Republic of Rwanda
Ministry of Education

RTB | RWANDA TVET BOARD

BRICK AND BLOCK MASONRY WALL ELEVATION

BDCBB301

ERECT BRICKS AND BLOCKS WALL

Competence

RQF Level: 3

Learning Hours: 100

Credits: 10

Sector: Construction and Building Services

Trade: Building construction

Module Type: Specific

Curriculum: CBSBDC3001- TVET Certificate 3 in Building Construction

Issue Date: October ,2021

<table>
<tr><td>Purpose statement</td><td colspan="5">This is a core module which describes the skills, knowledge and attitude to be acquired by the learner to perform good work by preparing the working area, erect brick and block wall in order to construct good quality brick, block wall and remove defect which may appear on elevation brick and block wall masonry. According to the standards, the learner will be able to choose appropriate material and has enough knowledge and skills of using tools and equipment.</td></tr>
<tr><td>Leaning assumed to be in place</td><td colspan="5">Safety, Health and environment at workplace, Construction basic technical drawing, Building Set out, Fundamentals of building materials, Construct stones structures</td></tr>
<tr><td rowspan="7">Delivery modality</td><td colspan="2">Training delivery</td><td>100%</td><td colspan="2">Assessment</td><td>Total 100%</td></tr>
<tr><td colspan="2">Theoretical content</td><td>30%</td><td rowspan="4">Formative assessment</td><td>30%</td><td rowspan="4">50%</td></tr>
<tr><td colspan="2">Practical work:</td><td rowspan="3">70%</td><td rowspan="3">70%</td></tr>
<tr><td>• Group project and presentation</td><td>20%</td></tr>
<tr><td>• Individual project /Work</td><td>50%</td></tr>
<tr><td colspan="3"></td><td colspan="2">Summative Assessment</td><td>50%</td></tr>
</table>

Elements of Competency and Performance Criteria

Elements of competency	Performance criteria
1. Select tools, equipment and materials.	1.1. Appropriate tools are selected according to the standard
	1.2. Appropriate equipment is selected according to the standard
	1.3.Adequate materials are selected according to the standard
2. Prepare working area	2.1.Adequate mixing place is prepared as per standard.
	2.2.Relevant storage spaces are identified according to types of construction materials.
	2.3.Appropriate safety equipment, signs and posts are positioned according to the standards.
3. Prepare mortar	3.1. Relevant mix ratio is identified according to the type of work.
	3.2. Mixing batch are prepared correctly reference to the mixing ratio.
	3.3. Precise ingredients are quantified according to the mix ratio.

	3.4. Relevant mortar mixing is done according to the standard.
4. Elevate brick walls	4.1. Relevant interpretation of drawing is done according to the standards.
	4.2. Adequate setting out of walls is done according to the drawing.
	4.3. Systematic brick laying is done according to the type of bond.
	4.4. Systematic construction of lintels, Arches, piers and pillars according to the standards
	4.5. Constructed wall and used tools, equipment is properly cleaned.
5. Elevate block walls	5.1. Relevant interpretation of drawing is done according to the standards. 5.2. Adequate setting out of walls is done according to the drawing. 5.3. Systematic blocks lying are done according to the type of bond. 5.4.Constructed wall and used tools, equipment is properly cleaned.
6. Apply jointing and pointing	6.1. Appropriate tools, equipment and materials are selected according to the work to be done. 6.2. Perfect Joint type is selected according to the type and location of structure. 6.3. Precise ingredients are quantified according to the mixing ratio. 6.4. Jointing of structures is systematically done according to the type of joint. 6.5. Pointing of structures is systematically done according to the type of pointing. 6.6. Regular curing of pointed area is conveniently done.

