



Republic of Rwanda
Ministry of Education



RTB | RWANDA
TVET BOARD

BDCCF001

CEMENT FLOORING

Competence: PERFORM CEMENT FLOORING

RQF Level: N/A

Learning Hours



Credits: 7

Sector: CONSTRUCTION AND BUILDING SERVICES

Program: MASONRY

Module Type: SPECIFIC

Curriculum: DUAL TRAINING SHORT COURSE IN MASONRY

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Purpose statement	This core module describes skills, knowledge and attitude to be acquired to perform cement flooring. It is designed for a trainee pursuing dual training program in masonry. At the end, the trainee will be able to construct pavement of any surface made with concrete by mainly preparing hardcore base, concrete, perform screeding and smoothing surface.					
Learning assumed to be in place	Maintain SHE at workplace, construction basic technical drawing, building set out, construct stones structures.					
Delivery modality	Training delivery		100%	Assessment		Total 100%
	Delivered in school		25%	Formative assessment in school	30%	50%
	Delivered in company		75%	Workplace comprehensive assessment in company	70%	
	• Demonstration and practice	25%				
	• Individual project /Independent Work	50%				
			Summative Assessment		50%	

Elements of Competency and Performance Criteria

Elements of competence	Performance criteria	Learning site
1. Prepare materials, tools and equipment.	1.1 PPEs are properly selected according to the work to be done, their types and uses	School
	1.2 Tools and equipment are appropriately selected according to the work to be done, , their types and uses	School
	1.3 Materials are appropriately selected according to the applicable quality standards and their use	School
2. Prepare the hard-core base	2.1. The ground base is well compacted and leveled in accordance to the design.	School &Company
	2.2. Hardcore bases are systematically laid on the ground base and leveled according to the required steps	School &Company
	2.3. Hard core base level is completely checked for	School &Company

	straightness following marked lines.	
3. Prepare concrete.	3.1. Ingredients for concrete mix are properly selected according to the applicable quality standards.	School & Company
	3.2. Mix ratios are accurately applied according to the standard requirements and expected concrete strength.	School & Company
	3.3. Concrete mixing is carried out at a convenient place with respect to the required methods	School & Company
4. Perform screeding	4.1. Sufficient layers of screed are strategically applied on the hardcore base at regular intervals.	School & Company
	4.2. Fresh concrete is efficiently poured on top of hardcore base and slightly deep into hardcore base using appropriate method	School & Company
	4.3. Cement screeding is continuously done for leveling the floor with reference to set screeds.	School & Company
	4.4. A layer of smooth surface is promptly applied on the top of screeded surface and further smoothed using required steps	School & Company
	4.5. Working place is correctly cleaned using relevant cleaning tools, materials, equipment and techniques	School & Company

Course content

Learning outcomes	<p>At the end of the module the trainee will be able to:</p> <ol style="list-style-type: none"> 1. Prepare materials, tools and equipment 2. Prepare the hard-core base 3. Prepare concrete 4. Perform screeding and smoothing
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Cement flooring materials, tools and equipment preparation

Learning outcomes	Indicative content	Learning Hours: 4	
		School	Company
1. Prepare cement flooring	<ul style="list-style-type: none"> • Tools used for cement pavement <ul style="list-style-type: none"> ✓ Use of cement pavement tools ✓ Cement pavement tools maintenance 	4	

