Model Curriculum

68 Hours- Bridge Course Construction Fitter

SECTOR: Construction

SUB-SECTOR: Real Estate and Infrastructure Construction

OCCUPATION: Fabrication

REF ID: CON/Q01205, V1.0

NSQF LEVEL: 3



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CURRICULUM / SYLLABUS

This program is aimed at training candidates for the job of a "Construction Fitter", in the "Construction" Sector/Industry and aims at building the following key competencies amongst the learner

Program Name	Construction Fitter
Qualification Pack Name & Reference ID. ID	CON/Q1205, v1.0
Pre-requisites to Training	Preferably 10 th standard with 5 Years site experience in Assistant Construction Fitter, Gas Cutter or Grinder for Non-trained worker/ 2 years site experience as a certified Assistant Construction Fitter, Gas Cutter or Grinder for Trained worker
Training Outcomes	 After completing this programme, participants will be able to: Carry out marking on structural steel elements to complete the fitup in accordance with shop drawing:-carry out marking structural steel elements and assemblies for completing fitup operations in accordance with shop drawings Carry out fitup of assemblies in fabrication yard: - carry out fitup of assemblies in fabrication yard. Work effectively in a team to deliver results at a construction site: - work effectively within a team to achieve the desired results. Work according to personal health, safety and environment protocol at construction site:- work according to personal health, safety and environmental protocol at construction site

This course encompasses <u>4</u> out of <u>4</u> National Occupational Standards (NOS) of "<u>Construction Fitter</u>" Qualification Pack issued by "<u>Construction Skill Development Council of India</u>".

. N	Module	Key Learning Outcomes	Equipment Required
T (f 0 P (f 0 0)	ntroduction Theory Duration (hh:mm) ()4:00 Practical Duration (hh:mm) ()0:00	 Introduction to role and responsibilities of the construction fitter how to read, write and understand basic English and knowledge of numeracy organizational procedures for obtaining approvals and indent of materials units of measurement and conversion career growth paths 	 Projector /White board Computer Charts and displays regarding MIG and SMAW welding
s e e til w	Carry out marking on structural steel elements to complete the fitup in accordance with shop drawing Theory Duration (hh:mm) (04:00 Practical Duration (hh:mm) (12:00) Corresponding NOS Code CON/N1208	 Theory: Procedures involved in fabrication Introduction to various procedures involved in fabrication works Knowledge of Methods of joining two steel sections namely: Welding Riveting Bolting (Note: this should include details of the procedure involved, knowledge of supplementary activities like drilling, cutting etc. knowledge of selection, type, use and storage of tools and equipment and consumables required in each process) Introduction to fit up: meaning, process involved and general requirements 2. Reading and interpretation of drawings: Knowledge to understand, remember and use assigned nomenclature for assemblies, components and understand their relative position and orientation in the structure Knowledge to read and understand various symbols, dimensions, 	 Drilling machine with bits Electric screw gun Electric hexa saw Welding tools and accessories Gas cutting tools and accessories Grinding tools and accessories Files Temperature gun/ chalk Clamps and anchors Vices Forklift Slings Wire ropes Shackles Spreader board Chain Link Eye hook Eye bolts Bull dog grips Clamp socket metric tape line dori scale welding gauge hammer punch Safety Helmet

orientations and other requirements of fit up from shop drawings • Knowledge to simplify and reproduce complex shop drawings into simple hand sketches 3. Tools and materials	red
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	evention kit
La Knowlodgo of vorious procedures of	rricade tape fety Tags
measuring and marking (liner and	, 0
angular measurement)	
Knowledge of selection and use of	
different tools and tackles used for	
measurement and marking.	
Types of markings tools and their	
areas of applications	
Standard procedure for measuring	
and marking on sections including	
the precautions to be undertaken for	
safe and accurate measuring and	
marking	
Practical:	
Practice the skills involved in measuring	
and marking by undertaking exercises that	
emphasise on the following:	
1) Reading and understanding	
drawings:	
a. Read and understand the shop	
drawings to compute various	
dimensions (both angular and liner)	
b. Convert the complex shop	
drawings and sections into easy to	
understand hand sketches	
2) Selection of materials from drawings:	
a. Identify materials from the	
nomenclature	

