National Occupational Skill Standard (NOSS)

Occupational Title : **Construction Mason**

Level : **2**

Sector : **Construction**

Sub - Sector : **Masonry**

NOSS ID/NSCO ID :

ISCO NO :

Council for Technical Education and Vocational Training

NATIONAL SKILL TESTING BOARD

Madhyapur Thimi-17, Sanothimi, Bhaktapur, Nepal

Revised: 12-01-2021 (28-09-2077)

2045

DACUM Panel

S.No.	Name	Designation	Organization
1.	Mr. Shyam Kumar Shrestha	Member	Cupec, Nepal, Kathmandu
2.	Mr. Krishna Bahadur Kshteri	Member	Cupec, Nepal, Kathmandu
3.	Mr. Purna Prasad Joshi	Member	REED-Helvetas Nepal
4.	Mr. Ramesh Dhakal	Member	Freelancer Expert, Kathmandu
5.	Mr. Binod Bhandari	Member	A.N.T.U.C, Kathmandu
6.	Ms. Binita Basnet	Member	Multiskills Pvt Ltd, Bhaktapur
7.	Mr. Laxman Chaudhary	Member	Dhorpatan Training Center, Machhapokhari, Kathmandu
8.	Mr. Kumar Man Dangol	Member	Nepal Airlines Corporation, Kathmandu

DACUM Facilitator/Co-facilitator:

1. Mr. Nalaram Devkota, Deputy Director, CTEVT, Sanothimi, Bhaktapur
2. Ms. Sharada Ghimire, Sr. Curriculum Development Officer, CTEVT, Sanothimi, Bhaktapur
3. Mr. Ishwor Chandra Ghimire, Curriculum Development Officer, CTEVT, Sanothimi, Bhaktapur

DACUM Workshop on 19 & 20 January 2017

The National Occupational Skill Standard Developed by:

No	Name	Designation	Organization
1.	Er. Kishore Kumar Shakya	Coordinator	Construction Technical Sub Committee National Skill Testing Board, Sanothimi, Bhaktapur
2.	Mr. Binod Badal	Director	National Skill Testing Board Sanothimi, Bhaktapur
3.	Er. Bijay Krishna Upadhyay	Member	National Society for Earthquake Technology (NSET) Bhaisepati, Lalitpur
4.	Er. Hare Ram Shrestha (PhD)	Member	Sustainable Infrastructure Development Foundation (SIDeF) Sinamangal, Kathmandu
5.	Er. Kshitiz Dhoj Thapa	Member	Habitat Construction Engineers Pvt. Ltd. Chabahil, Kathmandu
6.	Er. Parag Kayastha	Member	Freelancer Basundhara, Tokha
7.	Er. Susan Vaidya	Member	Team consultant Pvt Ltd. Hattisar, Kathmandu
8.	Mr. Surya Adhikari	Member	Skill Testing Officer National Skill Testing Board, Sanothimi, Bhaktapur
9.	Ms. Nishi Manandhar Shrestha	Member-Secretary	Construction Technical Sub Committee National Skill Testing Board, Sanothimi, Bhaktapur
10.	Mr. Tulsi KC	Member	Sr. Skill Testing Officer National Skill Testing Board, Sanothimi, Bhaktapur
11.	Mr. Suresh Maharjan	Member	Skill Testing Officer National Skill Testing Board, Sanothimi, Bhaktapur

Recommended by Construction Technical Sub Committee: 2019-04-25 (2076 Baishakh 12)

The National Occupational Skill Standard Revised by:

No	Name	Designation	Organization
1.	Er. Kishore Kumar Shakya	Coordinator	Construction Technical Sub Committee National Skill Testing Board, Sanothimi, Bhaktapur
2.	Mr. Tek Bahadur Malla	Director	National Skill Testing Board Sanothimi, Bhaktapur
3.	Er. Bijay Krishna Upadhyay	Member	National Society for Earthquake Technology (NSET) Bhaisepati, Lalitpur
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6.	Ms. Nishi Manandhar Shrestha	Member-Secretary	Construction Technical Sub Committee National Skill Testing Board, Sanothimi, Bhaktapur
7.	Mr. Tulsi KC	Member	Sr. Skill Testing Officer National Skill Testing Board, Sanothimi, Bhaktapur
8.	Mr. Suresh Maharjan	Member	Skill Testing Officer National Skill Testing Board, Sanothimi, Bhaktapur

Recommended by Construction Technical Sub Committee: 12 January 2021 (28 Paush 2077)

1	**Occupational Title: Construction Mason** **Level: 2**
2	**Job Description:** Construction Mason, L-2 constructs wall in brick, block and stone masonry.
	UNITS OF COMPETENCY: 1. Construct brick masonry 2. Construct block masonry 3. Construct stone masonry 4. Perform communication 5. Develop professionalism ***Note: Units 4 and 5 are not for testing purpose.***
4	**Qualifying Notes/Prerequisites:** • Physical Requirements: Sound health • Entry Requirements: As per NSTB rules. **Additional Information:** • Assessment Types: Performance test only. • Assessment Duration: 4 to 6 Hours (Single Competency) 8 to 10 hours (All Competency) • Recommended Group Size: 8 to 10 candidates

