substructure at the ends of a <i>bridge</i> span or dam supporting its superstructure
8.	A check list be completed and signed for entering confined spaces containing special checks according to that area like entering in a trench or mine <ul style="list-style-type: none"> • Oxygen level • Humidity • Illumination • Communication equipment • Temperature • Escape plan
9.	<ul style="list-style-type: none"> • Ensure that the atmosphere is tested and monitored for harmful elements. • Enter the confined space according to agreed procedure • Maintain communication with the stand-by person
10.	Followings points are important. <ul style="list-style-type: none"> • Prepare as per check list before entry. • Arrange the tools for the job • Use PPEs
11.	Each of the strings which, twisted together, make up a yarn, rope or cord
12.	Concrete blocks, plastic blocks, safety tapes , safety signs
13.	<ul style="list-style-type: none"> • Planning • Organizing • Staffing • Leading • Organizing
14.	Green business functioning in a capacity where no negative impact is made on local or global environment, the community and the economy.
15.	Supply chain management is the flow of goods and services and includes all processes that transform raw materials into final products. It involves the active streamlining of a business's supply-side activities to maximize customer value and gain a competitive advantage in the marketplace.
16.	Inventory management is a discipline primarily about specifying the shape and placement of stocked goods.
17.	Completeness; Concreteness; Courtesy; Correctness; Clarity; Consideration; Conciseness

Assessment Evidence Guide

For

“Steel Fixer/ Erector Supervisor”

Level-4

(Summative Assessment)

Paper-2



**National Vocational & Technical
Training Commission**

Instruction Sheet for the Candidate

Title of Qualification: National Vocational Certificate Level 4 in Steel Fixer & Erector (Steel Fixer/Erector Supervisor)	CS Code:	Level: 4	Version: 01
Competency Standard Title: Perform Computer Applications Execute Steel Work In Confined Spaces Fabricate Steel Reinforcement For Pre Stressed Structure Member Execute Splicing and Anchoring using Mechanical Methods Practice Entrepreneurial Skills	Assessment Date (DD/MM/YY): Assessment Time : 5hrs		

Candidate Details	Name: Registration/Roll Number:
Guidance for Candidate	<p>To meet this standard, you are required to complete the following within the given time frame (for practical demonstration & assessment):</p> <p style="text-align: center;">Assessment Task 1: Candidate is required to fabricate steel reinforcement and conduits for pre stressed girder as per drawing given by assessor</p> <p>And complete:</p> <ol style="list-style-type: none"> 4. Knowledge assessment test (Written or Oral) 5. Portfolios at the time of assessment (if any)
Minimum Evidence Required	<p>During a practical assessment, under observation by an assessor, you will complete:</p> <p>Assessment Task 1</p> <p>Performance Criteria 1: Interpret bar bending schedule</p> <p>Performance Criteria 2: Straighten rebars.</p> <p>Performance Criteria 3: Measure and mark required cut length on rebars</p> <p>Performance Criteria 4: Cut the rebars</p> <p>Performance Criteria 5: Make the bundle of prepared rebars and mark the bar code</p> <p>Performance Criteria 6: Fix the steel sheets of required size</p> <p>Performance Criteria 7: Place the flexible conduits in the mould</p> <p>Performance Criteria 8: Place top and bottom steel</p> <p>Performance Criteria 9: Fix the shear reinforcement with top and bottom steel</p> <p>Performance Criteria 10: Place steel/strands in conduits</p> <p>Performance Criteria 11: Provide tension by pulling tendons from the anchorage points</p> <p>Performance Criteria 12: Provide dead end anchors</p> <p>Performance Criteria 13: Fill flexible conduits with cement mortar</p>
	<p>Portfolios required at the time of assessment (if any) for</p>