Course content

Learning outcomes	**At the end of the module the learner will be able to:** 1. Select tools, equipment and materials 2. Prepare working area 3. Prepare mortar 4. Elevate brick walls 5. Elevate block walls 6. Apply jointing and pointing
Learning outcome 1: **Select tools, equipment and materials.**	**Learning hours: 5**
Indicative content	
• **Identification of tools used to erect brick and block masonry** ➢ The use of tools ➢ The maintenance of tools • **Identification of equipment** ➢ Use of equipment ➢ The maintenance of equipment • **Identification of materials used to erect bricks and block wall masonry complying with Rwanda Standards** • **Soil based block** • **Properties of materials** • **Quality of materials**	
Resources required for the learning outcome	
Equipment	RS 175: wheelbarrow specifications, ISO 18650-1: Building construction machinery and equipment-contrete mixers-part1: commercial specifications, ISO 19711-1: Truck mixers-part 1: terminologies and commercial specifications, RS EAS 1021: Steelhead hammer-specifications, RS EAS 1020: Shovels and spades specifications, RS ISO 3310-1: Test Sieves-Technical requirements and testing
Materials	Cement, Fine aggregate, Coarse aggregate, Water, Stone, Bricks, 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, Spirit level, Squares, Building line, Tape measure, Wheelbarrow, Roller brush, Hand brush, Scrapper, Tray , Steel float, Sand paper, Pan/bucket, Extension pole, Mixing stick, Strings (Road marking line), Brushes, Paint Scrapper, Roller, Roller tray and Bucket/pan
Facilitation techniques	• Group discussion

	• Trainer guided • Matching questions • Multiple choice • Sentence completion • Short questions • Essay • Open ended questions
Formative assessment methods	• Written assessment • Performance assessment

Learning outcome 2: **Prepare working area**	**Learning hours: 5**
Indicative content	
• **Preparation of mixing place.** ➢ Requirement of mixing area • **Identification of storage space.** ➢ Types of storage ➢ Requirements of good storage • **Setting of signs posts and use of PPE** ➢ PPE ➢ Types of sign post	
Resources required for the indicative content	
Equipment	RS 175: wheelbarrow specifications, ISO 18650-1: Building construction machinery and equipment-contrete mixers-part1: commercial specifications, ISO 19711-1: Truck mixers-part 1: terminologies and commercial specifications, RS EAS 1021: Steelhead hammer-specifications, RS EAS 1020: Shovels and spades specifications, RS ISO 3310-1: Test Sieves-Technical requirements and testing
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Tools	Trowel, Spirit level, Squares, Building line, Tape measure, Wheelbarrow, Roller brush, Hand brush, Scrapper, Tray , Steel float, Sand paper, Pan/bucket, Extension pole, Mixing stick, Strings (Road marking line), Brushes, Paint Scrapper, Roller, Roller tray and Bucket/pan
Facilitation techniques	• Group discussion • Trainer guided

	• Matching questions • Multiple choice • Practical exercises • Short questions • Essay • Open ended questions
Formative assessment methods	• Written assessment • Performance assessment • Product based assessment

Learning outcome 3: Prepare Mortar	**Learning hours: 10**
Indicative content	
• **Identification of mixing ratio** ➢ Meaning of mixing ratio ➢ Proportion of mixing ratio ➢ Application of mixing ratio • **Preparation of mixing batch** ➢ Meaning of batching ➢ Methods of batching • **Quantification of mixing ingredients** ➢ Ingredients for mortar ➢ Quantification method • **Application of mixing mortar method** ➢ Types of Mortar with reference from Rwanda Standards ➢ Mortar mixing tips ➢ function of various ingredients of mortar ➢ Properties of good mortar ➢ Method of mixing mortar	
Resources required for the indicative content	
Equipment	RS 175: wheelbarrow specifications, ISO 18650-1: Building construction machinery and equipment-contrete mixers-part1: commercial specifications, ISO 19711-1: Truck mixers-part 1: terminologies and commercial specifications, RS EAS 1021: Steelhead hammer-specifications, RS EAS 1020: Shovels and spades specifications, RS ISO 3310-1: Test Sieves-Technical requirements and testing
Materials	Cement, Fine aggregate, Coarse aggregate, Water, Stone, Bricks, 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, Spirit level, Squares, Building line, Tape measure, Wheelbarrow, Roller brush, Hand brush, Scrapper, Tray , Steel float, Sand paper, Pan/bucket, Extension pole, Mixing stick, Strings (Road marking line), Brushes, Paint Scrapper, Roller, Roller tray and Bucket/pan
Facilitation techniques	• Lectures • Demonstration and simulation • Individual and group work • Practical exercise • Individualized • Trainer guided • Group discussion
Formative assessment methods	• Written assessment • Performance assessment • Product based assessment • Project based assessment