5	**Unit No: 1** **Unit Title: Construct brick masonry**	**Unit code:**
	Elements of competency	**Performance standards**
	1.1 Perform preparatory works	1.1.1 ***Personal Protective Equipment (PPE)*** used in accordance with Occupation Health and Safety (OHS) procedures and policies. 1.1.2 Tools and equipment prepared as per task requirements. 1.1.3 Site cleared, surface levelled and layout done as per building layout plan. 1.1.4 ***Quality*** of ***construction materials*** checked and required quantity determined as per drawing. 1.1.5 Scaffold firmly erected and fixed at correct location to withstand load of materials as well as two persons.
	1.2 Prepare cement mortar	1.2.1 ***Platform*** prepared within 10 meters from worksite. 1.2.2 Impurities removed from cement and sand. 1.2.3 Dry cement and sand thoroughly mixed as per ratio to homogeneous mixture. 1.2.4 Admixture added and mixed. 1.2.5 Clean water added to dry mixture and thoroughly mixed to uniform consistency.
	1.3 Lay bricks	1.3.1 Surface cleaned and watered. 1.3.2 Alignment thread stretched and fixed to reference point within line and level. 1.3.3 Green cement mortar spread to a uniform thickness not exceeding 12 mm. 1.3.4 Brick laid in ***required bond*** course by course to line level $\pm$ 3mm and plumb for constructing ***walls.*** 1.3.5 Mortar filled and compacted in vertical joints uniformly not exceeding 15 mm. 1.3.6 Brick cut to right angle in ***required size***. 1.3.7 Openings left as per drawing. 1.3.8 Joints raked in ***required shape.*** 1.3.9 Excess mortar extruded from joints. 1.3.10 Curing performed after initial setting time.
	1.4 Place reinforcement for horizontal and vertical band	1.4.1 Reinforcement measured, cut and bent.

		1.4.2 Horizontal band, vertical band and corner stitch fabricated as per drawings. 1.4.3 Bands and stitch placed in wall in line and level maintaining 25 mm ±5mm clear cover at the bottom and sides. 1.4.4 Formwork prepared and erected in ***required location*** as per drawings.
	1.5 Perform concrete works	1.5.1 Platform prepared within 10 meters from worksite. 1.5.2 Impurities removed from cement, sand and aggregate. 1.5.3 Dry cement, sand and aggregate thoroughly mixed as per ratio to homogeneous mixture. 1.5.4 Admixture added and mixed. 1.5.5 Clean water added to dry mixture and thoroughly mixed to uniform consistency. 1.5.6 Concrete mixture gently poured in required location within height of 1 meter. 1.5.7 Concrete mixture uniformly compacted within line and level within ±5mm. 1.5.8 Curing performed after initial setting time.
	1.6 Perform finishing works	1.6.1 Masonry wall surface and work area cleaned. 1.6.2 Scaffold and formwork dismantled and stored. 1.6.3 Putlog hole packed. 1.6.4 Excess mortar disposed. 1.6.5 Tools and equipment cleaned, maintained, stored and record updated. 1.6.6 Excess materials stockpiled safely.
6	**Task Performance Requirements (Tools, Equipment and Materials):** • Measuring tape, builder's square, plumb-bob, spirit level, pipe level, wheel barrow, basket/tokari, trowel, pan/karai, mortar board, mason's thread, line block/line pin, brick bolster, brick axe/chupee, crowbar/gal, adze/khukuri, rammer, wooden pegs, pick axe, spade, shovel, mason's hammer, claw hammer, mason's spacing rule/gauge rod, water, water drum/tank, bucket, mug, step ladder, broom, brush, jointer, scaffolding materials (props, runners, stage, bracer, rope), hacksaw, bar bending die, marking pen, pencil, nails, work bench, reinforcement bar, binding wires, wire binder, wire brush, wrench, handsaw, timber, plank, plyboard, raker, sand, cement, aggregate, admixture, lime, brick, jute, cloth, toolbox, first aid kit and personal protective equipment (PPE).	

7	**Safety and Hygiene (Occupational Health and Safety):** • Use personal protective equipment. • Safe handling of materials, tools and equipment. • Hazards involved in lifting tools, equipment and materials. • Safe handling of debris. • Hazards involved in handling cement, concrete and lime. • Safe use of scaffolding. • Apply safety precautions while working at height.