-	Module	Key Learning Outcomes	Equipment Required
		 b. Identify materials based on drawings c. From the computed dimensional requirements, check the surface preparation such as bevel angle, scalloping, drill holes etc. d. Confirm that the material is clean, if not clean the impurity. 3) Measure and Mark the required dimensions on the metal a. considering the instructions either given in drawing or by superiors, identify the stat point b. From the computed dimensions and identified start point, commence the measurement, c. Inscribe appropriate marks on the section at required lengths. Ensure that marks are distinct and clear. 	
3	Carry out fitup of assemblies in fabrication yard Theory Duration (hh:mm) 04:00 Practical Duration (hh:mm) 12:00 Corresponding NOS Code CON/N1209	 Theory: Safety: Knowledge of acts and conditions that leads to unsafe acts and unsafe conditions Personal protective equipment for rigging, fit- up, and welding Pep talks and tool box talks Knowledge of different types of hazards associated with fabrication activities, their implications and how to avoid hazards Knowledge of types of fires and conditions/ actions leading to fire Knowledge of evacuation in case of fire and fire safety equipment's used for different types of fire Knowledge of site emergency and safety evacuation points Placing and fixing the components as per marking 	 Drilling machine with bits Electric screw gun Electric hex saw Welding tools and accessories Gas cutting tools and accessories Grinding tools and accessories Grinding tools and accessories Temperature gun/ chalk Clamps and anchors Vices Forklift Slings

Module	Key Learning Outcomes	Equipment Required
	Nowledge to understand the requirement of clamping, its purpose Knowledge of supports, applications of temporary supports Different types of clamps, jacks and anchorages, their use and operation checking the workability of different jacks & clamps/ conditions leading to inoperable tool Fabrication bed: importance of cleaning the fabrication bed and preparing the fabrication bed Knowledge for placing anchors at proper location Concept and importance of root gap Knowledge of maintenance and upkeep of tools and tackles Concept of need and importance of tack welding along with identifying location of placing tacks Knowledge of methods of straightening and bending metal plates, operation of equipment used for bending plates Concept of distortion Knowledge of different methods of correcting distortion based upon amount and type of distortion Knowledge of standard quality norms and organisational procedures related to fit up e.g. reports and data required in the same. Broad knowledge of welding defects to identify any major fault in tack welds Practical: Practice the skills involved in fit up by undertaking exercises that emphasis on the following: Placing and fixing components as per marking: Ensure that fabrication bed is cleaned and any temporary	14. Wire ropes 15. Shackles 16. Spreader board 17. Chain Link 18. Eye hook 19. Eye bolts 20. Bull dog grips 21. Clamp 22. socket 23. metric tape 24. line dori 25. scale 26. welding gauge 27. hammer 28. punch 29. Safety Helmet 30. Safety goggles 31. Safety shoes 32. Safety belt 33. gloves 34. Ear plugs 35. Reflective jackets 36. Dust mask 37. Fire Prevention kit 38. Barricade tape 39. Safety Tags 40. Jacks (manual and mechanical)

	Module	Key Learning Outcomes	Equipment Required
		supports erected for previous fit ups have been removed. Identify and erect/install all temporary supports and clamps at required places after visually checking them for workablity Identify the orientation of the sections and place them as per marking Carefully restrict the movement of the sections while lowering Ensure and check the root gap between the sections identify any defects in positioning of components in reference to the markings perform operations of striking, realignment etc. for fine adjusting the components locate positions for tack welds and identify any major defect in welds confirm the variation in dimensions post welding to confirm shrinkage is within tolerance rectify any errors arising in quality checks	
4	Work effectively in a team to deliver desired results at the workplace Theory Duration (hh:mm) 04:00 Practical Duration (hh:mm) 12:00 Corresponding NOS Code CON/N8001	 Method of oral and written communication skills with co-workers, trade seniors while handling and carrying out visual checks on materials, tools and equipment How to interpret scope of joint preparation and repair activities, material/ tools handling by adhering to instructions or consulting with seniors Method of reporting to seniors clearly and promptly Seek necessary support and complete assigned tasks within stipulated time duration Keep good relation and maintain well behavior with co-workers Demonstration/ Practical (D/P):- The skills will be developed and practiced while carrying out following trade related 	

