

The finish coat shall be cured in a booth capable of maintaining 65 °C for two to four hours.

975.65 Touch Up and Repairs.

Should any damage occur to the galvanized coating during shipping or handling at the job site, the Contractor shall repair and touch up any damaged areas to the satisfaction of the Engineer and the following.

Touch up of galvanizing before finish coat is applied shall be accomplished by applying a galvanizing repair paint in accordance with Section M7.04.11. The dry film thickness of the applied repair paint shall not be less than 76.2 micrometers. Applications shall be in accordance with the Manufacturer's instructions.

Field touch up procedures shall conform to the recommendations of the Galvanizer. Touch up of the finish coat shall be by applying a coating of a two part urethane, as supplied by the Galvanizer, to achieve a dry film thickness of at least 76.2 micrometers. Prior to the application of the paint, remove all damaged coatings down to a solidly adhered coating and apply galvanizing repair paint as primer. Allow the primer to dry for at least four hours.

The Contractor shall also use the touch up paint material to paint the galvanized hardware used in the field erection of the railing that has not been finish coated previously.

975.66 Inspection.

Inspection may be done at the mill and/or fabricating plant by the Engineer or the Engineer's representative (verification inspector). The Contractor shall give sufficient notice to the Engineer when the work will begin so that the Department may arrange for inspection. No material shall be shipped to a project until the verification inspector affixes his/her stamp to the material. Material shipped without such stamp shall be rejected and immediately removed from the job-site.

COMPENSATION

975.80 Method of Measurement.

Metal bridge railings will be measured by the meter along the line and grade of the railing for the distance from outside to outside of metal end posts above the base plates or outside to outside of top rail, whichever is greater. Curved portion of railings shall be measured along the centerline of the top rail.

975.81 Basis of Payment.

Metal bridge railings will be paid for at the contract unit price per meter under the item of railing required, complete in place.

975.82 Payment Items.

975.1	Metal Bridge Railing (1 Rail), Aluminum (Type AL-1)	Meter
976.1	Metal Bridge Railing (3 Rail), Aluminum (Type AL-3)	Meter
976.2	Metal Bridge Railing (3 Rail), Steel (Type S3-PL2) - Galvanized	Meter

SECTION 983

REVTMENT

DESCRIPTION

983.20 General.

Revetment shall consist of slope protection of the required type at the location shown on the plans and in accordance with these specifications and in close conformity with the lines and grades shown on the plans or established by the Engineer.

983.21 Classification.**A. Dumped Riprap.**

This work shall consist of angular shaped stones dumped in place to form a well graded mass with a minimum of voids, in locations where damage may be caused by water conditions and below water level as a foundation for slope paving.

B. Riprap.

This work shall consist of a protective covering of angular shaped stones laid on slopes in front of abutments, wingwalls, piers and elsewhere as required, to insure protection of structures and embankments.

C. Slope Paving.

Slope paving shall consist of angular shaped stones, having a reasonably flat face, carefully placed on slopes to insure their protection.

D. Special Slope Paving under Bridges.

This special slope paving is intended for use on slopes under bridges where not in contact with flowing water and shall consist of quarry stone, precast concrete blocks or cement concrete masonry laid on slopes in uniform courses under bridges.

E. Channel Paving and Grouted Channel Paving.

Channel Paving, of the type specified, shall be placed as protective covering along the slopes around culvert inlets or outlets, around foundations, bridge berms and dikes.

F. Modified Rockfill.

This work shall consist of slope protection of ditches and at ends of cross-culverts.

MATERIALS**983.40 General.**

Materials shall meet the requirements specified in the following Subsections of Division III, Materials:

Dumped Riprap	M2.02.2
Modified Rockfill	M2.02.4
Riprap	M2.02.0
Slope Paving	M2.06.0
Special Slope Paving under Bridge (Quarry Stone)	M2.06.1
Special Slope Paving under Bridge (Precast Concrete Blocks)	M4.05.3
Channel Paving	M2.06.2
30 MPa - 40 mm - 335 kg Cement Concrete Masonry	M4.02.00
Reinforcing Steel	M8.01.0
Joint Filler	M3.05.3
Joint Sealer	M3.05.0
Crushed Stone for Drainage Foundation	M2.01.1
Mortar	M4.02.15

CONSTRUCTION METHODS**983.60 General.**

Areas to be protected by revetment shall be free of brush, trees, stumps and other organic material and be dressed to a smooth surface. All soft or spongy material shall be removed to the depth shown on the plans or as directed by the

Engineer and replaced with approved materials.