8	Required Knowledge		
	Technical Knowledge	**Applied Calculation**	**Graphical Information**

	• Tools and equipment:
	  ○ Types
	  ○ Uses
	  ○ Safe handling
	• Site clearance, preparation and layout
	• Disposal of debris
	• Quality, testing and storing technique of construction materials
	• Surface levelling
	• Bed preparation
	  ○ Gravelling
	  ○ Sand filling
	  ○ Soling
	  ○ Concreting
	• Difference between load bearing and framed structure.
	• Location of bands (horizontal band, corner stitch, gable band) in load bearing and framed structures.
	• Foundation band
	• Vertical reinforcements in load bearing structure
	• Construction of foundation in slope land
	• Occupational health and safety rules and regulation
	• Use and importance of first aid
	• Types of mortar and their workability
	• Brick terminology and their standard sizes
	• Reason and importance of soaking brick
	• Types of bond (Header, Stretcher, English and Flemish)
	• Bonding of bricks in straight, corner, angular, curved wall and arch
		• Convert imperial units to metric units and vice versa
		• Calculate quantity of construction materials
			• Read and interpret drawing/sketch
			• Read and interpret manufacturer's label

	• Raking of joints
	• Reason and importance of stepped joint for continuing wall
	• Thickness of mortar and mortar setting time
	• Use of scaffolding
	• Importance and time period of curing walls and concrete works
	• Height of brick walls to be constructed per day as per thickness
	• Steel reinforcement
	  ○ Types
	  ○ Size
	  ○ Placement of reinforcement bars
	  ○ Accepted level of rusting in bars
	  ○ Reuse of reinforcement bar
	  ○ Lap length
	  ○ Weight per meter
	• Position of formwork/shuttering
	• Concreting
	  ○ Mix ratio
	  ○ Compaction
	  ○ Curing		

9	Assessment of Competency					
	Unit: 1 **Unit Title: Construct brick masonry**					
	Candidate Details		**Assessors Detail**			
	Candidate's Name: Registration Number: Symbol No: Test Centre: Test Date:		Assessors' Name 1. 2. 3.		ID/License No:	
Element of competency	**Performance Standards**		**Standard Met**	**Standard Not Met**	**Evidence Type**	**Comments**
1.1 Perform preparatory works	1.1.1 ***Personal Protective Equipment (PPE)*** used in accordance with Occupation Health and Safety (OHS) procedures and policies. 1.1.2 Tools and equipment prepared as per task requirements. 1.1.3 Site cleared, surface levelled and layout done as per building layout plan. 1.1.4 ***Quality*** of ***construction materials*** checked and required quantity determined as per drawing. 1.1.5 Scaffold firmly erected and fixed at correct location to withstand load of materials as well as two persons.					
1.2 Prepare cement mortar	1.2.1 ***Platform*** prepared within 10 meters from worksite. 1.2.2 Impurities removed from cement and sand. 1.2.3 Dry cement and sand thoroughly mixed as per ratio to homogeneous mixture. 1.2.4 Admixture added and mixed. 1.2.5 Clean water added to dry mixture and thoroughly mixed to					

	uniform consistency.				
1.3 Lay bricks	1.3.1 Surface cleaned and watered. 1.3.2 Alignment thread stretched and fixed to reference point within line and level. 1.3.3 Green cement mortar spread to a uniform thickness not exceeding 12 mm. 1.3.4 Brick laid in ***required bond*** course by course to line level ± 3mm and plumb for constructing ***walls.*** 1.3.5 Mortar filled and compacted in vertical joints uniformly not exceeding 15 mm. 1.3.6 Brick cut to right angle in ***required size***. 1.3.7 Openings left as per drawing. 1.3.8 Joints raked in ***required shape.*** 1.3.9 Excess mortar extruded from joints. 1.3.10 Curing performed after initial setting time.				
1.4 Place reinforcement for horizontal and vertical band	1.4.1 Reinforcement measured, cut and bent. 1.4.2 Horizontal band, vertical band and corner stitch fabricated as per drawings. 1.4.3 Bands and stitch placed in wall in line and level maintaining 25 mm ±5mm clear cover at the bottom and sides. 1.4.4 Formwork prepared and erected in ***required location*** as per drawings.				
1.5 Perform concrete works	1.5.1 Platform prepared within 10 meters from worksite. 1.5.2 Impurities removed from cement, sand and aggregate. 1.5.3 Dry cement, sand and aggregate thoroughly mixed as per ratio to homogeneous mixture. 1.5.4 Admixture added and mixed.				

	1.5.5 Clean water added to dry mixture and thoroughly mixed to uniform consistency. 1.5.6 Concrete mixture gently poured in required location within height of 1 meter. 1.5.7 Concrete mixture uniformly compacted within line and level within ±5mm. 1.5.8 Curing performed after initial setting time.				
1.6 Perform finishing works	1.6.1 Masonry wall surface and work area cleaned. 1.6.2 Scaffold and formwork dismantled and stored. 1.6.3 Putlog hole packed. 1.6.4 Excess mortar disposed. 1.6.5 Tools and equipment cleaned, maintained, stored and record updated. 1.6.6 Excess materials stockpiled safely.				

