higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

RIGGING THEORY N2

30 JULY 2018

This marking guideline consists of 6 pages.

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QUESTION 1

1.1 A – solid thimble
B – crosby clamps
C –D Shackle (3)

1.2 1.2.1 An eye splice is used to make a permanent eye in the end of the rope.

1.2.2 A back splice is used to finish the end of the which is not required to be reeved through the block.

(2 × 2) (4)

1.3
- The wire tensile.
- The rope size.
- The surface finish, galvanised or un galvanised.
- The type of rope, round strand, triangular strand, mulita-strand or locked coil.
- The type of lay, left hand or right hand, crossed or equal.
- The type of strand. (6)

1.4
- The strength of the rope. Resistance to breaking.
- Resistance to bending and vibrational fatigue.
- Resistance to crushing.
- Resistance to abrasion.
- Reserve strength. (5)

1.5 Check for:
- acid or caustic burns
- cuts on the fibre rope
- broken or worn stitches on the fibre rope
- damaged eye
- knots on fibre ropes (Any 2 × 1) (2)

[20]

QUESTION 2

2.1 A – Ratchet jack
B – Hydraulic jack
C – Screw jack (3)

2.2 Ensure that:
- there are no cuts on the fibre of the harness.
- the safety hook is not damaged.
- there are no worn or broken stitches on the harness.
- the rope is not damaged.
- the latches are in a good condition, not broken, cracked and worn. (5)

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2.3
- Damage to the ratchet, can slip or worn out gears.
- Corrosion of the jack.
- Condition of the jack.
- Wear on the shaft of the jack.
- Adjusting lever is damaged. (Any 3 × 1) (3)

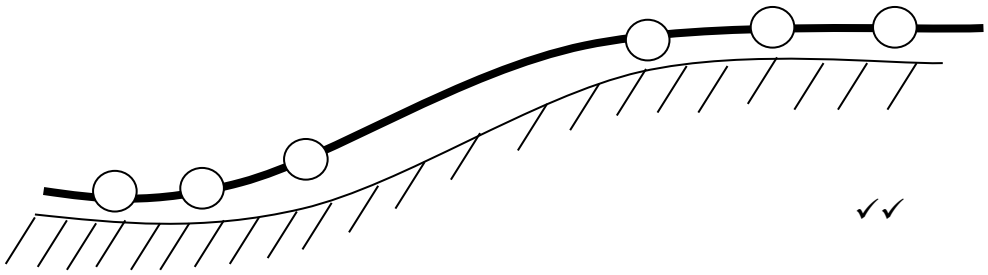
2.4 A snatch block are single blocks in which part of the shell is hinged to allow a rope to be inserted in the swallow from one side. (2)

2.5 To prevent the sling from being damaged. (2)
[15]

QUESTION 3

3.1
- Wear on the rope
- Corrosion on the rope
- Fatigue on the rope
- Accidental damage on the rope
- Distortion on the rope (5)

3.2



(2)

3.3 Alloy steel chain should not be annealed because it reduces the hardness✓ and the strength✓ of the equipment. The alloy steel chain also will also stretch causing it to break easily.✓ (3)
[10]

QUESTION 4

4.1
- Permanent drum winders for vertical shafts and inclined shafts
- Friction Koepe winders
- Drum winders for sinking shafts
- Platform winders for sinking shafts (4)

4.2 4.2.1 Platform ropes are used to suspend the sinking platform and to act as a guide for the kibble cross-heads✓ during the greater part of the kibble wind.✓
The ropes that are used in construction are the six strand triangular winding ropes and the triangular no-spin ropes.✓

4.2.2 The platform has four seperate ropes which has its own drum.✓ In each rope only two parts are used and the other ropes assist in case of any breakage in the rope.✓

(2 × 3) (6)

4.3



(2)

4.4 A – grip pulley
B – v-groove pulley
C – flat belt pulley (3)
[15]

QUESTION 5

5.1 A – lifting eye
B – plate grip
C – horizontal clamp base (3)

5.2 horizontal plate clamp (1)

5.3
- Slide the plate clamps on to the plate.
- Hook the shackle and sling on the lifting eye.
- Hoist the sling up until the arm with the plate grip clamps the plate.
- Ensure the plate grip is not smooth because the clamp can slip out.
- Check for secureness of the plate clamp and the lifting equipment and then do the lift. (5)

5.4 safe working load (1)
[10]

QUESTION 6

6.1 6.1.1 Radius is the horizontal distance from the centre line of the lifting hook to the centre about which the jib slews to the nearest base line.

6.1.2 Outreach is the horizontal distance from the centre line of the lifting hook to the nearest point on the chassis.

6.1.3 Slewing is the rotary motion of the crane jib in a horizontal plane.

(3 × 2) (6)

6.2 6.2.1 Guy anchors are used for heavy loads. They stretch considerably and their tension can be adjusted. They are commonly used in ship masts, radio masts, wind turbines and utility poles.

6.2.2 Double staking anchors are used in the environment where there are no other source of anchors. The double staking anchor is pined into the ground and a rope is used for rigging.

(2 × 2) (4)

6.3 Mobile cranes:

- can move into tight areas.
- saves time when doing a job.
- is easy to set up.
- can lift up heavy and large loads easily and positioning a load with ease.
- can travel to remote locations.
- make job sites much safer. (Any 5 × 1) (5)

6.4 The crane:

- must be level
- must have free movement of the cabin on platform
- must not be moved whilst load is hanging from the jib
- When jib must be in a high position and the load must not bump against the jib
- must not lift a load whilst the chassis rest on springs (5)

[20]

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QUESTION 7

7.1 a) A1= π × 0,1²
= 0,03142 m²
= 0,03142 × 2
= 0,0628 m²✓

A2 = l × b
= 5 × 0.2
= 1 m²✓

Total Area = A1 + A2
= 0,0628 + 1
= 1,0628 m² ✓

b) $M = A \times specific\ mass$
= 1,0628 m² × 80 kg/m²✓
= 85,024 kg✓ (5)

7.2 a) A = l × b
= 1,2 × 1.2
= 1,44 m² ✓

Total Area = A × 6
= 1,44 × 6✓
= 8,64 m²✓

b) $V = A \times H$
= 8,64 m² × 1,2 m✓
= 10,368 m³✓ (5)
[10]

TOTAL: 100

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