A toe trench as shown on the plans shall be dug and maintained until the revetment is placed.

Protection for structure foundations shall be provided as early as the foundation construction permits. The area to be protected shall be cleaned of waste materials and the surface to be protected prepared as shown on the plans.

Where shown on the plans a foundation shall be placed on the area before the stone is placed. The foundation will be specified as either gravel borrow or crushed stone and at least 300 millimeters in thickness.

983.61 Dumped Riprap.

Stone for riprap shall be placed on the prepared slope or area in a manner which will produce a reasonably well graded mass of stone with the minimum practicable percentage of voids and minimum thickness of 600 millimeters. Riprap protection shall be placed to its full course thickness at one operation and in such a manner as to avoid displacing the underlying material. Placing of riprap protection in layers or by dumping into chutes or by similar methods likely to cause segregation will not be permitted.

The larger stones shall be well distributed and the entire mass of stone shall conform approximately to the gradation specified in Subsection M2.02.2. All material going into riprap protection shall be so placed and distributed that there will be no large accumulations of either the larger or smaller sizes of stone.

It is the intent of these specifications to produce a fairly compact riprap protection in which all sizes of material are placed in their proper proportions. Hand placing or rearranging of individual stones by mechanical equipment may be required to the extent necessary to secure the results specified.

Unless otherwise authorized by the Engineer, the riprap protection shall be placed in conjunction with the construction of the embankment with only sufficient lag in construction of the riprap protection as may be necessary to allow for proper construction of the portion of the embankment protected and to prevent mixture of embankment and riprap material.

In no case will the elevation of the embankment be greater than 1.5 meters above the elevation of the riprap material.

983.62 Riprap.

The stones shall be placed upon an approved bed of gravel, crushed stone or other acceptable material, to the lines and grades shown on the plans and as directed.

Each stone shall be carefully placed by hand or machine, on a prepared bed, normal to the slope and firmly bedded thereon.

The larger stones shall be placed closely together and the intervening spaces filled with smaller stones in such a manner that the entire surface will form a compact mass.

983.63 Slope Paving.

The stones shall be placed upon an approved bed of gravel, crushed stone or other acceptable material, to the lines and grades shown on the plans and as directed. The larger stones shall be placed closely together throughout the surface and the interstices carefully chinked with smaller stones. All stones shall be securely bedded, with the exposed surfaces approximately parallel to and within 150 millimeters of the slope shown on the plans. When the paving cannot be laid to the required line and grade below water, a suitable foundation of dumped riprap shall be constructed.

983.64 Special Slope Paving Under Bridges.

A. General. This type of slope paving shall consist of either quarry stone, precast concrete blocks or cement concrete masonry and shall be firmly bedded on a 150 millimeter gravel foundation. The finished paving shall have a continuous surface of uniform appearance, approximately parallel to and within 75 millimeters of the slope shown on the plans.

B. Quarry Stone or Precast Concrete Blocks. The paving shall be laid in uniform courses with broken joints not exceeding 50 millimeters in width. The joints shall then be filled with sand or fine gravelly material to within 50 millimeters of the paved surface. Cement mortar (M4.02.15) shall then be placed in the joints to the top of the paved surface.

C. Cement Concrete Masonry. The paving shall be placed as specified in Section 901, the surface shall be finished as specified in Subsection 901.68C.

983.65 Channel Paving and Grouted Channel Paving.

All stones shall be placed upon an approved bed to the lines and grades shown on the plans and as directed. The larger stones shall be placed as closely together as possible throughout the surface. All stones shall be securely bedded and laid so that the exposed surfaces will be approximately parallel to and within 75 millimeters of the grade shown on the plans. The finished paving shall present a continuous uniform surface of stonework.