- Folder/file includes power point presentation about entrepreneurial skills
 - Folder/file includes spread sheets
 - Folder/file includes evidence of splice and anchor using mechanical methods
- Performance Criteria 1:** Develop a worksheet as per given data.
- Performance Criteria 2:** Format the worksheet according to given criteria.
- Performance Criteria 3:** Apply Formulas according to the requirement.
- Performance Criteria 4:** Generate Charts/Graphs according to the given data.
- Performance Criteria 5:** Print Worksheet according to requirements.
- Performance Criteria 6:** Insert Slides with different Layouts according to requirements of presentation.
- Performance Criteria 7:** Insert text, tables, images, etc. according to the requirement.
- Performance Criteria 8:** Apply a set of effects to animate the slide according to requirement.
- Performance Criteria 9:** Apply Slide Transitions on Slides according to requirement.
- Performance Criteria 10:** Apply Sound Effects on Objects/text/images according to requirement.
- Performance Criteria 11:** Present a presentation according to 7Cs of communication.
- Performance Criteria 12:** steel work in confined spaces Select tools for checking working conditions
- Performance Criteria 13:** Select & wear PPEs
- Performance Criteria 14:** Mark check list includes:
- Oxygen level
 - Humidity
 - Illumination
 - Communication equipment
 - Temperature Escape Plan Emergency Plan
- Performance Criteria 15:** Interpret of bar bending schedule
- Performance Criteria 16:** Interpret structure drawings
- Performance Criteria 17:** Straighten the rebars.
- Performance Criteria 18:** Measure and mark the required cut length on rebars
- Performance Criteria 19:** Cut the rebars
- Performance Criteria 20:** Make the bundle of prepared rebars and mark the bar code using tag for pre stressed girder for reference.
- Performance Criteria 21:** Mark spacing of rebars on prepared bed
- Performance Criteria 21:** Place rebars according to drawing
- Performance Criteria 22:** Bind rebars
- Performance Criteria 23:** Place spacers as per requirement
- Performance Criteria 24:** Recover tools, equipment and materials from the confined space
- Performance Criteria 25:** Clear work area and dispose of or recycle materials
- Performance Criteria 26:** Remove, clean and store barriers and signs
- Performance Criteria 27:** Prepare material as per requirement
- Performance Criteria 28:** Thread reinforcement rebars as detailed in job specifications
- Performance Criteria 29:** Fit and secure splicing couplers to reinforcing bar in accordance with job specifications
- Performance Criteria 30:** Free coupler connections and reinforcing rebars from mill scaling and residual debris
- Performance Criteria 31:** Locate and anchor reinforcement as prescribed in job specifications

	<p>Performance Criteria 32:Fix ties to reinforcement</p> <p>Performance Criteria 33:Check depth of coverage, clearance, spacing and overlap of reinforcement material according to drawing</p> <p>Performance Criteria 34:Clean, maintain and store plant tools & equipment</p>
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Assessors Judgment Guide

(to be completed by the Assessor and signed both by the assessor and the candidate after the assessment)

Candidate Details	Name:Registration/Roll Number: Candidate Signature:.....
Assessment Outcome	COMPETENT <input type="checkbox"/> NOT YET COMPETENT <input type="checkbox"/> Name of the Assessor:Assessor's code: Signature of the Assessor:

Assessment Summary (to be filled by the assessor)							
Activity	Method					Result	
Nature of Activity	Written	Oral	Observation	Portfolio	Role Play	Competent	Not Yet Competent
Practical Skill Demonstration			✓	✓			
Knowledge Assessment	✓	✓					
Other Requirement							

Observation Checklist

Assessment Task 1	Description of Assessment Task 1 Candidate is required to fabricate steel reinforcement and conduits for pre stressed girder as per drawing given by assessor		
During the practical assessment, candidate demonstrated the following:	Yes	No	Remarks
1. Interpret bar bending schedule			
2. Straighten rebars.			
3. Measure and mark required cut length on rebars			
4. Cut the rebars			
5. Make the bundle of prepared rebars and mark the bar code			
6. Fix the steel sheets of required size			
7. Place the flexible conduits in the mould			
8. Place top and bottom steel			
9. Fix the shear reinforcement with top and bottom steel			
10. Place steel/strands in conduits			
11. Provide tension by pulling tendons from the anchorage points			
12. Provide dead end anchors			
13. Fill flexible conduits with cement mortar			
Competent <input type="checkbox"/>		Not Yet Competent <input type="checkbox"/>	

Portfolio		Description of Portfolio		
		<ul style="list-style-type: none"> ▪ Folder/file includes power point presentation about entrepreneurial skills ▪ Folder/file includes spread sheets ▪ Folder/file includes evidence of Splice and anchor using mechanical methods 		
During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1.	Develop a worksheet as per given data.			
2.	Format the worksheet according to given criteria.			
3.	Apply Formulas according to the requirement.			
4.	Generate Charts/Graphs according to the given data.			
5.	Print Worksheet according to requirements.			
6.	Insert Slides with different Layouts according to requirements of presentation.			
7.	Insert text, tables, images, etc. according to the requirement.			
8.	Apply a set of effects to animate the slide according to requirement.			
9.	Apply Slide Transitions on Slides according to requirement.			
10.	Apply Sound Effects on Objects/text/images according to requirement.			
11.	Present a presentation according to 7Cs of communication.			
12.	steel work in confined spaces Select tools for checking working conditions			
13.	Select & wear PPEs			
14.	Mark check list includes: <ul style="list-style-type: none"> • Oxygen level • Humidity • Illumination • Communication equipment • Temperature Escape Plan Emergency Plan			
15.	Interpret of bar bending schedule			
16.	Interpret structure drawings			
17.	Straighten the rebars.			
18.	Measure and mark the required cut length on rebars			
19.	Cut the rebars			
20.	Make the bundle of prepared rebars and mark the bar code using tag for pre stressed girder for reference.			
21.	Place rebars according to drawing			
22.	Bind rebars			