WT- Written Test **OQ**- Oral Question **PT-** Practical Test **DO** – Direct Observation **SR**- Supervisor's report **SN**–Simulation

RP- Role Play **PG** –Photographs **VD**- Video **CT** – Certificates **TS** – Testimonials (Reward) **PP** – Product Produced

CS – Case Study

Range Statement

Variable	Range
Personal Protective Equipment	*May include but not limited to:* • Helmet • Apron/Safety Jacket • Goggles • Gloves • Protective shoes • Mask • Safety belt • Ear plug
Quality	*May include but not limited to:* • Brick: Shape, size, and burnt • Sand: Cleanliness, coarse and impurities • Aggregate: Shape, size, grade and impurities • Cement: Manufacture date, freshness and lump • Water: Cleanliness and impurities • Admixture materials: Expiry and ratio • Reinforcement: Type, size and deformation • Formworks: Type and deformation
Construction material	*May include but not limited to:* • Brick • Sand • Aggregate • Cement • Water

	• Admixture materials • Reinforcement • Binding wires • Galvanized wire • Timber, props and planks
Platform	*May include but not limited to:* • Dry brick soiling • Mortar board • Metal sheet
Required bond	*May include but not limited to:* • Header • Stretcher • English • Flemish
Walls	*May include but not limited to:* • Straight wall • Corner wall • Cross wall • Angular wall • Curve wall • Arch wall
Required size	*May include but not limited to:* • Queen closer • Half bat • ¾ bat

Required shape	*May include but not limited to:* • Concave • Raked • V
Required location	*May include but not limited to:* • Horizontal band • Vertical band • Corner stitch • Gable band • Holdfast

5	**Unit No: 2** **Unit Title: Construct block masonry**	**Unit code:**
	Elements of competency	**Performance standards**
	2.1 Perform preparatory works	2.1.1 ***Personal Protective Equipment (PPE)*** used in accordance with Occupation Health and Safety (OHS) procedures and policies. 2.1.2 Tools and equipment prepared as per task requirements. 2.1.3 Site cleared, surface levelled and layout done as per building layout plan. 2.1.4 ***Quality*** of ***construction materials*** checked and required quantity determined as per drawing. 2.1.5 Scaffold firmly erected and fixed at correct location to withstand load of materials as well as two persons.
	2.2 Prepare cement mortar	2.2.1 ***Platform*** prepared within 10 meters from worksite. 2.2.2 Impurities removed from cement and sand. 2.2.3 Dry cement and sand thoroughly mixed as per ratio to homogeneous mixture. 2.2.4 Admixture added and mixed. 2.2.5 Clean water added to dry mixture and thoroughly mixed to uniform consistency.
	2.3 Lay blocks	2.3.1 Surface cleaned and watered. 2.3.2 Alignment thread stretched and fixed to reference point within line and level. 2.3.3 Green cement mortar spread to a uniform thickness not exceeding 12 mm. 2.3.4 ***Block and block type*** selected as per job requirement. 2.3.5 Block and block type laid in required bond course by course to line level $\pm$ 3mm and plumb for constructing ***walls***. 2.3.6 Mortar filled and uniformly compacted in vertical joints not exceeding 15 mm. 2.3.7 Block cut to right angle in required size. 2.3.8 Openings left as per drawing. 2.3.9 Excess mortar extruded from joints. 2.3.10 Curing performed after initial setting time.
	2.4 Place reinforcement for horizontal and vertical band	2.4.1 Reinforcement measured, cut and bent.

		2.4.2 Horizontal band, vertical band and corner stitch fabricated as per the drawings. 2.4.3 Bands and stitch placed in wall in line and level maintaining 25 mm ±5mm clear cover at the bottom and sides. 2.4.4 Formwork prepared and erected in ***required location*** as per drawings.
	2.5 Perform concrete works	2.5.1 Platform prepared within 10 meters from worksite. 2.5.2 Impurities removed from cement, sand and aggregate. 2.5.3 Dry mix of cement, sand and aggregate thoroughly mixed as per ratio to homogeneous mixture. 2.5.4 Admixture added and mixed. 2.5.5 Clean water added to dry mixture and thoroughly mixed to uniform consistency. 2.5.6 Concrete mixture gently poured in required location within height of 1 meter. 2.5.7 Concrete mixture uniformly compacted within line and level within ±5mm. 2.5.8 Curing performed after initial setting time.
	2.6 Perform finishing works	2.6.1 Masonry wall surface and work area cleaned. 2.6.2 Scaffold and formwork dismantled and stored. 2.6.3 Putlog hole packed. 2.6.4 Excess mortar disposed. 2.6.5 Tools and equipment cleaned, maintained, stored and record updated. 2.6.6 Excess materials stockpiled safely.
6	**Task Performance Requirements (Tools, Equipment and Materials):** • Measuring tape, builder's square, plumb-bob, spirit level, pipe level, wheel barrow, basket/tokari, trowel, pan/karai, mortar board, line block/line pin, mason's hammer, claw hammer, mason's spacing rule/gauge rod, axe/chupee, crowbar/gal, adze/khukuri, rammer, wooden pegs, pick axe, spade, shovel, water, water drum/tank, bucket, mug, step ladder, broom, brush, jointer, mason's thread, scaffolding materials (props, runners, stage, bracer, rope), hacksaw, bar bending die, marking pen, pencil, nails, work bench, reinforcement bar, binding wires, wire binder, wire brush, wrench, handsaw, block cutter, timber, plank, plyboard, sand, cement, aggregate, admixture, lime, block, jute, cloth, toolbox, first aid kit and personal protective equipment (PPE).	