-	Module	Key Learning Outcomes	Equipment Required
		activities in a predictable and familiar working condition 1. Selection of materials, tools or devices for defined purpose under 2. carrying out preparatory activities for joint preparation and repair activities 3. Carrying out joint preparation and repair activities	
5	Work according to personal health, safety and environment protocol at construction site Theory Duration (hh:mm) 04:00 Practical Duration (hh:mm) 12:00 Corresponding NOS Code CON/N9001	 Theory:- Types of hazards involved in construction sites Types of hazards involved in of joint preparation and repair works Emergency safety control measures and actions to be taken under emergency situation Concept of:- First Aid process Use of fire extinguisher Classification of fires and fire extinguisher Safety drills Types and use of PPEs as per general safety norms Reporting procedure to the concerned authority in emergency situations Standard procedure of handling, storing and stacking material, fabrication accessories What is safe disposal of waste, type of waste and their disposal basic ergonomic principles as per applicability Demonstration/ Practical (D/P):- The skills will be developed and practiced while carrying out following trade related activities in a predictable and familiar working condition. Selection of PPEs and use them appropriately as per working need of scaffolding activities like: Selection of materials, tools or devices for defined purpose under carrying out preparatory activities for joint preparation and repair activities 	 Leather Hand Gloves Jump suit Wire brush Hand & Leg guards leather Safety goggles Nose mask Ear protection Fire extinguishers Sand buckets Flashback arrestors Welding helmet Welding glass

-	Module	Key Learning Outcomes	Equipment Required		
		3. Carrying out joint preparation and			
		repair activities			
		2. Selection of fire extinguisher based on			
		classification of fire, standard practice of			
		storing & stacking firefighting equipments/			
		materials at work locations			
		3. Disposal of waste materials as per their			
		nature and effects on weather			
	Total Duration	Unique Equipment Required:			
		Drilling machine with bits; Electric screw gur			
	Theory Duration	Welding tools and accessories; Gas cutting tools and			
	20:00	accessories; Grinding tools and accessories; Pliers; Files;			
		Temperature gun/ chalk; Clamps and anchors; Vices; Forklift;			
	Practical Duration	Slings; Wire ropes; Shackles; Spreader board; Chain; Link; Eye			
	48:00	hook; Eye bolts; Bull dog grips; Clamp; sock			
		dori; scale; welding gauge; hammer; punch;			
		Safety goggles; Safety shoes; Safety belt;			
		Reflective jackets; Dust mask; Fire Prevention kit; Barricade			
		tape; Safety Tags; Jacks (manual and mechanical);			
		Leather Hand Gloves; Jump suit; Wire brush; Hand & Leg			
		guards leather; Safety goggles; Nose mask; Ear protection; Fire			
		extinguishers; Sand buckets Flashback arrestors; Welding			
		helmet; Welding glass			

Grand Total Course Duration: 68 Hours, 0 Minutes

Trainer Prerequisites for Job role: "Construction Fitter" mapped to Qualification Pack: "CON/Q1205", v1.0"

Sr. No.	Area	Details
1	Description	To deliver accredited training service, mapping to the curriculum detailed above, in accordance with the Qualification Pack "CON/Q1205".
2	Personal Attributes	Aptitude for conducting training, and pre/ post work to ensure competent, employable candidates at the end of the training. Strong communication skills, interpersonal skills, ability to work as part of a team; a passion for quality and for developing others; well-organised and focused, eager to learn and keep oneself updated with the latest in the mentioned field
3	Minimum Educational Qualifications	ITI/12th
4a	Domain Certification	Trainer/Assessor-80% in each NOS of Qualification Pack "MEP/Q0102" or "MEP/Q0104" and Lead trainer/Lead Assessors- 90% in each NOS of Qualification Pack "MEP/Q0101" or "MEP/Q0103"
4b	Platform Certification	Trainer/Assessor-50% in each NOS of Qualification Pack "MEP/Q0101" or "MEP/Q0103"& 80% overall, Lead trainer/ Lead Assessors- 50% in each NOS of Qualification Pack "MEP/Q0101" or "MEP/Q0103" and overall 90%
5	Experience	i. Technical Degree holder with minimum three years of Field experience and preferably two years of teaching experience or, ii. In case of a Diploma Holder five years of field experience and preferably two years of teaching experience or, iii. In case of ITI/12 th pass minimum eight years of field experience and preferably two years of teaching Experience.