Learning outcome 4: Elevate brick wall	**Learning hours: 50**
Indicative content	

- **Identification and interpretation of types of construction drawings**
  - Types of Drawing:
    - ✓ Site plan
    - ✓ Section plane
    - ✓ Elevation plan
    - ✓ Floor plans
    - ✓ Foundation plan
- **Setting out brick walls**
  - Identification types of damp proof course
  - Requirements of damp proof course
  - Steps of setting out and leveling first course brick
- **Construction of brick wall according to the type of bond**
  - Rules of bonding for brick
  - Technical terms for bonding
  - Identify, draw and interpret
  - types of brick bond
  - Classification of walls
- **Construction of lintels, arches, piers and pillars**
  - Identification of lintel and arches
  - Classification of arches

➢ Terminologies of Arches ➢ Calculation of arches ➢ Steps of lintel and arch construction ➢ Piers and pillars construction • **Clean working area.** ➢ Method of Cleaning ✓ Manual ✓ Mechanical

Resources required for the indicative content	
Equipment	RS 175: wheelbarrow specifications, ISO 18650-1: Building construction machinery and equipment-contrete mixers-part1: commercial specifications, ISO 19711-1: Truck mixers-part 1: terminologies and commercial specifications, RS EAS 1021: Steelhead hammer-specifications, RS EAS 1020: Shovels and spades specifications, RS ISO 3310-1: Test Sieves-Technical requirements and testing
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Tools	Trowel, Spirit level, Squares, Building line, Tape measure, Wheelbarrow, Roller brush, Hand brush, Scrapper, Tray , Steel float, Sand paper, Pan/bucket, Extension pole, Mixing stick, Strings (Road marking line), Brushes, Paint Scrapper, Roller, Roller tray and Bucket/pan
Facilitation techniques	• Lectures • Demonstration and simulation • Individual and group work • Practical exercise • Individualized • Trainer guided • Group discussion
Formative assessment methods	• Written assessment • Performance assessment • Product based assessment • Project based assessment

Learning outcome 5: Elevate Block walls	**Learning hours: 25**
Indicative content	

- **Identification and interpretation of types of construction drawings**
  - Types of Drawing:
    - ✓ Site plan
    - ✓ Section plane
    - ✓ Elevation plan
    - ✓ Floor plans
    - ✓ Foundation plan
- **Setting out block walls**
  - Identification types of damp proof course
  - Requirements of damp proof course
  - Steps of setting out and levelling first course block
- **Construction of block wall according to the type of bond**
  - Rules of bonding for block
  - Technical terms for bonding
  - Identify, draw and interpret
  - types of block bond
  - Classification of walls
- **Clean working area.**
  - Method of Cleaning
    - ✓ Manual
    - ✓ Mechanical

Resources required for the indicative content	
Equipment	RS 175: wheelbarrow specifications, ISO 18650-1: Building construction machinery and equipment-concrete mixers-part1: commercial specifications, ISO 19711-1: Truck mixers-part 1: terminologies and commercial specifications, RS EAS 1021: Steelhead hammer-specifications, RS EAS 1020: Shovels and spades specifications, RS ISO 3310-1: Test Sieves-Technical requirements and testing
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Tools	Trowel, Spirit level, Squares, Building line, Tape measure, Wheelbarrow, Roller brush, Hand brush, Scrapper, Tray , Steel float, Sand paper, Pan/bucket, Extension pole, Mixing stick, Strings (Road marking line), Brushes, Paint Scrapper, Roller, Roller tray and Bucket/pan
Facilitation techniques	• Lectures • Demonstration and simulation • Individual and group work • Practical exercise

	• Individualized • Trainer guided • Group discussion
Formative assessment methods	• Written assessment • Performance assessment • Product based assessment • Project based assessment

Learning outcome 6: Apply jointing and pointing	**Learning hours: 5**
Indicative content	

- **Identification of tools used for jointing and pointing works**
  - Pointing trowel
  - Bricklaying trowel
  - Pointing bar(s)
  - Soft bristle cleaning brush
  - Hawk
- **Selection of jointing type**
  - Racked jointing
  - Flush jointing
  - Concave jointing
  - Weather jointing
- **Selection of pointing type**
  - Weathered pointing
  - Struck pointing
  - Flush pointing
  - V-Grooved pointing
- **Jointing process**
- **Pointing Process**
- **Cleaning Methods**
  - Manual
  - Mechanical
- **Curing methods/Techniques of surface complying with Rwanda Standards**
  - Water curing
  - Wet covering
  - Membrane curing