23.	Place spacers as per requirement			
24.	Recover tools, equipment and materials from the confined space			
25.	Clear work area and dispose of or recycle materials			
26.	Remove, clean and store barriers and signs			
27.	Prepare material as per requirement			
28.	Thread reinforcement rebars as detailed in job specifications			
29.	Fit and secure splicing couplers to reinforcing bar in accordance with job specifications			
30.	Free coupler connections and reinforcing rebars from mill scaling and residual debris			
31.	Locate and anchor reinforcement as prescribed in job specifications			
32.	Fix ties to reinforcement			
33.	Check depth of coverage, clearance, spacing and overlap of reinforcement material according to drawing			
34.	Clean, maintain and store plant tools & equipment			
Competent <input type="checkbox"/>		Not Yet Competent <input type="checkbox"/>		

Question	Candidate's answer
6. Define Green business.	
7. Define business ethics.	
8. Define subsidiary books.	
9. What are the steps of anchoring in reinforcement?	
10. How lap splice is created?	
11. Define W/C ratio.	
12. What are the factors affecting concrete?	
13. What are the types of splicing?	
14. What are the steps of anchoring in reinforcement?	
15. Define pre stressed structure.	
16. Enlist basic types of prestressing.	
17. Define conduits.	
18. Define pre stressed girders.	
19. Define strands.	
20. Define mould.	
21. What is MS Excel spreadsheet?	
22. What are the four uses of Microsoft Power Point?	
23. How to insert a table in power point?	

Question	Candidate's answer
24. What is the purpose of powerpoint?	

ANSWER KEY

Sr.	Answers
1.	<ul style="list-style-type: none"> • Industry • Commerce • Trade
2.	<ul style="list-style-type: none"> • Research • Determine the purpose of plan • Create a company profile • Document all aspects of business • Have a strategic marketing plan in place • Make it adaptable based on audience • Explain all the necessary points briefly
3.	In the words of Keith Davis, "Communication is the process of passing information and understanding from one person to another. It is essentially a bridge of meaning between people."
4.	Labor market regulation and laws are useful economic and social institutions designed to protect workers from undesirable consequences of market failure such as <u>arbitrary or discriminatory actions by employers</u>
5.	A physical count of inventory is an actual count of all the products that a business store or stock.
6.	Green business functioning in a capacity where no negative impact is made on local or global environment, the community and the economy.
7.	Business ethics is the study of appropriate business policies and practices regarding potentially controversial subjects including corporate governance, insider trading, bribery, discrimination, corporate social responsibility, and fiduciary responsibilities
8.	Subsidiary books are of original entry in which transactions of similar nature are recorded at one place and in sequential order
9.	Structural rebar anchoring is to drill holes in the original concrete structure, insert steel bar into the hole of concrete, and inject structural glue. In recent years, the production and operation of some enterprises have changed under the influence of the market.
10.	The lap splice, as the name suggests, is created by overlapping two lengths of rebar, then wiring them together.
11.	The ratio of the weight of water to the weight of cement is called Water/Cement ratio.
12.	<ul style="list-style-type: none"> • Water/Cement Ratio. • Compaction of Concrete. ... • Ingredients of Concrete. ... • Curing of Concrete. ... • The Shape of Aggregate. ... • Maximum Size of Aggregates. ... • Grading of Aggregate. ... • Weather Condition
13.	There are four main types of splice joints: half lap, bevel lap, tabled, and tapered finger
14.	Structural rebar anchoring is to drill holes in the original concrete structure, insert steel bar into the hole of concrete, and inject structural glue. In recent years, the production and operation of some enterprises have changed under the influence of the market.
15.	A <i>prestressed structure</i> is one whose overall integrity, stability and security depend, primarily on <i>prestressing</i>
16.	<ul style="list-style-type: none"> • Precompression with mostly the structure's own weight • Pre-tensioning with high-strength embedded tendons • Post-tensioning with high-strength bonded or unbonded tendons
17.	A channel for placing strands and concrete in pre stressing.

18.	A hollow container used to give shape to fresh concrete .
19.	Prestressed girders is a type of concrete girder that facilitates the rapid construction of a bridge
20.	Each of the strings which, twisted together, make up a yarn, rope or cord
21.	Spreadsheets present tables of values arranged in rows and columns that can be manipulated mathematically using both basic and complex arithmetic operations and functions.
22.	Documents ,Performed calculations ,Analyzed data ,Reports in slides shows
23.	Click on INSERT , click on TABLE, select rows and column in power point
24.	It allows users to create visual presentations comprised of individual slides