7	**Safety and Hygiene (Occupational Health and Safety):** • Use personal protective equipment. • Safe handling of materials, tools and equipment. • Hazards involved in lifting tools, equipment and materials. • Safe handling of debris. • Hazards involved in handling cement, concrete and lime. • Safe use of scaffolding. • Apply safety precautions while working at height.

8	Required Knowledge		
	Technical Knowledge	**Applied Calculation**	**Graphical Information**

	• Tools and equipment:
	  ○ Types
	  ○ Uses
	  ○ Safe handling
	• Site clearance, preparation and layout
	• Disposal of debris
	• Quality, testing and storing technique of construction materials
	• Surface levelling
	• Bed preparation
	  ○ Gravelling
	  ○ Sand filling
	  ○ Soling
	  ○ Concreting
	• Difference between load bearing and framed structure.
	• Location of bands (horizontal band, corner stitch, gable band) in load bearing and framed structures.
	• Foundation band
	• Vertical reinforcements in load bearing structure
	• Construction of foundation in slope land
	• Occupational health and safety rules and regulation
	• Use and importance of first aid
	• Block:
	  ○ Types (Hollow, Solid, Interlock, Cellular)
	  ○ Characteristics of each type of block
	  ○ Laying process of different types of block
	  ○ Insertion of vertical reinforcement
		• Convert imperial units to metric units and vice versa
		• Calculate quantity of construction materials
			• Read and interpret drawing/sketch
			• Read and interpret manufacturer's label

	○ Placing of horizontal band, corner stitch and gable band ○ Use of foundation block, full block, half block and lintel block ○ Importance of wetting • Types of mortar and their workability • Thickness of mortar and mortar setting time • Use of scaffolding • Position of formwork/shuttering • Use of admixture • Concrete compaction • Importance and time period of curing walls and concrete works • Height of walls to be constructed per day as per thickness • Steel reinforcement ○ Types ○ Size ○ Placement of reinforcement bars ○ Accepted level of rusting in bars ○ Reuse of reinforcement bar ○ Lap length ○ Weight per meter • Concreting ○ Mix ratio ○ Compaction ○ Curing		

9	Assessment of Competency					
	Unit: 2 **Unit Title: Construct block masonry**					
	Candidate Details		**Assessors Detail**			
	Candidate's Name: Registration Number: Symbol No: Test Centre: Test Date:		Assessors' Name 1. 2. 3.		ID/License No:	
Element of competency	**Performance Standards**		**Standard Met**	**Standard Not Met**	**Evidence Type**	**Comments**
2.1 Perform preparatory works	2.1.1 ***Personal Protective Equipment (PPE)*** used in accordance with Occupation Health and Safety (OHS) procedures and policies. 2.1.2 Tools and equipment prepared as per task requirements. 2.1.3 Site cleared, surface levelled and layout done as per building layout plan. 2.1.4 ***Quality*** of ***construction materials*** checked and required quantity determined as per drawing. 2.1.5 Scaffold firmly erected and fixed at correct location to withstand load of materials as well as two persons.					
2.2 Prepare cement mortar	2.2.1 ***Platform*** prepared within 10 meters from worksite. 2.2.2 Impurities removed from cement and sand. 2.2.3 Dry cement and sand thoroughly mixed as per ratio to homogeneous mixture. 2.2.4 Admixture added and mixed. 2.2.5 Clean water added to dry mixture and thoroughly mixed to					

	uniform consistency.				
2.3 Lay blocks	2.3.1 Surface cleaned and watered. 2.3.2 Alignment thread stretched and fixed to reference point within line and level. 2.3.3 Green cement mortar spread to a uniform thickness not exceeding 12 mm. 2.3.4 ***Block and block type*** selected as per job requirement. 2.3.5 Block and block type laid in required bond course by course to line level ± 3mm and plumb for constructing ***walls***. 2.3.6 Mortar filled and uniformly compacted in vertical joints not exceeding 15 mm. 2.3.7 Blocks cut to right angle in required size. 2.3.8 Openings left as per drawing. 2.3.9 Excess mortar extruded from joints. 2.3.10 Curing performed after initial setting time.				
2.4 Place reinforcement for horizontal and vertical band	2.4.1 Reinforcement measured, cut and bent. 2.4.2 Horizontal band, vertical band and corner stitch fabricated as per the drawings. 2.4.3 Bands and stitch placed in wall in line and level maintaining 25 mm ±5mm clear cover at the bottom and sides. 2.4.4 Formwork prepared and erected in ***required location*** as per drawings.				
2.5 Perform concrete works	2.5.1 Platform prepared within 10 meters from worksite. 2.5.2 Impurities removed from cement, sand and aggregate. 2.5.3 Dry mix of cement, sand and aggregate thoroughly mixed as per ratio to homogeneous mixture.				