Heat curing	
Resources required for the indicative content	
Equipment	RS 175: wheelbarrow specifications, ISO 18650-1: Building construction machinery and equipment-contrete mixers-part1: commercial specifications, ISO 19711-1: Truck mixers-part 1: terminologies and commercial specifications, RS EAS 1021: Steelhead hammer-specifications, RS EAS 1020: Shovels and spades specifications, RS ISO 3310-1: Test Sieves-Technical requirements and testing
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Facilitation techniques	• Demonstration and simulation • Individual and group work • Practical exercise • Individualized • Trainer guided • Group discussion
Formative assessment methods	• Written assessment • Performance assessment • Product based assessment • Project based assessment

Integrated/Summative assessment (For specific module)

Integrated situation

Kabanda lives in Gitega sector, Cyahafi neighborhood. After facing thief issues due to direct access in his compound, he decided to build the fence whereby he called for an interested construction company to construct the above said fence on the existing foundation. Inventive contractors co.ltd have been selected to conduct this work. As a mason employed by the above company, you are requested to start the work by building brick masonry fence and lay ten first brick courses using row lock bond as follow:

- ✓ In one corner, 1 m long on both sides with tooting ends.
- ✓ The wall elevation is in burnt bricks, with cement mortar and 21 cm of wall thickness.
- ✓ The ratio is 1:4 (cement, sand).
- ✓ The time is 8 hours.

Resources

Tools	Wood floater, Tape measure, Spirit level, Spades, Steel squares, Trowel, Notch trowel, Pointing bar, pointing trowel, Steel ruler, Hammer, Scraper, Straight edge, cleaning brush, Mason's line, Mortar pan, Dampy level, Calibrated Gauge Box, Wheelbarrow
Equipment	PPE, concrete mixer
Materials/ Consumables	Sand, Cement, Water, Nails

Assessable outcomes	Assessment criteria (Based on performance criteria)	Indicator	Observation		Marks allocation
			Yes	No	
Learning outcome 1: 1. **Select tools, equipment and materials (5%)**	1.1. Appropriate tools are selected according to the standard	Tools are properly selected			2
	1.2. Appropriate equipment is selected according to the standard	Equipment are properly selected			1
	1.3. Adequate materials are selected according to the standard	Materials are properly selected			2
Learning outcome 2: **Prepare working area** **(5%)**	2.1. Adequate mixing place is prepared as per standard	Mixing place is properly prepared			2
	2.2. Relevant storage spaces are identified according to types of construction materials	Relevant storage spaces are identified			1
	2.3. Appropriate safety equipment, signs and posts are positioned	Safety equipment, signs and posts are appropriately			2

	according to the standards	positioned			
Learning outcome 3: **Prepare mortar** **(15%)**	3.1. Relevant mix ratio is identified according to the type of work	mix ratio is properly identified			3
	3.2. Mixing batch are prepared correctly reference to the mixing ratio	Mixing batch are correctly prepared			3
	3.3. Precise ingredients are quantified according to the mix ratio	Ingredients are Precisely quantified			4
	3.4. Relevant mortar mixing is done according to the standard	mortar mixing is done			5
Learning outcome 4: **Elevate brick walls (55%)**	4.1. Relevant interpretation of drawing is done according to the standards	drawing interpretation is properly done			2.5
	4.2. Adequate setting out of walls is done according to the drawing and work requirements	setting out of walls is properly done			5
	4.3. Systematic brick laying is done according to the type of bond	Brick laying is properly done			25
	4.4. Systematic construction of piers and pillars according to drawings	Piers and pillars are systematically constructed			20
	4.5. Constructed wall and used tools, equipment is properly cleaned	Constructed wall and used tools, equipment is properly cleaned			2.5
Learning outcome 6: Apply jointing and pointing (20%)	6.1 Mixing batch is prepared correctly with reference to the mixing ratio	Mixing batch is respected			5
	6.2 Pointing of structures is done	Jointing of structures is done			10
	6.3 Pointed area is cleaned	Pointed area is cleaned			5
Total marks					**100**
Percentage Weightage					**100%**
Minimum Passing line % (Aggregate): 70%					

References:

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12. William M., George B. (2013). Plastering Plain, jointing and Decorative: (4th Revised Edition), Taylor & Francis Ltd