higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

RIGGING THEORY N2

30 July 2021

This marking guideline consists of 6 pages.

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QUESTION 1

1.1
- Ordinary lay
- Lang's lay (2)

1.2 1.2.1
- Centre wire is covered with small wires.
- Small wires covered by larger wires in grooves and layers in a strand are equal but lengths are unequal.
- Construction is 19 wires which are flexible.

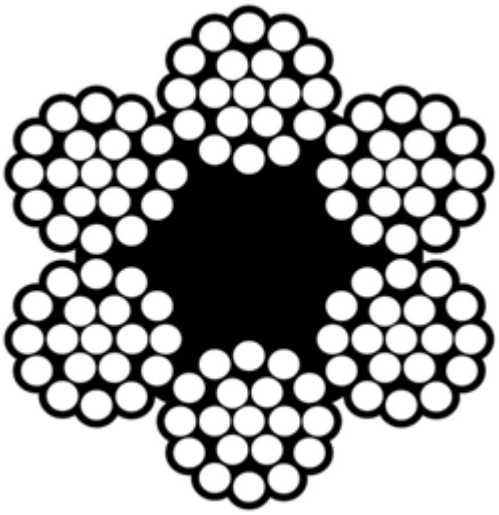
1.2.2
- Similar features as seale but more flexible.
- Six smaller wires are laid on the crown of the inner wires.
- A strand of 19 wires in which the outer wires are of two sizes alternately.

1.2.3
- Develops a type of non-spin rope.
- The ordinary lay works against the lang's lay.
- Alternate strands are more ordinary than lang's lay.

1.2.4
- High degree of flexibility, either with round or flattened strands.
- Called concentric stranded ropes.
- Used for shaft sinking or special circumstances for winding.

(4 × 3) (12)

1.3



✓✓✓ (3)

1.4 A – Open spelter socket
B – Single eye with a solid thimble
C – Single eye with a thimble (3)

[20]

QUESTION 2

2.1
- Ensure the air pipe is securely fitted to the winch and the air line.
- Ensure the winch is secured to a structure.
- Ensure the safety guards are fitted on the winch.
- Ensure there is a proper braking system on the winch.
- Ensure the rope is in a good condition, no defects.
- Ensure the winch drum and components are not damaged.
- Ensure the SWL is indicated on the winch. (Any relevant 6 x 1)) (6)

2.2
- Step1: Hold harness by the back ring and shake harness to allow all straps to fall in place.
- Step 2: Release any straps that are buckled or tangled.
- Step 3: Slip straps over shoulders so the back ring is located in the middle of the back, between the shoulder blades.
- Step 4: Pull leg straps between the legs and connect to opposite ends.
- Step 5: If belt harness has a waist strap connect the strap and tighten.
- Step 6: Connect chest strap and and position in midchest area. Tighten to keep shoulder straps tight.
- Step 7: After all straps have been connected tighten all buckles so that the harness fits appropriately and allows full range of movement. Loop away excess straps on the harness. (7)

2.3
- Wear on the sheave.
- Cracks on the sheave.
- Kinks on the sheaves.
- Corrosion on the sheaves (Any 2 × 1) (2)

[15]

QUESTION 3

3.1 Haulage depressing rollers are usually confined✓ to the dead side of a haulage rope or in front of the back balance or tension carriage. The rollers are also used to guide the rope✓ onto the drum, fleeting wheel or return and tension sheave.✓ The rollers may function as a reflector✓ to the track of the rope when it is required to pass under a bridge or a set of track rails.✓ (4)

3.2 3.2.1 Protection of sheave wheels is safety guards that are mounted over the sheave wheels.✓ They are made from woven wire, expanded metal or perforated metal.✓ (2)

3.2.2 Rope supports are used to guide the haulage rope in a number of ways and also depends on the contour of the ground it passes over.✓ All the rope supports must be kept in a good condition and lubricated so that the rope can run freely.✓ (2)

3.2.3 External corrosion can be seen and assessed but internal corrosion is sometimes present with little or no indication on the outer wires.✓ If there is internal corrosion, use spikes to check the rope.✓ (2)

[10]

QUESTION 4

4.1
- Reducing peak power demands
- Result in a substantial saving (2)

4.2
- Check if terrain around drum is accessible for employees.
- Check the type of equipment that is required.
- Check the height of the building for easy movement.
- Check ends of the building are opened or closed.
- Check the assembly of the roof trusses. (5)

4.3
- Ensure the rope has no defects.
- Ensure the pulleys and sheaves are not jammed and are in good condition.
- Ensure the braking system has no wear or any other defects.
- Ensure the cabin is not rusty or has any defects.
- Ensure the weights are not damaged and can accommodate the elevator.
- Ensure the drum winders are moving freely. (Any 4 × 1) (4)

4.4
- Very simple in operation
- Only one brake is required
- Extension is very easy
- Can be used in narrow openings, pathways or roads (4)

[15]

QUESTION 5

5.1 Lower the crane hook until the plate is placed correctly and there is slack on the sling attached to the crane hook and plate grab.✓ Release the locking lever on the plate grab and remove from the plate.✓ Remove the sling by moving the latch on the crane hook.✓ Remove the sling from the plate grab by releasing the shackle.✓ (4)

5.2
- Check for cracks.
- Check for corrosion
- Check for wear
- Check for kinks
- Check for any damage to the structure (Any 4 × 1) (4)

5.3 Safe Working load (SWL) is the mass or force that a lifting equipment, lifting device or accessory can safely lift, suspend, or lower without fear of breaking. (2)

[10]

QUESTION 6

6.1 6.1.1 Stability reach is the distance of the jib head pin from the point of intersection of the nearest base line and the vertical plane passing through the centre line of the jib.

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

6.1.3 Margin of stability is the percentage additional load required to bring the crane to the condition of tipping when it is handling the safe Working Load at any raduis.

(3 × 2) (6)

6.2
- Locomotive crane
- Automotive crane
- Crawler crane
- Three-wheel industrial crane
- Forklift (Any 3 × 1) (3)

6.3 The tower is set up from two poles or masts with their bottom ends spread from each other and their top ends joined together.✓ Crossbars connect the two poles, forming an A-shaped tower.✓ The tower is anchored to the ground for support.✓ A boom is hinged from the lowest crossbar and extends outward and upward. The top end of the boom is connected to a pulley system, which is connected to the top of the tower.✓ Manipulation of the pulley system will allow the boom to change the angle against the tower.✓ Another pulley system is connected to the top of the boom to lift the load.✓ (6)

6.4 Hook a safe working load on the overhead crane and lift the load slowly from the ground and then stop.✓ Check if there is any movement of the load, if there is movement readjust the brakes until it is safe to lift the load.✓ (2)

6.5
- Ensure the gin pole is secured to the ground properly.
- Ensure the rope blocks are tightened correctly and securely.
- Ensure the rope moves freely and there are no defects.
- Ensure the gin pole is tighten properly at the top of the tower. (Any 3 × 1) (3)

[20]

QUESTION 7

7.1 7.1.1 A1 = L × B × 2
= 15 × 3 × 2
= 90 m²✓

A2 = L × B × 2
= 15 × 3 × 2
= 90 m²✓

A3 = L × B × 2
= 3 × 3 × 2
= 18 m²✓

At = A1 + A2 + A3✓
= 90 + 90 + 18✓
= 198 m²✓ (6)

7.1.2 M2 = ms × At✓
= 50 kg/m² × 198 m²✓
= 9 900 kg✓ (3)

7.1.3 Mt = M1 + M2
= 500 kg + 9900 kg
= 10 400 kg✓ (1)
[10]

TOTAAL: 100

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