higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

CONCRETE STRUCTURES
NQF LEVEL 4

28 November 2023

This marking guideline consists of 6 pages.

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QUESTION 1: DELIVERY, HANDLING AND STORAGE OF REINFORCING STEEL

1.1
- Bars should be stored by size and length in some logical manner with tags at the same end for easy identification.
- It is a good idea to cross out the number showing the original total number of bars and write in the new number of bars left. (2)

1.2
1.2.1 substances
1.2.2 neutralises
1.2.3 acids
1.2.4 cement
1.2.5 alkaline
1.2.6 passive
1.2.7 corrosion
1.2.8 acidic conditions

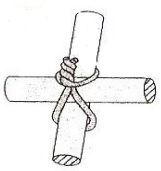
(8 × 1) (8)
[10]

QUESTION 2: INSTALLATION OF REINFORCING STEEL

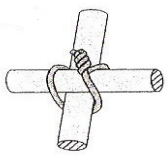
2.1 One should bend them back to ensure that the embedded portion does not extend into the specified minimum cover,✓✓ which may affect the setting between concrete and steel.✓ (3)

2.2
- Safety boots
- Safety clothes
- Safety goggles
- Gloves (Any 3 × 1) (3)

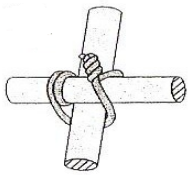
2.3 2.3.1



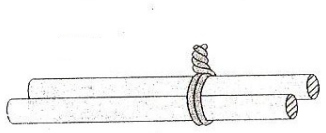
2.3.2



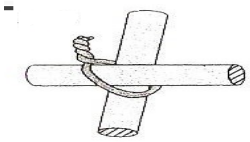
2.3.3



2.3.4



2.3.5



(5 × 2) (10)

2.4 2.4.1 False
2.4.2 False
2.4.3 True
2.4.4 True
2.4.5 False

(5 × 1)

2.5 It is malleable. It can be bent easily and it is strong to tie steel bars. (2)

2.6 2.6.1 Tying wire nip: It is a special pair of pliers used in steel fixing to tighten wire around reinforcement.

2.6.2 Bar tie twister: It is used to tighten bars and make twists in tie wire.

(2 × 2) (4)

2.7
- The types of tie used and their position must be such that the required finished is achieved.
- Form ties and spacers left in position must not spoil the desired appearance or affect the durability of the structure.
- One must always neatly cut off and bend back the ends of the wires. This is to ensure that the embedded portion does not extend into the specified minimum cover – they should terminate at a distance of not less than the specified minimum cover from the formed surface of the concrete.
- Ties cast into spacer blocks should not extend deeper into the spacer block by more than half the depth of the spacer block. The concrete cover of projecting ends of ties or clamps must comply with specified concrete cover requirements.
- Reinforcement, including stirrups, links and tying wire, must not encroach into the specified cover.

(Any 4 × 2) (8)

[35]

QUESTION 3: CHECKS BEFORE CONCRETING

3.1
- Dead load
- Impose load
- Environmental loads
- Hydrostatic loads (Any 2 × 1) (2)

3.2 3.2.1
- 20 – number of bars.
- Y – type of bar (high-yield steel bar)
- 10 – size of bar/diameter of the bar (3)