	2.5.4 Admixture added and mixed. 2.5.5 Clean water added to dry mixture and thoroughly mixed to uniform consistency. 2.5.6 Concrete mixture gently poured in required location within height of 1 meter. 2.5.7 Concrete mixture uniformly compacted within line and level within ±5mm. 2.5.1 Curing performed after initial setting time.				
2.6 Perform finishing works	2.6.1 Masonry wall surface and work area cleaned. 2.6.2 Scaffold and formwork dismantled and stored. 2.6.3 Putlog hole packed. 2.6.4 Excess mortar disposed. 2.6.5 Tools and equipment cleaned, maintained, stored and record updated. 2.6.6 Excess materials stockpiled safely.				

WT- Written Test **OQ**- Oral Question **PT-** Practical Test **DO** – Direct Observation **SR**- Supervisor's report **SN**–Simulation

RP- Role Play **PG –**Photographs **VD**- Video **CT** – Certificates **TS** – Testimonials (Reward) **PP** – Product Produced

CS – Case Study

Range Statement

Variable	Range
Personal Protective Equipment	*May include but not limited to:* • Helmet • Apron/Safety Jacket • Goggles • Gloves • Protective shoes • Mask • Safety belt • Ear plug
Quality	*May include but not limited to:* • Block: Shape, size and curing • Sand: Cleanliness, coarse and impurities • Aggregate: Shape, size, grade and impurities • Cement: Freshness and lump • Water: Cleanliness and impurities • Admixture materials: Expiry and ratio • Reinforcement: Type, size and deformation • Formworks: Type and deformation
Construction material	*May include but not limited to:* • Block • Sand • Aggregate • Cement • Water

	• Admixture materials • Reinforcement • Binding wires • Galvanized wire • Formworks
Platform	*May include but not limited to:* • Dry brick soling • Mortar board • Metal sheet
Block	*May include but not limited to:* • Hollow block • Solid block • Interlock block • Cellular block
Block type	*May include but not limited to:* • Foundation block • Half block • Full block • Lintel block
Walls	*May include but not limited to:* • Straight • Corner • Cross • Angular

Required location	*May include but not limited to:* • Horizontal band • Vertical band • Corner stitch • Gable band • Holdfast

5	**Unit No: 3** **Unit Title: Construct stone masonry**	**Unit code:**

Elements of competency	Performance standards
3.1 Perform preparatory works	3.1.1 ***Personal Protective Equipment (PPE)*** used in accordance with Occupation Health and Safety (OHS) procedures and policies. 3.1.2 Tools and equipment prepared as per task requirements. 3.1.3 Site cleared, surface levelled and layout done as per building layout plan. 3.1.4 ***Quality*** of ***construction materials*** checked and required quantity determined as per drawing. 3.1.5 Stone surface smoothened and dressed to ***required size***. 3.1.6 Scaffold firmly erected and fixed at correct location to withstand load of materials as well as two persons.
3.2 Prepare cement mortar	3.2.1 ***Platform*** prepared within 10 meters from worksite. 3.2.2 Impurities removed from mud, cement and sand. 3.2.3 Dry cement and sand thoroughly mixed as per ratio to homogeneous mixture. 3.2.4 Admixture added and mixed. 3.2.5 Clean water added to dry mixture and thoroughly mixed to uniform consistency.
3.3 Prepare mud mortar	3.3.1 Location identified for mud motor preparation and top soil removed. 3.3.2 Impurities removed from mud and thoroughly mixed with water to homogeneous mixture.
3.4 Lay stone	3.4.1 Surface cleaned and watered. 3.4.2 Alignment thread stretched and fixed to reference point within line and level. 3.4.3 Surface cleaned and green ***mortar*** spread to a ***uniform*** **thickness.** 3.4.4 Corner stone placed at the beginning of ***walls*** maintaining plumb within ± 3mm. 3.4.5 Face stone and inner stones laid with bond stones within 900 mm to line, level and plumb. 3.4.6 Bond stones placed at height not exceeding 600 mm. 3.4.7 Stone laid in required ***pattern*** to line level and plumb ± 3mm for constructing walls. 3.4.8 Mortar filled and uniformly compacted in vertical joints.

		3.4.9 Openings left as per drawing. 3.4.10 Pointing joints done in stone masonry. 3.4.11 Excess mortar extruded from joints. 3.4.12 Curing performed in cement mortar stone masonry after initial setting time.
	3.5 Place horizontal and vertical band	3.5.1 ***Band materials*** measured, cut and bent. 3.5.2 Horizontal band, vertical band and corner stitch fabricated as per the drawings. 3.5.3 Timber/bamboo bands placed and anchored in wall in line and level. 3.5.4 Reinforcement bands and stitch placed in wall in line and level maintaining 25 mm ±5mm clear cover at the bottom and sides. 3.5.5 Formwork prepared and erected in ***required location*** as per drawings.
	3.6 Perform concrete works	3.6.1 Platform prepared within 10 meters from worksite. 3.6.2 Impurities removed from cement, sand and aggregate. 3.6.3 Dry mix of cement, sand and aggregate thoroughly mixed as per ratio to homogeneous mixture. 3.6.4 Admixture added and mixed. 3.6.5 Clean water added to dry mixture and thoroughly mixed to uniform consistency. 3.6.6 Concrete mixture gently poured in required location within height of 1 meter. 3.6.7 Concrete mixture uniformly compacted within line and level within ±5mm. 3.6.8 Curing performed after initial setting time.
	3.7 Perform finishing works	3.7.1 Masonry wall surface and work area cleaned. 3.7.2 Scaffold and formwork dismantled and stored. 3.7.3 Putlog hole packed. 3.7.4 Excess mortar disposed. 3.7.5 Tools and equipment cleaned, maintained, stored and record updated. 3.7.6 Excess materials stockpiled safely.