materials, tools and equipment	<ul style="list-style-type: none"> • Cement pavement equipment <ul style="list-style-type: none"> ✓ Sprayer machine with accessories ✓ Grading machine ✓ PPE ✓ Use of cement pavement equipment • Materials for cement pavement <ul style="list-style-type: none"> ✓ Types of materials used for cement pavement ✓ Properties of Materials ✓ cement pavement selection criteria 		
Resources required for the learning outcome		School	Company
Equipment	RS 175: wheelbarrow specifications, ISO 18650-1: Building construction machinery and concrete mixers-part1: commercial specifications, RS EAS 1021: Steelhead hammer-specifications, RS ISO 3310-1: Test Sieves-Technical requirements and testing, Pans.		
Materials	Cement, Nails, Planks, Additives ,Fine aggregate, Coarse aggregate, Water, Stone, Bricks, handouts, RS 107 : Building sand from natural sources — Specification, RS ARS 1304 : Guidelines for use of various types of cement, RS EAS 18-1 : Cements — Part 1 : Composition, specification and conformity criteria for common cements.		
Tools	Trowel, Spirit level, Squares, Tape measure, Hand brush, Claw hammer, club hammer, Spade, Pick axe, String, hoe		
Facilitation techniques / learning activities	<ul style="list-style-type: none"> ✓ Demonstration and simulation ✓ Individual and group work ✓ Practical exercise ✓ Individualized ✓ Trainer guided ✓ Group discussion 		
Formative assessment methods	<ul style="list-style-type: none"> ✓ Written assessment ✓ Oral based assessment 		

Hardcore base preparation

Learning outcomes	Indicative content	Learning Hours: 16	
		School	Company
2. Prepare the hardcore base	<ul style="list-style-type: none"> • Compacting and levelling the ground base. <ul style="list-style-type: none"> ✓ Methods of preparing ground base 	5	

	<ul style="list-style-type: none"> ✓ Methods of compacting ground base ✓ Purpose of compacting ground base ✓ Check ground base level ✓ Types of hard-core 		
	<ul style="list-style-type: none"> • Laying and levelling hard-core material <ul style="list-style-type: none"> ✓ Check ground base level ✓ Steps of laying hard-core material • Checking hard core base level. <ul style="list-style-type: none"> ✓ Check ground base level ✓ Checking the marked level of hard core methods ✓ Adjusting hard-core base level 		11
Resources required for the learning outcome		School	Company
Equipment	RS 175: wheelbarrow specifications, ISO 18650-1: Building construction machinery and concrete mixers-part1: commercial specifications, RS EAS 1021: Steelhead hammer-specifications, RS ISO 3310-1: Test Sieves-Technical requirements and testing, Pans.		
Materials	<ul style="list-style-type: none"> ✓ Water ✓ Stone ✓ Bricks ✓ Aggregate 		
Tools	Trowel, spirit level, squares, tape measure, hand brush, claw hammer, club hammer, spade, pick axe, hoe, string		
Facilitation techniques and learning activities	<ul style="list-style-type: none"> ✓ Demonstration and simulation ✓ Individual and group work ✓ Practical exercise ✓ Individualized ✓ Trainer guided ✓ Group discussion 		
	<ul style="list-style-type: none"> ✓ Demonstration ✓ Practical work 		
Formative assessment methods	<ul style="list-style-type: none"> ✓ Written assessment ✓ Performance assessment ✓ Product based assessment 		
	<ul style="list-style-type: none"> ✓ Product Evidence ✓ Performance evidence 		

Preparation of concrete

	Indicative content	Learning Hours: 10
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Learning outcomes		School	Company
3.Prepare concrete	<ul style="list-style-type: none"> • Ingredients for concrete <ul style="list-style-type: none"> ✓ Ingredient for concrete in compliance with Rwanda standard (RS 108 mortar masonry - specification) ✓ Properties of concrete ingredients ✓ Use of concrete ingredient ✓ Quality of good ingredients for concrete 	2	
	<ul style="list-style-type: none"> • Apply mixing ratio <ul style="list-style-type: none"> ✓ Determine the mixing ratio ✓ Concrete strength ✓ Quantification of mixing ingredients ✓ Quantification method ✓ Quantifying ingredients for mortar and concrete ✓ Mixing ingredients 	3	
	<ul style="list-style-type: none"> • Carry out concrete mixing <ul style="list-style-type: none"> ✓ Concrete transport method ✓ Keeping concrete in convenient place 		5
Resources required for the learning outcome		School	Company
Equipment	<ul style="list-style-type: none"> ✓ RS 175: wheelbarrow specifications ✓ ISO 18650-1: Building construction machinery ✓ concrete mixers-part1: commercial specifications ✓ RS EAS 1021: Steelhead hammer-specifications ✓ Pans 		
Materials	Cement, Fine aggregate, Coarse aggregate, Stones Water, Additive, handouts, RS 107: Building sand from natural sources – Specification, RS ARS 1304: Guidelines for use of various types of cement, RS EAS 18-1 : Cements – Part 1 : Composition, specification and conformity criteria for common cements.		
Tools	Trowel, Spade, hoe, bucket, jerrican, rake, forked hoe,		
Facilitation techniques and learning activities	<ul style="list-style-type: none"> ✓ Demonstration and simulation ✓ Individual and group work ✓ Practical exercise ✓ Individualized ✓ Trainer guided ✓ Group discussion 		
	<ul style="list-style-type: none"> ✓ Practical work ✓ Demonstration 		
	<ul style="list-style-type: none"> ✓ Written assessment ✓ Oral based assessment 		