CRITERIA FOR ASSESSMENT OF TRAINEES

Job Role Construction Fitter

Qualification PackCON/Q1205Sector Skill CouncilConstruction

Guidelines for Assessment

- 1. Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. SSC will also lay down proportion of marks for Theory and Skills Practical for each PC.
- 2. The assessment for the knowledge part will be based on knowledge bank of questions created by Assessment Bodies subject to approval by SSC
- 3. Individual assessment agencies will create unique question papers for knowledge/theory part for assessment of candidates as per assessment criteria given below
- 4. Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/training center based on assessment criteria.
- 5. The passing percentage for each QP will be 50%. To pass the Qualification Pack, every trainee should score a minimum of 50% individually in each NOS.
- 6. The Assessor shall check the final outcome of the practices while evaluating the steps performed to achieve the final outcome.
- 7. The trainee shall be provided with a chance to repeat the test to correct his procedures in case of improper performance, with a deduction of marks for each iteration.
- 8. After the certain number of iteration as decided by SSC the trainee is marked as fail, scoring zero marks for the procedure for the practical activity.
- 9. In case of successfully passing only certain number of NOS's, the trainee is eligible to take subsequent assessment on the balance NOS's to pass the Qualification Pack within the specified timeframe set by SSC.
- 10. Minimum duration of Assessment of each QP shall be of 4hrs/trainee.

				Marks All	ocation
Assessment outcomes	Assessment Criteria for outcomes	Total Mark	Out Of	Theory	Skills Practical
CON/N1208: Carry out marking	PC1. identify the correct drawing and section therein as per requirement		5	1	4
on structural steel elements to	PC2. compute required dimensions as from the section using linear calculations		10	2	8
complete the fit- up in accordance with shop	PC3. note the orientation of the sections		5	1	4
drawings	PC4. simplify and reproduce the drawing as a hand sketch for subordinates for explaining the work requirements		10	2	8
	PC5. refer the drawing for identifying the correct material based upon its dimensions		10	2	8
	PC6. measure the dimensions of the identified the material to check its compliance with job if the said is not marked	100	10	2	8
	PC7. check the work piece for its preparation such as beveling, scalloping etc.		5	1	4
	PC8. clean the surface of the section to remove any dust, paint, oil, rust etc.		5	1	4
	PC9. identify the start point for measuring and marking the dimensions on the section as per drawing		10	2	8
	PC10. use appropriate tools and instruments for measurement		10	2	8
	PC11. use correct tools and instruments for marking such as scribers etc.		10	2	8
	PC12. make accurate and distinguishable markings on the external surface of sections		10	2	8
		Total	100	20	80
CON/N1209: Carry out fitup of assemblies in	PC1. identify any potential hazard in the work area related to own work and report the same to appropriate authority		3	1	2
fabrication yard	PC2. avoid any unsafe act by self particularly while working at site		3	1	2
	PC3. avoid wearing any loose clothing and preferably wear the yard jumpsuit or any other uniform issued at site PC4. select and correctly use personnel protective	100	3	1	2
	equipment as per work requirement PC5. dispose of any unwanted material from the work area as per instructions		3	1	2

