

ITEM 17203.77 M - WIRE MESH SLOPE PROTECTION

DESCRIPTION

Design, furnish and install wire mesh and appurtenances on rock slopes as shown on the plans or as ordered by the Engineer.

SUBMITTALS

Submit shop drawings to the Engineer for approval not less than two weeks prior to the installation of the wire mesh slope protection. Do not begin work prior to approval. Provide drawings including the following:

- Proposed start date, completion date and detailed construction sequence.
- Details of the wire mesh and anchor layout on the existing slope.
- Proposed anchor drilling method and equipment including hole diameter, method of keeping holes open, and hole clean out procedures.
- Proposed anchor installation procedure including grout placement procedures, grouting equipment, and the procedure for setting the wire rope anchor centralizers.
- Method of verifying anchor capacity and equipment setup including details of the jacking frame and appurtenant bracing. Include the calibration data for the stressing device. The calibration shall be performed by an independent testing laboratory within 60 calendar days of the submittal date.

MATERIALS

1. Furnish eleven (11) gauges (3 mm diameter), single twisted, coated **steel wire mesh, with Class 1 (Zn-5Al) coating** conforming to ASTM F1345. The steel wire composing the mesh shall have a minimum tensile strength conforming to ASTM A817.
2. Furnish **galvanized mesh support cables** having a minimum diameter of 19 mm or as directed by the Engineer, 6 x 19 IWRC construction (or equivalent), conforming to the requirements of ASTM A741 Type II construction, Class A coating. Furnish fittings (including galvanized thimbles and wire rope clips) conforming to the requirements of ASTM A123M.
3. Furnish **galvanized 19 mm diameter wire rope anchors** conforming to the requirements of ASTM A741 Type II construction, Class A coating.
4. Furnish **concrete grout** conforming to the requirements of §701-05, Concrete Grouting Material.
5. Furnish anchor **centralizers** consisting of plastic, steel or any material not detrimental to the anchor. Do not use wood.

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6. Furnish the following **galvanized** appurtenances as supplied by the manufacturer:
 - a) 8 mm diameter **seam wire rope**, 7 x 19 Galvanized Aircraft Cable, conforming to the requirements of Military Specification MIL-DTL-83420 Type I, Composition A.
 - b) 25 mm x 101 mm **steel rings** conforming to the requirements of Federal Specification RR-C71D Type VI.
 - c) 19 mm **wire rope clips** conforming to the requirements of Federal Specification FF-C-450 Type I, Class 1.
 - d) 19 mm **thimbles** conforming to Federal Specification FF-T-276b Type III.

CONSTRUCTION DETAILS

1. Design the grouted wire rope anchors so that the design load (P) is at least equal to 134 kN.
2. Install grouted wire rope anchors with accompanying centralizers at the top of the rock slope on 3.5 meter centers or as indicated by Engineer. Mix grout per manufacturer's instructions. Wait a minimum of 7 days after grouting before applying any load to the anchors.
3. Proof test each anchor. Perform the proof test by incrementally loading and unloading the anchors to 1.5 times the design load (P). The alignment load (AL) necessary to maintain the stressing and testing equipment shall not exceed 0.05P. Record the anchor movements to the nearest 0.025 mm at each load increment. No part of the temporary yoke or load frame shall bear within 0.9 meter of the anchor. The proof test schedule is as follows:

Load
AL
0.25P
0.50P
0.75P
1.00P
1.25P
1.50P

Hold the load at each increment just long enough to obtain a total movement reading, but not more than one (1) minute except for the final load 1.5P which is to be held for 10 minutes. Start the 1.5P load hold time when the pump begins to load the anchor from 1.25P to the test load. Record total movement at 1, 2, 3, 4, 5, 6 and 10 minutes. If the movement between the one (1) and the ten (10) minute readings is 1 mm or more, maintain the test load for an additional 50 minutes and measure the movement. Record the additional movement at 15, 20, 25, 30, 45 and 60 minutes. Plot the movement versus load for each increment.

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An anchor will be accepted by the Engineer if the creep rate at 1.5P does not exceed 1 mm between the one (1) and ten (10) minute readings or for a load hold time of 60 minutes, the creep rate does not exceed 2 mm per log cycle of time. If an anchor fails the proof test, install a new anchor at no cost to the State.

4. Connect vertical wire rope tag lines to the anchors. Connect the horizontal support cable(s) to the vertical tag lines with steel rings as shown on the attached drawing for this specification. Do not draw cable taut. Maintain a minimum cable sag of 19 mm on the horizontal support cable between vertical tag lines.
5. Attach the mesh to the horizontal support cable by a continuous weave through each of the mesh openings with galvanized 8 mm seam wire rope, as shown on the attached drawing for this specification.
6. Install the wire mesh in vertical strips. Overlay horizontal and vertical laps a minimum of 0.3 meter and connect with a continuous weave through each of the mesh openings with galvanized 8 mm seam wire rope along the edge of the upper mesh strip. The mesh shall be installed in such a manner that the end of a roll curls into the rock face.
7. Install the wire mesh to cover the specified area of rock face.

METHOD OF MEASUREMENT

Measure the quantity of wire mesh as the number of square meters of rock face satisfactorily covered. No measurement will be made of wire mesh used in any overlap.

BASIS OF PAYMENT

The unit price bid for this item includes the cost of furnishing all equipment, materials, tools and labor necessary to complete this work, including anchor testing and disposal of any material removed from the slope.