Formative assessment methods	✓ Product Evidence		
	✓ Performance evidence		

Screeding performing

Learning outcomes	Indicative content	Learning Hours: 40	
		School	Company
4. Perform screeding	<ul style="list-style-type: none"> • Apply screeds layers <ul style="list-style-type: none"> ✓ Types of screeds ✓ Thickness of screed determination ✓ Determination of screeds intervals • Pour fresh concrete on hard-core base <ul style="list-style-type: none"> ✓ Concrete pouring method ✓ Properties of concrete ✓ Defects of concrete 	10	
	<ul style="list-style-type: none"> • Screed concrete with screeding references <ul style="list-style-type: none"> ✓ Pouring of fresh concrete ✓ Steps of concrete screeding • Smoothing surface <ul style="list-style-type: none"> ✓ Steps of smoothing surface with cement ✓ Surface smooth performing • Clean the working place <ul style="list-style-type: none"> ✓ Cleaning of tools and equipment <ul style="list-style-type: none"> ✚ Cleaning of tools ✚ Cleaning of equipment ✓ Cleaning of working area <ul style="list-style-type: none"> ✚ Classification of unwanted materials ✓ Storing tools and equipment 		30
Resources required for the learning outcome		School	Company
Equipment	<ul style="list-style-type: none"> ✓ RS 175: wheelbarrow specifications ✓ ISO 18650-1: Building construction machinery equipment-concrete mixers-part1: commercial specifications ✓ RS EAS 1021: Steelhead hammer-specifications ✓ Pans 		
Materials	Cement, fine aggregate, coarse aggregate, oil, water, internet, handouts, RS 107: building sand from natural sources — specification, RS ARS 1304: guidelines for use of various types of cement, RS EAS 18-1 : Cements — Part 1 :		

	Composition, specification and conformity criteria for common cements.		
Tools	Trowel, Spade, hoe, bucket, , rake, Wooden float, steel float, Straight edge, pan, spirit level, Scrapper, broom		
Facilitation techniques and learning activities	<ul style="list-style-type: none"> ✓ Demonstration and simulation ✓ Individual and group work ✓ Practical exercise ✓ Individualized ✓ Trainer guided ✓ Group discussion 		
	<ul style="list-style-type: none"> ✓ Practical work ✓ Demonstration 		
Formative assessment methods	<ul style="list-style-type: none"> ✓ Written assessment ✓ Oral based assessment 		
	<ul style="list-style-type: none"> ✓ Product Evidence ✓ Performance evidence 		

Integrated/Summative assessment

Integrated situation

Carrefour Guest house located in Musanze District has gained the competitive edge over its competitors and the market increased dramatically, therefore is facing the problem of accommodating its esteemed clients and has decided to extend the business. It has signed a contract with **BENCCO LTD** to construct a five roomed house. The project is at the phase of making cement pavement in the rooms, and each room with **4m²** should have a mason to prepare materials, tools and equipment, prepare the hardcore base, screeding and also perform smoothing surfaces. As a Mason in **BENCCO LTD**, you are requested to work in one of the rooms within **4** hours, given that: the mix ratio of mortar is **1:3**. All materials, tools and equipment are provided.