PC6. participate in safety drills organized at site	2	4	2
PC7. participate in prep talks and tool box talks organized at site	3	1	2
PC8. estimate the required number of fixtures such as clamps etc. for completing the assigned task	3	1	2
PC9. decide the locations and position for erecting temporary supports and anchors	3	1	2
PC10. erect temporary support and anchors at identified locations as per work requirement	3	1	2
PC11. check the working condition of fixtures	3	1	2
PC12. inspect the fabrication bed before commencing the fit-up	3	1	2
PC13. estimate the scope of grinders and gas cutters for completing the job.	3	1	2
PC14. identify the orientation of the components as shown in the drawings	3	1	2
PC15. assist in lowering of heavy sections at proper location as per work requirement	3	1	2
PC16. anchor the section at proper location to restrict its movement	3	1	2
PC17. place the sections as per markings	3	1	2
PC18. ensure that proper root gap is maintained throughout the assembly for welded connections	3	1	2
PC19. oversee the preparation of fabrication bed and other fitting activities such as placing and tightening the clamps, jacking and striking etc.	3	1	2
PC20. check the accuracy of positioning of sections as per requirement	3	1	2
PC21. identify any defects in positioning of components in reference to the markings	3	1	2
PC22. carry out operations such as striking, realignment etc. for accurate positioning of structural components	3	1	2
PC23. identify locations for tack welding such that root gap is maintained consistent and the joint is stable	3	1	2
PC24. check the requirements for preheating in consultation with superiors	3	1	2
PC25. supervise the finishing of the tack weld as carried out by grinder	3	1	2

	PC26. oversee the finishing of the surface				
	1 620. Oversee the missing of the surface		3	1	2
CON/N8001: Work effectively in a team to deliver desired results at the workplace	PC27. check the tack weld visually to ensure no defects in welding		3	1	2
	PC28. recheck the dimensions post tack welding to ensure that change due to shrinkage is within tolerance limit		3	1	2
	PC29. submit the fitted assembly to superiors for inspection		4	1	3
	PC30. rectify any repairs indicated by superior by following standard procedure		4	1	5
	PC31. assist the foreman in preparation of fit-up report		3	1	2
	PC32. conduct straightening and bending operations on sections if required		3	1	2
	PC33. locate the distortions identified by superiors		3	1	2
	PC34. apply suitable method for correcting distortions like application of heat, application of force or a combination there off		3	1	2
	PC35. oversee or conduct heating of distorted material as per instruction		3	1	2
	PC36. use vice or jack efficiently to remove distortion		3	1	2
		Total	100	20	80
	PC1. pass on work related information/ requirement clearly to the team members		10	2	8
	PC2. inform co-workers and superiors about any kind of deviations from work	100	5	1	4
	PC3. address the problems effectively and report if required to immediate supervisor appropriately		5	1	4
	PC4. receive instructions clearly from superiors and respond effectively on same		5	1	4
	PC5. communicate to team members/subordinates for appropriate work technique and method		5	1	4
	PC6. seek clarification and advice as per requirement and applicability		10	2	8
	PC7. hand over the required material, tools tackles, equipment and work fronts timely to interfacing teams		30	6	24
	PC8. work together with co-workers in a synchronized manner		30	6	24
		Total	100	20	80
CON/N9001: Work according	PC1. identify and report any hazards, risks or breaches in site safety to the appropriate authorities	100	5	1	4

to personal health, safety and	PC2. follow emergency and evacuation procedures in case of accidents, fires, natural calamities		5	1	4
environment protocol at construction site	PC3. follow recommended safe practices in handling construction materials, including chemical and hazardous material whenever applicable		10	2	8
	PC4. participate in safety awareness programs like Tool Box Talks, safety demonstrations, mock drills, conducted at site		5	1	4
	PC5. identify near miss , unsafe condition and unsafe act		5	1	4
	PC6. use appropriate Personal Protective Equipment (PPE) as per work requirements including:		10	2	8
	PC7. handle all required tools, tackles, materials & equipment safely		5	1	4
	PC8. follow safe disposal of waste, harmful and hazardous materials as per EHS guidelines		5	1	4
	PC9. install and apply properly all safety equipment as instructed		15	3	12
	PC10. follow safety protocol and practices as laid down by site EHS department		15	3	12
	PC11. collect and deposit construction waste into identified containers before disposal, separate containers that may be needed for disposal of toxic or hazardous wastes		10	2	8
	PC12. apply ergonomic principles wherever required		10	2	8
		Total	100	20	80