Grouting, when required, shall be done after the paving is completely in place. The paving stones shall be sprinkled with water immediately before placing the grout. The grout shall conform to Subsection M4.02.15.

983.66 Modified Rockfill.

Stone shall be placed on the prepared area in a manner which will produce a reasonably well graded mass with a minimum practical percentage of voids and a minimum thickness of 300 millimeters. The stone will be placed to its full thickness in one operation and in such a manner as to avoid displacing the underlying material.

It is the intent of these specifications to produce a fairly compact Rockfill protection in which all sizes of material are placed in their proper proportions.

Hand-placing or rearranging of individual stones by mechanical equipment may be required to the extent necessary to secure the results specified.

Unless otherwise authorized by the Engineer, the Modified Rockfill shall be placed in conjunction with the adjacent construction as shown on the plans.

COMPENSATION

983.80 Method of Measurement.

The quantity of Dumped Riprap, Riprap and Modified Rockfill shall be the mass of the stones.

Slope Paving, Special Slope Paving under Bridges, Channel Paving and Grouted Channel Paving will be measured in place by the square meter on the surface of the paved slope as constructed.

983.81 Basis of Payment.

No deduction from the excavation pay quantities will be made for stone taken from excavation and used in any type of revetment, provided that any additional filling material made necessary by such use shall be furnished as specified in Subsection 4.09.

Excavation below the original ground surface at the toe of slopes when required in the construction of revetment, unless otherwise shown on the plans, will be paid for under the Item for Class A Trench Excavation; but where the excavation is made along the slopes of an existing or proposed channel, such excavation will be paid for under the Item for Channel Excavation.

Excavation in cuts when required in the construction of revetment, will be paid for at the contract unit price per cubic meter under the Item of Earth Excavation or Bridge Excavation, whichever is applicable.

Gravel Borrow required in the construction of revetment will be paid for under the contract unit price per cubic meter for Item 151. Gravel Borrow, complete in place.

Crushed stone when required for foundation revetment will be paid for at the contract unit price per metric ton for Crushed Stone for Drainage Foundation.

The tonnage of Dumped Riprap, Riprap and Modified Rockfill will be paid for at the contract unit price per metric ton for the kind of stone required, complete in place.

Slope Paving, Special Slope Paving under Bridges, Channel Paving and Grouted Channel Paving will be paid at the contract unit price per square meter, complete in place.

983.82 Payment Items.

983.	Dumped Riprap	Metric Ton
983.1	Riprap	Metric Ton
984.	Stone and Stone Chips for Waterway Revetments, Groins, Jetties, Breakwaters and Mounds	Metric Ton
985.	Slope Paving	Square Meter
986.	Modified Rockfill	Metric Ton
987.	Special Slope Paving under Bridge - Option	Square Meter
987.1	Special Slope Paving under Bridge - Quarry Stone	Square Meter
987.12	Special Slope Paving under Bridge - Quarry Stone (Grouted)	Square Meter
987.2	Special Slope Paving under Bridge - Precast Concrete Blocks	Square Meter
987.3	Special Slope Paving under Bridge - Cement Concrete Masonry	Square Meter
988.	Channel Paving	Square Meter
988.1	Grouted Channel Paving	Square Meter
120.	Earth Excavation	Cubic Meter
140.	Bridge Excavation	Cubic Meter
141.	Class A Trench Excavation	Cubic Meter
143.	Channel Excavation	Cubic Meter
151.	Gravel Borrow	Cubic Meter
156.	Crushed Stone for Drainage Foundation	Metric Ton

SECTION 995

BRIDGE STRUCTURE

DESCRIPTION

995.20 General.

Work included in this section shall consist of constructing bridge structures in accordance with the designs and to the lines and grades shown on the plans, and in accordance with these specifications complete in place including the furnishing and installation of all materials that are part of the structures. The work also includes approach slabs, wing