Tools	Wood floater, tape measure, spirit level, spades, steel squares, trowel, , steel ruler, club hammer, straight edge, mason's line, dumpy level, calibrated gauge box,
Equipment	PPE, concrete mixer, mortar pan, wheelbarrow, bucket
Materials/ Consumables	Sand, cement, water, lime, nails, stones, coarse aggregate, additive

Assessable outcomes	Assessment criteria (Based on performance criteria)	Indicator	Observation		Marks allocation
			Yes	No	
1. Prepare cement flooring materials, tools and equipment (14%)	1.1. Tools are appropriately selected according to the work to be done	Tools to use are selected			4
		Tools to use are prepared			
		PPEs are selected			6

	1.2. Equipment are appropriately selected according to the work to be done, their types and uses	Cement flooring equipment is selected				
		Cement flooring equipment is prepared				
	1.3. Materials are appropriately selected according to the applicable quality standards and their use	Materials to use are selected				4
		Materials to use are quantified				
2. Prepare the hardcore base (25%)	2.1. The ground base is well compacted and leveled in accordance to the design.	Top soil containing unwanted element is removed			6	
		The ground base is compacted				
		Ground base is levelled				
	2.2. Hardcore bases are systematically laid on the ground base and leveled according to the required steps	Mark lines are set with determined core base thickness			8	
		No left gaps into the core base				
		Hardcore base are laid on the ground base and leveled				
		Dimensions are respected				
	2.3. Hard core base level is completely checked for straightness following marked lines.	Hard core materials are arranged without gaps.			3	
		Flatness is checked			2	
		Hardcore material is arranged			3	
Straightness is checked				3		
3. Prepare concrete (25%)	3.1. Ingredients for concrete mix are properly selected according to the applicable quality standards.	Sand is selected			8	
		Coarse aggregate is selected				
		Cement is selected				
		Water is selected				
	3.2. Mix ratio is accurately applied according to the standard requirements and expected concrete strength.	Mix ratio are applied			8	
		Batching of ingredients is respected				
		Concrete mixing steps are respected				
		Fresh concrete is achieved.				
	3.3. Concrete mixing is carried out at a convenient place with respect to the required methods	Transportation of concrete method is respected			3	
		Concrete mix is kept in convenient place			3	
Method of concrete placing is achieved				3		

4. Perform screeding (36%)	4.1. Sufficient layers of screed are strategically applied on the hardcore base at regular intervals	Intervals for mark lines screed are respected			6
		Recommended thickness of screed is respected			
		Straightness of screed layers are applied			
	4.2. Fresh concrete is efficiently poured on top of and slightly deep into hardcore base using appropriate method	Fresh concrete is poured			6
		Fresh concrete is slightly deep into hardcore base			
	4.3. Cement screeding is continuously done for leveling the floor with reference to set screeds.	Cement screeding is continuously done			6
		Interval places are filled with fresh concrete			
		Pavement surface is levered			
	4.4. A layer of smooth surface is promptly applied on the top of screeded surface and further smoothed.	Smooth surface layer is promptly applied			8
		Pavement is finished with provided slope			
		No cracks are observed			
		Pavement surface is periodically cured			
	4.5 Working place is correctly cleaned using relevant cleaning tools, materials, equipment and techniques	Equipment are cleaned careful			4
		Dusts and wastes are removed			
		working area are cleaned			4
		Tools are cleaned			2
		Tools and equipment are stored in respective place.			
Total marks					/100
Percentage Weightage					100%
Minimum Passing line % (Aggregate): 70%					

References

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2. De Vekey RC (2001). Bricks blocks and masonry made from aggregate concrete: Part 2 – APPEarance and environmental aspects, BRE Digest 460, Part 2.
3. M.Rashad Islam & Rafiqul A Tarelder, Pavement Design: Materials, Analysis,2016, McGraw-Hill Education
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5. William & Radford, Cement Houses and How to Build Them ,1996, McGraw-Hill Education