6	**Task Performance Requirements (Tools, Equipment and Materials):** • Measuring tape, builder's square, plumb-bob, spirit level, pipe level, wheel barrow, brick axe/chupee, crowbar/gal, adze/khukuri, rammer, wooden pegs, rope, pick axe, hacksaw, bar bending die, mason's thread, marking pen, pencil, nails, work bench, reinforcement bar, timber, bamboo, wire mesh, binding wires, wire binder, wire brush, handsaw, plank, ply board, basket/tokari, trowel, mortar board, pan/karai, line block/line pin, mason's hammer, claw hammer, dressing hammer, chisel, mason's spacing rule/gauge rod, water, water drum/tank, bucket, mug, step ladder, broom, brush, jointer, scaffolding materials (props, runners, stage, bracer, rope), wrench, pointing trowel, sand, cement, mud, aggregate, shovel, admixture, lime, spade, stone, jute, cloth, tool box, first aid kit and personal protective equipment (PPE).
7	**Safety and Hygiene (Occupational Health and Safety):** • Use personal protective equipment. • Safe handling of materials, tools and equipment. • Hazards involved in lifting tools, equipment and materials. • Safe handling of debris. • Hazards involved in handling cement, concrete and lime. • Safe use of scaffolding. • Apply safety precautions while working at height.

8	Required Knowledge		
	Technical Knowledge	**Applied Calculation**	**Graphical Information**

	• Tools and equipment:
	  ○ Types
	  ○ Uses
	  ○ Safe handling
	• Site clearance, preparation and layout
	• Disposal of debris
	• Quality, testing and storing technique of construction materials
	• Surface levelling
	• Bed preparation
	  ○ Gravelling
	  ○ Sand filling
	  ○ Soling
	  ○ Concreting
	• Difference between load bearing and framed structure.
	• Location of bands (horizontal band, corner stitch, gable band) in load bearing and framed structures.
	• Foundation band
	• Vertical reinforcements in load bearing structure
	• Construction of foundation in slope land
	• Occupational health and safety rules and regulation
	• Use and importance of first aid
	• Stone:
	  ○ Types
	  ○ Characteristics of each type of stone
	  ○ Size and tolerance
	  ○ Difference between soft, medium and hard stone
		• Convert imperial units to metric units and vice versa
		• Calculate quantity of construction materials
			• Read and interpret drawing/sketch
			• Read and interpret manufacturer's label

	○ Methods and procedures for cutting/dressing stone ○ Use of corner stone, bond(through) stone and face stone and their location • Mud: ○ Types and their uses ○ Ratio of sand and clay in mud mortar • Types of mortar and their workability • Thickness of mortar and mortar setting time • Types of stone masonry • Advantages of pointing • Concreting ○ Mix ratio ○ Compaction ○ Curing ○ Placement of reinforcement bar • Use of scaffolding • Position of formwork/shuttering • Use of admixture • Importance and time period of curing walls and concrete works • Height of walls to be constructed per day as per thickness • Steel reinforcement ○ Types ○ Size ○ Placement of reinforcement bars ○ Accepted level of rusting in bars ○ Reuse of reinforcement bar ○ Lap length ○ Weight per meter		

9	**Assessment of Competency**					
	Unit: 3 **Unit Title: Construct stone masonry**					
	Candidate Details		**Assessors Detail**			
	Candidate's Name: Registration Number: Symbol No: Test Centre: Test Date:		Assessors' Name 1. 2. 3.		ID/License No:	
Element of competency	**Performance Standards**		**Standard Met**	**Standard Not Met**	**Evidence Type**	**Comments**
3.1 Perform preparatory works	3.1.1 ***Personal Protective Equipment (PPE)*** used in accordance with Occupation Health and Safety (OHS) procedures and policies. 3.1.2 Tools and equipment prepared as per task requirements. 3.1.3 Site cleared, surface levelled and layout done as per building layout plan. 3.1.4 ***Quality*** of ***construction materials*** checked and required quantity determined as per drawing. 3.1.5 Stone surface smoothened and dressed to ***required size***. 3.1.6 Scaffold firmly erected and fixed at correct location to withstand load of materials as well as two persons.					
3.2 Prepare cement mortar	3.2.1 ***Platform*** prepared within 10 meters from worksite. 3.2.2 Impurities removed from mud, cement and sand. 3.2.3 Dry cement and sand thoroughly mixed as per ratio to homogeneous mixture. 3.2.4 Admixture added and mixed.					