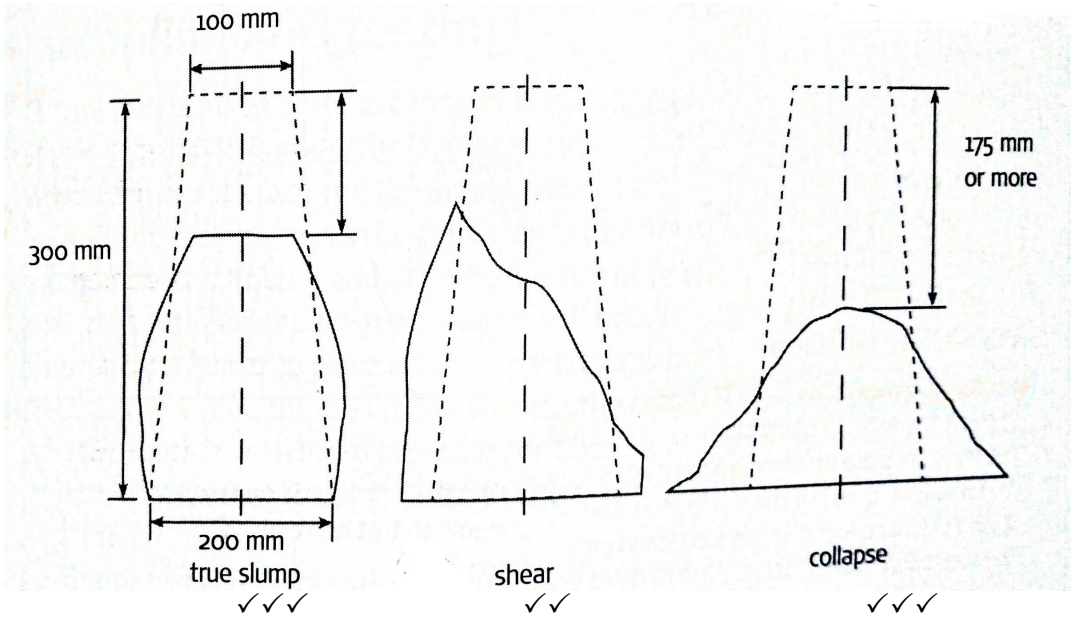
3.2.2
- 4 – number of bars
- R – type of a bar (mild steel)
- 8 – size of the bar/diameter of the bar (3)

3.3 SANS 10100-2: "All reinforcement, at the time of placing the concrete, shall be free from rust, oil and coating that might reduce the bond between the steel and surrounding or initiate of reinforcement." (2)

[10]

QUESTION 4: THE MANUFACTURE, PLACING AND COMPACTING OF CONCRETE

4.1



✓✓✓ ✓✓ ✓✓✓

Correctness = 3	Correctness = 2	Correctness = 3
Measurements = 1✓		Measurements = 1✓
Total = 4	Total = 2✓	Total = 4

(10)

4.2 4.2.1 1,5 m^3 or less
4.2.2 Increase by 15 s for each additional cubic metre or part therefore.
4.2.3 10 minutes

(3 × 1) (3)

4.3 Reduce the temperature of the concrete mix.✓

- Cool the mixing water by using well crushed ice for part or all of the mixing water. The ice particles need to be small enough to melt completely during the mixing process.✓
- Cool the aggregate by shading the stockpiles wetting the stone.✓
- Inject liquid nitrogen into the mix during mixing.✓

Add retarders to the concrete mix.✓

- One can delay the stiffening of concrete by adding retarders to the mix.✓ Retarders are chemicals that delay the setting of concrete and work by physically inhibiting the hydration of cement.✓
- Retardation is used to prevent cold joints in structures.✓

Add water reducers to the concrete mix.✓

- Water reducers allow the concrete to become more plastic with less water.✓
- The benefit is a strong concrete with les labour needed for placing and working it.✓
- High-range reducers or super plasticisers increase the ability of concrete to flow without reducing its strength.✓ (12)

[25]

QUESTION 5: STRIKING OF FORMWORK, MAKING GOOD AND FINISHING

5.1

- The company will not spend money on extra labour to repair damages.
- The company will not lose productive time.
- The company will not need to spend money on material for repairs.
- There will be no risk of concrete being weakened by repairs.
- There will be no unplanned hold-ups in the construction cycle.
- There will be fewer risk of the concrete finish being substandard. (6)

5.2 Surface plunking occurs when patches of the surface sticking to the formwork are pulled off the face during removal. (2)

5.3 Decking panels are the underside parts of formwork used for the base of a slab or decking. (2)

[10]

QUESTION 6: MAINTANING AND STORING FORMWORK

6.1	6.1.1	Yes.✓ They are stored in a horizontally position.✓	(2)
	6.1.2	Waterproof sheet	(1)
	6.1.3	It helps with reducing warping.	(2)

6.2
- Are easy to identify (correctly labelled)
- Do not block walkways
- Are easy to hold of
- Are securely placed
- Stored in containers with lids in order to stack them on top of one another (5)

[10]

TOTAL: 100

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