	3.2.5 Clean water added to dry mixture and thoroughly mixed to uniform consistency.				
3.3 Prepare mud mortar	3.3.1 Location identified for mud motor preparation and top soil removed. 3.3.2 Impurities removed from mud and thoroughly mixed with water to homogeneous mixture.				
3.4 Lay stone	3.4.1 Surface cleaned and watered. 3.4.2 Alignment thread stretched and fixed to reference point within line and level. 3.4.3 Surface cleaned and green ***mortar*** spread to a ***uniform*** **thickness.** 3.4.4 Corner stone placed at the beginning of ***walls*** maintaining plumb within ± 3mm. 3.4.5 Face stone and inner stones laid with bond stones within 900 mm to line, level and plumb. 3.4.6 Bond stones placed at height not exceeding 600 mm. 3.4.7 Stone laid in required ***pattern*** to line level and plumb ± 3mm for constructing walls. 3.4.8 Mortar filled and uniformly compacted in vertical joints. 3.4.9 Openings left as per drawing. 3.4.10 Pointing joints done in stone masonry. 3.4.11 Excess mortar extruded from joints. 3.4.12 Curing performed in cement mortar stone masonry after initial setting time.				

3.5 Place horizontal and vertical band	3.5.1 ***Band materials*** measured, cut and bent. 3.5.2 Horizontal band, vertical band and corner stitch fabricated as per the drawings. 3.5.3 Timber/bamboo bands placed and anchored in wall in line and level. 3.5.4 Reinforcement bands and stitch placed in wall in line and level maintaining 25 mm ±5mm clear cover at the bottom and sides. 3.5.5 Formwork prepared and erected in ***required location*** as per drawings.				
3.6 Perform concrete works	3.6.1 Platform prepared within 10 meters from worksite. 3.6.2 Impurities removed from cement, sand and aggregate. 3.6.3 Dry mix of cement, sand and aggregate thoroughly mixed as per ratio to homogeneous mixture. 3.6.4 Admixture added and mixed. 3.6.5 Clean water added to dry mixture and thoroughly mixed to uniform consistency. 3.6.6 Concrete mixture gently poured in required location within height of 1 meter. 3.6.7 Concrete mixture uniformly compacted within line and level within ±5mm. 3.6.8 Curing performed after initial setting time.				
3.7 Perform finishing works	3.7.1 Masonry wall surface and work area cleaned. 3.7.2 Scaffold and formwork dismantled and stored. 3.7.3 Putlog hole packed. 3.7.4 Excess mortar disposed. 3.7.5 Tools and equipment cleaned, maintained, stored and				

	record updated. 3.7.6 Excess materials stockpiled safely.				

WT- Written Test **OQ**- Oral Question **PT-** Practical Test **DO** – Direct Observation **SR**- Supervisor's report **SN**–Simulation

RP- Role Play **PG –**Photographs **VD**- Video **CT** – Certificates **TS** – Testimonials (Reward) **PP** – Product Produced

CS – Case Study

Range Statement

Variable	Range
Personal Protective Equipment	*May include but not limited to:* • Helmet • Apron/Safety Jacket • Goggles • Gloves • Protective shoes • Mask • Safety belt • Ear plug
Quality	*May include but not limited to:* • Stone: Shape, size, crack and hardness • Sand: Cleanliness, coarse and impurities • Aggregate: Shape, size, grade and impurities • Cement: Manufacture date, freshness and lump • Water: Cleanliness and impurities • Mud: Clay and sand composition, impurities • Admixture materials: Expiry and ratio • Reinforcement: Type, size and deformation • Formworks: Type and deformation
Construction materials	*May include but not limited to:* • Stone • Sand • Aggregate • Cement

	• Water • Admixture materials • Reinforcement • Mud • Wood/bamboo • Timber • Binding wires • Galvanized wire • Formworks
Required size	*May include but not limited to:* • Corner stone — Length: 50 cm ± 2.5 cm; Breadth: Minimum 15 cm; Height: Minimum 15 cm • Bond stone — Length: Equal to wall thickness/ two stones equal to ¾ of wall thickness; Breadth: Minimum 15 cm; Height: Minimum 15 cm • Other stones — Length: Minimum 15 cm; Breadth: Minimum 15 cm; Height: Minimum 10 cm
Platform	*May include but not limited to:* • Dry brick soling • Mortar board • Metal sheet
Mortar	*May include but not limited to:* • Cement mortar • Mud mortar
Uniform thickness	*May include but not limited to:* • Cement: 15mm • Mud: 25 mm

Pattern	*May include but not limited to:* • Random rubble • Course rubble • Ashlar
Walls	*May include but not limited to:* • Straight wall • Corner wall • Cross wall • Angular wall • Curve wall • Arch
Band materials	*May include but not limited to:* • Reinforcement • Timber • Bamboo • Wire mesh
Required location	*May include but not limited to:* • Horizontal band • Vertical band • Corner stitch • Gable band • Holdfast